In an ideal world, accurate prediction of anthropogenic impacts on the aquatic environment would be achieved by integrating three components: (1) an a priori census of a proposed human development, (2) a detailed knowledge of the surrounding ecological system, (3) a clear understanding of the interaction between (1) and (2). Changes in these characteristics may lead to drastic change in the aquatic environment, and an ultimately affect the community of aquatic biota. A detailed account of water pollution and its effect on soil environment have been presented in “Pollution and Biomonitoring of Indian Rivers” (Trivedy, 2000). With reference to this, a good amount of work has been carried out by many scientists on the ecology of polluted rivers. “Water Pollution, Laws and Remedies presented by Sahay et al., (2002) deals with various types of water pollution and major sources of pollution of Indian rivers. Similarly, a detailed account of river pollution has been given in Ecology of Polluted Water” by (Kumar, 2002). Although, the benthic organisms provide a valuable indicator of past and present water quality conditions and prove to be the most useful in the assessment of pollution, the distribution of the benthic fauna in the intertidal sediments is much less known than that of vegetation (Eisma, 1998). Bioindicators and Biomarkers of Environmental pollution and Risk Assessment Published” in Aquatic Environment quality Monitoring” (Jamil, 2001) was also reviewed.

Studies on the effect of various industrial effluents on Damodar River Ecosystem, west Bengal was Undertaken by Ghatak & Konar (1992). The Physico-Chemical and Biological characteristics of Damodar River water (W.B, India) was found gradually changed due to toxic effects of various industrial effluents. The concentrations of DO, Alkalinity, Phosphate and Hardness of river water were significantly decreased but CO₂, was found significantly increased (P<0.05) at various sampling stations. This also
resulted in reduction of planktonic Population (both zooplankton and Phytoplankton) and also bottom organisms significantly.

Study on the waste water purification in Tanghe sewage reservoir based on the characters of benthos community is done by Jiang and Mugi (1995). Based on the theory of pollution ecology, the pollution situation in waters can be reflected on the characters of local aquatic biological community structure and distribution of dominant species. The result of investigation showed the existence of purification capability to certain extent in this sewage reservoir.

Bhasker et al., (2003) have studied the Physico-chemical and bacteriological parameters on certain locations of the river Torsa and reported that the water was highly alkaline with high concentration of free ammonia. Gupta and Pankaj (2006) reported organic pollution of River Gomati due to anthropogenic activities. The sewage from many parts of Tripur and discharged from the surrounding areas, gets into Noyyal river, which are responsible for the decreased in water quality. Okendro and Mahanta (2007) described chloride, bicarbonate alkalinity and pH are indicators of three significant component viz., animal waste, sewage, and industrial discharges in to the Narmada river. Verma and Khan (2007) reported that rapid urbanization and increased anthropogenic activities have been deteriorated the water quality parameter of Arpa river water of Bilaspur in Chattisgarh. Majority of water characteristics of River Gomati at Sultanpur (Uttar Pradesh) were found to exceed the permissible limits due to sewage discharge and posed problems for the survival of the aquatic life and human beings. The river also continuously receiving daily sewage, domestic and municipal and industrial waste water from the city.

The ecological significance of heavy metals as stress by some earlier workers (Keith and Telhard, 1979., Purves, 1985) could be due to their toxicity and cumulative behaviors with serious public health implications
Unlike other pollutants they are not biodegradable hence undergo a global ecobiological cycle (Nurnberg, 1984) in which natural waters are the main pathways. Many hazardous substances discharged into the aquatic environment are known to accumulate in river and estuarine sediments (Forstner and Muller, 1973).

For copper, varying values in different seasons were obtained in a study conducted by Venugopal et al., (1982). Regarding the fate of such metals in estuarine waters studied by (Gibbs, 1973., Dunicker and Nolting, 1976). Flocculation and sedimentation of colloidal and fine material in suspension may cause a net settling of trace elements (Dyer, 1972). A net sedimentation of metals in estuaries was also reported by Turekian (1971).

Presented by Alexander (1965) in which he gave the information regarding microbial ecology, soil environment and their ecological inter-relationships. However, some of the investigators have reported details regarding the physical properties of soil sediments and soil in relation to environment and inhabiting organisms. Out of few such available literatures, “Soils and The Environment; An Introduction” (Wild, 1996) and “Analysis of Soil Physical Properties” (Majumdar and Singh, 2002) have been reviewed. A similar study was done by (Agarwal, 2005).

Anand (2002) encompasses various aspects of algal taxonomy, physiology and ecology further concentrating more on the problems of environment like pollutants and their effect on phytoplankton, biology of algae with reference to uptake and accumulation of metals and detoxification mechanism in algae, heavy metals effects in aquatic food chain, restoration of eutrophic lakes and biofouling and biocorrosion by algae and their controls. Hydrobiology of inshore waters of Bay of Bengal and nutritional studies of dominant planktonic diatoms have considerably added to the knowledge of phytoplankton ecology. Long term hydrobiological studies on the eutrophication of the Lake at Ooty was studied. The role of Diatoms in
bioaccumulation, biotransference and biomagnifications of heavy metals and locations of metallothioneins as detoxification mechanisms in diatoms was also reviewed.

**Pillai (1986)** stated that compared to the information gathered on the plankton of the temperate water, especially of the North Atlantic, that on tropical plankton is meager. These are unfortunate since the Plankton community of the tropical waters is quite different from, and far richer in variety than, the temperate water plankton.

The study of meiofauna is a late component of benthic research, despite the fact that meiobenthic animals have been known since the early days of microscopy. While the terms macrofauna and microfauna had been long established, it was not until 1942 that “meiofauna” was used by **Mare** to define an assemblage of mobile or hapto-sessile benthic invertebrates distinguished from microbenthos by their small size.

Studies on the role of benthic organisms reveal that the “small food web” comprising of micro-organisms like protozoan, microphytobenthos, and smaller metazoans which play a dominant role in the turnover of organic matter (**Kuipers et al., 1981**). In “Pollution and Marine Ecology” by **Olson and Burgess, (1967)** an extensive study on the meiofauna and benthic animals had been described. “The Estuarine Ecosystems” by **Mclusky (1981)** also deals with the similar studies on meiofaunal organisms. **Ansari et al., (1982)** gave the distribution of meiobenthos and microbenthos at the mouth of some rivers of India. Similar studies was done by **Ramanamurthy and Kondala Rao (1986)**. The details on benthic communities have been reported by many workers, viz; **Nybakken (1988)** had given a detailed account of benthic associations with special reference to meiofaunal organisms, their composition and adaptations in relation to surrounding environment in Marine Biology-An ecological Approach”. Similarly **Funch et al., (2002)** gave the major taxa representing meiofaunal communities.
However, the studies on Benthic communities are scanty in Indian water bodies, some of the investigators have reported the details on Indian meiofauna.

Meiofauna could be better indicators of environmental stress than macrofauna due to their smaller size, shorter generation time, and a life-style almost always limited to the benthos (Fenchel, 1967). Studies on meiobenthos, the motile microscopic fauna of aquatic sediments, are gaining an importance, revealing trophic cycles and allowing the impacts of anthropogenic factors to be assessed (Giere, 1993).

Meiobenthos often show an aggregated spatial distribution within the sediment stated by Rodrigues et al., 1982. Further according to Moens et al. (1999), the meiofauna of estuarine and marine sediments typically have a strong heterogeneous distribution, with pronounced horizontal patchiness. The patch sizes are defined on a range from Km to subcentimeter scales, with the larger scales related to the abiotic gradients was carried by Findlay, 1981 and Moens et al., 1999. In Thane creek the meiofauna was very abundant but did show an increasing trend from the river to the middle region of the creek thereafter marginally declining towards the seaward end. But on the whole despite the fluctuations, the trend was increasing towards the sea. These observations corroborated with the findings of Annie Mathew (1989) for the subtidal zone of the same study area. This shows a substantial influence of physical disturbance on the meiofaunal organism.

Study of Meiobenthos communities of some sub-arctic lakes is done by Skvotsov in 1997. Meiobenthos communities of 19 relatively small Tundra lakes (area 0.2-320 hectare) were studied during summer seasons of 1986-1988 and 1993. Benthic Cladocera and Chironomidae are more vulnerable to the effect of oil pollution. They were only abundant at unpolluted and low polluted localities of the lake bottom. Cyciopoda is the
most resistant component of the meiobenthos communities. Their abundance was highest at most polluted localities.

Study on the effects of a short term environmental change of a brackish water polychaete community is carried out by Giangrande and Fraschetti (1996) in Acquatina lake with a mean salinity of 26 ppt. An abundance in the biomass of fifteen polychaete species due to obstruction of freshwater inflow to the lake causing an increase in salinity up to 40 ppt. This is also followed by some changes in the polychaete community. Notomastus latericevs became dominant and abundance of the other species decreased except for Naineris laevigata. Salinity assumed normal values after 3 months, but community response slowly because the massive presence of N.latericeus inhibited the recovery of other species. An abiotic disturbance, followed by a biotic disturbance, altered the structure of the polychaete community.

Sinha & Das (1993) studied the effects of organic waste on macrozoobenthos in Ganga at Patna (Bihar) during the years 1984&1985. The distribution and abundance of 5 groups of benthos viz., Polychaeta, Oligochaeta, Insecta, Gastropoda and Pelecypoda and Correlated the population with the Physico-Chemical parameters such as temperature, pH, DO, BOD, COD, Chloride, Sulphate. Their studies revealed that at the entry point of Ganga at patna near Digha a diverse group of organisms were present with a maximum diversity index of 1.9. As the river passes along the city of Patna and receives domestic discharge from various points, it becomes heavily polluted with organic pollutants specially near Antaghat, where, monoculture of tubificids was noticed with few insect larvae like Chronomus sp, Psychoda sp etc.

Kurihara (2007) reviewed that an increase in CO\textsubscript{2} concentration leads to a rise in CO\textsubscript{2} concentrations and a decrease in pH of the ocean surface
water due to continues gas exchange between air and sea water, which may have serious impacts on neretic marine organisms.

At present, many more scientist devoted themselves to the research of meiofauna, with topics ranging from studies using meiofauna, with topics ranging from studies using meiofauna as biological indicators, macrofauna-meiofauna-bacteria relationships, meiofaunal biology and physiology, to community ecology and systematic taxonomy. Studies using meiofauna and nematodes in pollution monitoring are still of importance and some new methods have been proposed, such as the use of maturity index to reflect the state of the sediments environment (Bongers, 1990).

Although many new meiofaunal species have been described in the last century, many new species are still being discovered and publications are still forthcoming (Huang and Zhang, 2004., Huys and Mu, 2008). The most important progress for meiofaunal research is the introduction of molecular techniques, fatty acid profile and stable isotopes analyses into the studies of phylogenetic taxonomy and functional ecology of these animals. Since Blaxter et al., (1998) produced a molecular evolutionary framework for the phylum Nematode, many articles have been published on the Molecular, phylogenetic systematics of nematodes (Derynke et al., 2005).

Synchronous sampling for macrofauna, meiofauna shows that meiofaunal patterns are more often co-related with bacteria and the protein concentration than with macrofaunal patterns indicating a potential utilization of bacteria as a major food source by meiofaunal organisms (Papageorgiou et al., 2007). In addition DNA barcoding techniques have the potential for the straight foreword identification of meiofauna, which will enable their use in environmental monitoring (Bhadury et al., 2006).

(1981) studied particulate and dissolved trace metals in Narmada and Tapi rivers. Physico-chemical parameters and productivity were estimated in Tapi estuary by Ragothaman & Reddy (1982).