**General Introduction**

The hydrobiology of marine ecosystem plays an important role in predicting, locating and exploiting the marine fishery resources. Hydrobiological features of any coastal ecosystem control the phytoplankton community dynamics by determining species composition, species seasonality, species biomass and productivity biomass (Jayasiri and Priyadarshani, 2007; Harris 1986). Predominantly, the planktonic organisms are restricted to neritic zone due to abundance of nutrients, sun light penetration, and favourable physico-chemical characteristics of the water column viz., sea surface temperature, dissolved oxygen, salinity, hydrogen ion activity of the water column etc. (Santhosh Kumar and Perumal, 2011a). Any of these hydrobiological factors affecting the plankton productivity directly affects the plankton feeders such as commercial fishes (Robin *et al.*, 2010) and health of the coastal ecosystem mainly depends on plankton community. Zooplankton is the primary consumers of the oceans and grazes on the phytoplankton.

Phytoplankton productivity will determine the zooplankton productivity of any aquatic ecosystem. Zooplankton themselves act as vital food source for large marine organisms such as sharks, whales, fin fishes and some species of rays rely on zooplankton for their nourishment by feeding on copepods zooplankton (Santhosh Kumar and Perumal, 2011b). Population of fish and other aquatic organisms are reported to be greatly influenced by hydrobiological condition of the fishing zone (Selvin Pitchaikani and Lipton, 2012; Biswas *et al.*, 2009). Fish production and fish catch from natural sources is determined by three important factors such as:

1. Inherent environments and climate of a region, which decide the structure and functions of the ecosystems (Vivekanandan and Krishnakumar, 2010; Stergiou, 1999);
2. Fishing (Devaraj *et al.*, 1997; Srinath, 2003) and
3. Other human induced interferences like pollution, climate change etc., on marine environment and climate (Vivekanandan and Krishnakumar, 2010).

The productivity of a specific water body depends on the amount of plankton present in the same water body (Guy, 1992). The plankton growth and distribution depend on the carrying capacity of the environment, availability of the inorganic nutrients and the physico-chemical parameters of the coastal waters. All these factors in turn collectively support the fishery resources of coastal ecosystem. Any changes including depletion on the physical, chemical and biological parameters would therefore affect the health of the coastal ecosystem and alternatively reduce the fishery and fish productivity.

This complies with the general ecological trend that seasonal variations in ecological parameters could eventually exert profound effects on the distribution and population density of both animal and plant species as suggested by Odum (1971).

Coastal ecosystem, bays and estuaries are productive habitats used by a variety of fishes and other organisms (Qasim, 1973 and Yanez-Arancibia, 1985). Almost 60% of the world fish catch is taken from coastal ecosystems (Lie, 1983). A number of marine fishes congregate in this zone for reproduction, feeding and shelter. Coastal and nearshore ecosystems are some of the richest areas of marine biodiversity globally (Stewart et al., 2010). Since human populations has increasing, fishing pressure in coastal areas also exaggerate drastically. Coastal fisheries are playing an important role in the economics and livelihoods of people around the World (Begossi, 2006). However, during the past one decade, there has been a growing issue concerning the sustainability of fisheries worldwide. Hence, Integrated Coastal Zone Management (ICZM) project is being implemented in coastal states of India with the objectives of conserving and protecting the coastal resources; managing the environment and pollution aspects and to ensure the livelihood security of the coastal communities.
Offshore and deep sea fishing is carried out with the help of specialized kinds of fishing gears and vessels in addition to the coastal fishing. Coastal fishing is generally limited to 11 to 16km distance from the shore and total contributed shelf area of 0.5 million km$^2$ along the 7516km coastline of India (Zacharia et al., 1997).

Despite of this, very little information is available on the fish fauna of the Indian coast, and their seasonal occurrence in bays and estuaries, hydrobiological study with special emphasis on biological productivity in traditional fishing grounds were initiated. Hydrobiological study is a pre-requisite in any aquatic system for the assessment of its potentialities and to understand the realities between its different tropic levels and food webs (Damotharan et al., 2010).

The physico-chemical and biological characteristics along the northern part of Gulf of Mannar from Rameswaram to Tuticorin were extremly studied earlier. However, scientific studies are only limited in Southern part of the Gulf of Mannar (From Tuticorin to Kanyakumari) and there was no study reported from Tiruchendur coastal waters. Considering the need to evaluate coastal water quality conditions and biological fertility of Tiruchendur to understand the health of the coastal fishing zones and fishery productivity for the sustainable utilization of the coastal fishery resources and coastal zone management the present work was undertaken. The primary objective of the present investigation was to describe and evaluate the hydro-biological conditions and its influence on coastal fisheries of the Tiruchendur coast and to understand the current scenario of the coastal ecosystem. It is expected that such studies will be useful to understand the impact of seasonal changes on the coastal ecosystem and coastal fisheries.

In general, seasonal changes in tropical region would affect the physical, biological, and biogeochemical characteristics of the coastal water column on different spatial and temporal scales. Such changes have crucial consequences for the conservation of marine
ecosystems, and thus for their role as suppliers of goods and services, including for fisheries on which billions of people rely for their subsistence. Discharge of effluent waters into coastal area and changing of weather pattern resulting changes in current pattern in coastal water bodies influences coastal water quality characteristics, fisheries and other marine organisms through the modification of habitat characteristics, affecting the organisms to the extent that the physical, chemical and biological conditions that influence their productivity, development, nourishment, reproduction and distribution are altered (Martinez et al., 2011).

Increase in the sea surface temperature is expected to impact coastal and marine ecosystems by influencing metabolic rate of organisms and alter ecological processes such as productivity and species interactions (Roessig et al., 2004). Extremes in environmental factors, such as elevated water temperature, low dissolved oxygen, salinity, and pH, can have deleterious effects on fishes (Moyle and Cech, 2004).

Apart from these, presently, the Indian coastline is facing increased human pressure like over exploitation of marine resources, dumping of industrial and toxic wastes, oil spills and leaks which have resulted in substantial damage to the marine ecosystem. Added to this, coastal seasonal (weather) changes will also continue to impact coastal fish stock and fish catch. This in turn will affect the livelihood of coastal fisher folk and national economy.

In order to study the hydrobiological condition of the marine ecosystem, it is essential to assess the water quality characteristics, nutrients, population density of phytoplankton, zooplankton and fish catch of the coastal ecosystem. Gulf of Mannar is a very important marine biosphere in the world due to the presence of unique marine organisms and coral species (Kumaraguru et al., 2006). Meteorological fluctuations are expected to influence the seasonal changes consequentially affects marine fisheries productivity because of changes in water temperature, ocean currents and other ocean conditions (Pauly et al., 2002).
The expected impacts of meteorological change will be seen first on the distribution and abundance of pelagic fishes (Hobday et al., 2006). Changes in the weather patterns, would affect the rainy season and shifting of seasonal cycles such as monsoonal shift, it leads to affect the fresh water discharge. Hydrobiological factors are mainly governed by the monsoon and river systems flowing into the coastal waters causing seasonal fluctuations in salinity, dissolved oxygen, sea surface temperature and nutrients (Zafar, 2007). Changes in the meteorological variability influence the coastal ecosystem in many ways.

Among the meteorological variabilities, temperature is the key factor, as it controls the sea surface temperature. Surface water temperature is a key variable with regard to the distribution, abundance and metabolic activity of fishes. Since fishes are poikilothermous, changing water temperature will affect the physiological activity and it leads to decline of biodiversity of fishes (Biswas et al., 2009). In aquatic environment, phytoplankton acts as primary producer and their growth is an important process which depends on the concentration of nutrients in water along with external factors such as temperature and light illuminations (Scavia and Park, 1976; Groden, 1977; Desormeau, 1978; Park et al., 1979; Biswas et al., 2009). The pelagic fishes are not particularly diverse; there are approximately 260 pelagic species, out of 12,000 marine species worldwide. Air temperatures are expected to increase ocean warming, most significantly in the upper layer 500 – 800 m (Bernal, 1993; Roessig et al., 2004). It causes a rise in sea level, higher sea surface temperature and a weakened thermocline which is associated with reduced primary productivity (Miller and Fluharty, 1992) and subsequent impact on pelagic fisheries. Extremes in environmental factors such as elevated water temperature, low dissolved oxygen or salinity and pH can have deleterious effects on fishes (Moyle and Cech, 2004).

The environmental conditions of Gulf of Mannar are unique, mainly because of the coral reefs, sea grass beds and mangroves, which act as spawning and feeding grounds and
shelters for many species of economically important finfish and shellfish. The Gulf of Mannar ranks among the remarkable place in the world due to its rich biodiversity resources. It encompasses the territorial waters of the southeast coast of India, from Dhanushkodi in the north to Kanyakumari in the south. Palk Strait is the northern boundary of Gulf of Mannar and southern boundary is the Indian Ocean at Kanyakumari (Kumaraguru, et al., 2006).

The Gulf of Mannar is influenced by seasonally reversing surface circulations patterns due to both southwest and northeast monsoons will have a concerted effect on the ecology of these oceanographically important areas. Due to this reversing surface current pattern, the waters of Gulf of Mannar are transitional between the oceanic conditions of Arabian Sea and coastal conditions of Palk Bay (Rao et al., 2008, Jagadeesan et al., 2013). It is mentioned worthy here that, GOM has a chain of 21 islands stretching from Mandapam to Tuticorin to a distance of 140 km along the coast and supports a wide variety of flora and fauna of economically importance comprising of 117 species of corals, 641 species of crustaceans, 731 species of molluscs, 441 species of fin- fishes, 147 species of seaweeds and 52 species of sea grasses (ICMAM, 2005).

An overall fish landing in Tamil Nadu during 2011 has increased corresponding to 2010 with the estimated landings of 6.04 lakh tonnes (CMFRI Annual Report, 2011-12). Likewise, 7.1 lakh tonnes of total fish landings were recorded during 2012, which showed 13% of increasing compared to 2011. It is clearly understood that, fish catch in Tamil Nadu coast shows increasing trend. In the total catch, the pelagic contributed 51.44 %, demersals 34.1%, crustaceans 8.7% and the molluscs 5.9%.

Thamiraparani is the only perennial river discharging regularly fresh water to the Gulf of Mannar at the point of Punnakayal, nearer to the study area (about 15 km north of the study area). There are other minor rivers, which bring in freshwater only during the northeast
monsoon season and that too only in small quantities. Therefore, the influence of freshwater drainage on the salinity of Gulf of Mannar waters is only limited.

Substantial scientific studies have been carried out in Gulf of Mannar from Rameswaram to Tuticorin, however, study related to hydrobiological and coastal fisheries are scanty in southern part of Gulf of Mannar; and there is no similar study in Tiruchendur coastal area (southern part) of Gulf of Mannar.

Hence, there is a need to investigate coastal water quality, ecology and biological fertility of Tiruchendur to provide vital ideas regarding possible future changes. Considering these, in the present study, hydrobiological characteristics of the fishing grounds and its influence on the fish catch and fishery productivity were analysed. Hence, Tiruchendur (Amali Nagar) fishing village has been chosen for the present study. Amali Nagar is a fishing village in Tiruchendur coastal town (Lat: 8.29.19 and Long: 78.26.62) in the Thoothukudi District of Tamil Nadu. It is located in between Thoothukudi and Kannyakumari and situated in the bank of Gulf of Mannar, Southeast Coast of India. The present study was carried out at three traditional fishing grounds off Tiruchendur coast, Gulf of Mannar for the period of two years January 2009 to December 2010, with the following objectives:

- To understand the physico-chemical conditions of the traditional fishing grounds.
- To study the hydrobiological characteristics on the biological productivity of the coastal ecosystem.
- To understand the phytoplankton species composition in the fishing grounds.
- To understand the zooplankton population density and its species composition together with the role on the fishery productivity.
- To estimate the fish catch, fishery productivity patterns in the fishing grounds to estimate the sustainable fish catch of the Tiruchendur coastal waters.
Review of Literature

Physicochemical parameters

Coastal area is the most dynamic and productive ecosystem and are also foci of human settlements, industry and tourism. The water quality of coastal environment is playing a major role in the health of the ecosystem. Physical, chemical and biological characteristics of the coastal waters exert influence on marine biota of the coastal ecosystem. Hydro-biological characteristics are indeed vital water quality parameters for monitoring due to their instability (Efe et al., 2005), where significant seasonal variations in physico-chemical parameters affect the coastal water quality and coastal fisheries in many ways. Likewise, seasonal variations of plankton dynamics and the time dependent changes in plankton biomass are the results of complex interplay of physical, chemical and biological process. Alternatively, changes in these factors could be affecting the fishery productivity and it leads to affect the livelihood of the coastal fishers.

In tropical region on the earth, seasons are based on monsoons and different physico-chemical parameters altered by the rate and extent of admixing of coastal water with varying quantities of freshwater discharged by rivers. The distribution and behaviour of nutrients in the coastal environment, mainly in the near shore waters and estuaries, exhibit considerable variations depending upon the local conditions such as rainfall, quantum of fresh water inflow, tidal incursion and also biological activities (Satpathy et al., 2010). Bearing in mind, various studies carried out on physico-chemical parameters and biological parameters collectively called hydro-biological factors and its role on coastal productivity have been studied in east and west coast of India (Jeyaraman 1951, 1954; Ramamirtham and Patil 1964; Sankaranarayana and Reddy 1968; Rajendran et al., 1980; Panigraphy et al., 1984; Sasmal et al., 1986; Choudhury and Panigraphy, 1991; Kumar and Manivannan 2001; Rajasegar et al., 2000; Venkataraman and Wafar 2005; Sridhar et al., 2008; Ramkumar et al., 2010; Satpathy
et al., 2010; Govindasamy et al., 2012) and their impacts on the occurrence and abundance of phytoplankton population (Varshney et al., 1983; Prasannakumar et al., 2002; Rajkumar et al., 2009; Madhupratap et al., 2003; Thillai Rajasekar et al., 2010; Damodharan et al., 2010).

An investigation on hydrobiological conditions and its influence on zooplankton composition of Ayyampatinam coastal region of Tamil Nadu have been studied by Santhosh Kumar and Perumal (2011b). The impact of coolant water discharge on hydrobiological characteristics of Tuticorin coastal waters were studied by Selvin Pitchaikani et al., (2010). Choudhury and Panigraphy, (1991) investigated on seasonal distribution and behaviour of nutrients in Greek and coastal waters of Gopalpur, India: and opined on the near shore and estuary water characteristics and exhibited considerable seasonal variations depending on the local conditions of rainfall, various abiotic and biotic processes, fresh water inflow affecting the nutrient cycle of different coastal environment.

Species composition and seasonal variation in phytoplankton abundance were studied by many workers (Ramadhas, 1977; Rajkumar et al., 2009; Sridhar et al., 2006; Thillai Rajasekar et al., 2005 & 2010; Geetha Madav and Kondalarao, 2004; Rajasegar et al., 2000; Perumal et al., 1999). Physico-chemical properties of the ambient marine environment will play pivotal role in determining the type of ecosystem (Govindasamy et al., 2012).

In Indian waters, numerous studies on physico-chemical characteristics and heavy metals have been carried out by many workers (Murugan and Ayyakannu, 1991; Saraladevi et al., 1991; Ananthan et al., 2008; Perumal, 1993; Reddi et al., 1993; Satpathy, 1996; Sampathkumar, 1992; Kannan and Kannan, 1996; Sampathkumar and Kannan, 1998; Subramanian and Mahadevan, 1999; Rajasegar et al., 2000; Santhanam and Perumal, 2003; Karthikeyan et al., 2004 and 2007; and Saravanakumar et al., 2008). Physico-chemical characteristics of Muthupet environment were investigated by Sankar, (1998); Kannan et al., (2003); Paramasivam and Kannan (2005).
Seasonal changes in the chemical conditions of coastal waters could be altering biological conditions of the ecosystem and it leads to distress the final consumer of the food web. Seasonal variability of physical, chemical and hydro-biological properties of inshore waters of Gulf of Mannar have been studied by many authors, however few important works were furnished here. Hydro-biology of marine ecosystem plays an important role in predicting, locating and exploiting the marine fishery resources (Asha and Diwakar, 2007). Considerable information is available on the hydrography of the Gulf of Mannar (Marichamy and Pon Siraiyetan, 1979; Gopinathan and Rodrigo, 1991). Selvin Pitchaikani et al (2010); Santhanam and Venkataramanujam, (1996) investigated hydro-biological characteristics of Tuticorin coastal waters. Marichamy et al., (1985) has summarized the hydrology and plankton productivity in the inshore waters off Tuticorin. Manimaran and Ramadhas, (1989) investigated on the Phosphorus enrichment in Tuticorin coastal water.

Phytoplankton abundance and composition in aquatic ecosystems are regulated by abiotic factors such as, nutrients related to physico-chemical variability and biotic, trophic interactions (Sin et al., 1999; and Lewis, 2000). The growth of phytoplankton in tropical regions depends on ambient nutrient levels more than other environmental factors (Morris et al., 1980; and Al-Jassabi and Khalil, 2006). However, the relationships between phytoplankton dynamics and environmental changes are still poorly understood in many regions of the world (Miretzky et al., 2002). Studies on phytoplankton composition and community structure were carried out in Ariyankuppam estuary and Verampattinam coast of Pondicherry by Ananthan et al., (2008). Sarupriya and Bhargava, (1998) investigated on seasonal primary production in different sectors of the EEZ of India. Sridhar et al., (2010) recorded spatial and temporal variations in phytoplankton in coral reef and sea grass ecosystems of the Palk Bay, Southeast Coast of India. Sridhar et al., (2006) reported the seasonal behaviour of distribution of phytoplankton in the Palk Bay region of South India.
It is worth mentioning that Reynolds (1993) has stated that the changes in species composition and dominance of phytoplankton can be mediated by a variety of mechanisms including ambient temperature, light penetration, nutrient supply and removal by zooplankton etc.

Lee et al., (2007) studied about the influence of the East Australian current eddy filed on phytoplankton dynamics in the coastal zone and quantified the oceanographic and meteorological conditions leading to nutrient enrichment and subsequent phytoplankton responses (bloom) through a series of cross shelf flux studies undertaken over spring and summer seasons in the 1990’s along east coast of Australia. Hallegraeff and Reid (1986) indicated two distinct peaks in productivity related to surface layer nutrient maxima in the austral spring (September-October) and bottom layer nutrient maxima in late summer (February-March) in Australian coastal waters. Hallegraeff (1983) documented that combinations of chemical and physical factors that control basic bloom conditions and their location, specific interrelationship between species are important considerations. Banse et al., (1996) studied the possible causes of the seasonal phytoplankton blooms along the southeast coast of India and reported that the seasonal increase of nutrient supply preliminary increased the growth rate of the phytoplankton. Growth of phytoplankton in the coastal ecosystem is frequently limited by the availability of inorganic macro nutrients and limiting nutrient concentrations vary with season, location, solar radiation (Jane, 2007; Fisher et al., 1992). Generally, the nitrogenous (N) nutrients limitations prevails in most marine systems (Fisher et al., 1992; Howarth, 1988 and Jane, 2007) except for the North Pacific sub-tropical gyre, where phosphate (P) is reported to play the major role on the productivity and act as limiting element (Karl, 1999).

Elevated or increasing ocean temperatures will undoubtedly affect marine ecosystems and reduce fishery productions (IPCC, 2001). Chen et al., (1999) suggested that bottom
waters of the Sea of Japan might even become anoxic as early as 2200. The environmental variables such as temperature, salinity, ocean currents, upwelling strength, pollution, diminishing wetlands and nursery areas as well as predation patterns, can sharply alter the marine food chain and fish productivity IPCC (2001) and Ji et al., (2001).

Dickey and Simpson (1983) found that in clear water; about 35 percent of the net surface insolation penetrates below five meters. Various studies have been carried out by many authors on SST oscillation around Indian seas (Premkumar et al., 2000; Madhupradap et al., 1996; Darbyshire, 1967 and Sanilkumar et al., 2000).


**Phytoplankton**

The community structure and abundance of phytoplankton are usually controlled by the physicochemical parameters viz. sun light, temperature and availability of inorganic nutrients in the water column. From the earlier studies in various parts of the world ocean, it was understood that most species are usually undergo a moderately predictable annual cycle; however, some species may develop suddenly forming blooms. Phytoplankton are ranging from 0.2 µm to several millimetres, including diatoms, dinoflagellates, phytoflagellates, coccolithophorids, green algae, red algae and blue green algae. Around 50,000 species of diatoms recorded in marine and fresh water environment (Thomas, 1997). Phytoplankton
successions and community composition reflect the environmental conditions of the coastal ecosystem, among which, availability of nutrients plays a significant role on the productivity of the phytoplankton (Jane, 2007).

Phytoplankton succession and community composition reflect the environmental conditions of the ecosystem, and among which the availability of nutrients plays a significant role (Jane, 2007). Andersen and Sørensen, (1986) reported the plankton food web in the Limfjorden in Denmark.

Various studies have been carried out with special emphasis on impacts of seasonal changes on phytoplankton (Blackburn, 2005; Boyd, 2002; Boyd and Doney, 2002; Edwards et al., 2006; Edwards and Richardson, 2004). Copious studies on phytoplankton in Indian coastal waters were carried out by Santhanam, 1976; Vasantha, 1989; Raman et al., 1990; Patterson Edward and Ayyakannu, 1991; Murugan and Ayyakannu, 1991; Gopinathan et al., 1994; Ananthan, 1995; Satpathy and Nair, 1996; Perumal et al., 1998; Rajkumar et al., 2009; Ananthan et al., 2008; Saravanakumar et al., 2008a. However, few works have been conducted with respect to hydrographical conditions in Gulf of Mananr.

**Zooplankton**

Several works have been carried out on species composition and structure of zooplankton, in estuaries and coastal waters of India (Madhupratap, 1987; Govindasamy and Kannan, 1991; Sampathkumar, 1992; Ambikadevi, 1993; Kumar, 1993; Gothandaraman, 1994; Ananthan, 1995; Krishnamurthy and Naidu, 1977; Goswami, 1996; and Ananthan et al., 2008). Robin et al., (2009) explored the distribution pattern of zooplankton in the southern part of Kerala in the Arabian Sea and stated that copepods and decapods were the higher forms production during ebb tide.

Zooplankton plays a significant role in energy transfer through marine pelagic food web and hence their ecology and dynamics received worldwide attention (Godhantaraman,
Thirunavukkarasu et al., (2013) documented zooplankton composition and community structure in Nari backwaters in Tamil Nadu. Due to small body size, micro zooplanktons have higher weight specific physiological rates such as feeding, respiration, excretion and growth than large zooplankton (Verity, 1985). They efficiently feed on pico and nanoplankton that are generally unutilized by large zooplankton and act as a significant food source for a variety of fin and shell fishes from pelagic to demersal fishery (Robertson and Blabber, 1992). The temporal, spatial and tidal dynamics of the zooplanktonic community of the Mondego estuary studied by Marques et al., (2007) suggested that abundance, biomass and diversity of the zooplanktonic community are strongly influenced by the hydrological circulation pattern. Pershing et al., (2005) investigated interdecadal variability in zooplankton community structure in Gulf of Maine with fishery recruitment and concluded that correlation between fish recruitment and zooplankton changes is not conclusive, unclear and warrants further study.

**Fisheries**

Seasonal changes influences the fishery productivity through the modification of habitat characteristics, affecting the organisms to the extent that the physical, chemical and biological conditions that influence their productivity, development, nourishment, reproduction and distribution are altered. Various studies have been carried out by many authors on impact of climate change on benthic and demersal fishes (Gillett and Thompson, 2003; Pauly et al., 1998; Perry et al., 2005; Ware, 1995; Thresher, 2002). Hendiarti et al., (2005) investigated on the seasonal variation of pelagic fish catch and their relation to the coastal processes responsible for them around the island of Java. Hughes (2003) stated that warming and greater climate extremes could alter primary production, regional currents and water quality, which may cause a change in fish migration, abundance, growth and survival. Andrade and Garcia, (1999) studied the relationship
between fish catch with oceanographic and climate variability in Southern Brazilian coast. Zeeberg et al., (2008) documented that the strong seasonality of Sardinella sp abundance apparent from catch is connected with the upwelling-dominated SST cycle.

Pauly (1997) highlighted the potential of historical scientific trawl survey data to assess the status of coastal demersal fisheries resources in Western Indonesia. Hoguane et al., (2012) reported on the impact of rainfall on artisanal fisheries catch in Mozambique waters and stated that rainfall causing exports of nutrients that enrich and generate new production in coastal waters. Meynecke et al. (2006) found correlation between total catch of fish with one or two years lagged response to rainfall events in Queensland. Ogawa and Nakahara, (1979) studied the interrelationship between pelagic fishes and plankton in the fishing ground of Japan Sea. Impacts of climate changes on pelagic fishes were studied by many workers (Bakun and Weeks, 2,004; Chavez et al., 2003; Block et al., 2003; Hobday, 2001; Hobday and Matear, 2005; Jacobson et al., 2001; Pecl and Jackson (2005); Ward et al., 2006; Young and Hobday, 2004. Vinayachandran et al., (2004) studied the biological response of the sea around Sri Lanka to summer monsoon and recorded that high chlorophyll ‘a’ occurred around Sri Lanka during summer monsoon and presented the first evidences for coastal upwelling in this region. IPCC, (2007) IPCC’S fourth assessment report highlights that the impacts of climate change will affect a wide range of species and may threatened at the level of ecosystem functionality.

Quinones and Montes, (2001) recorded the relationship between fresh water input to the coastal zone and the historical landing of the benthic / demersal fish Eleginopsmaclovinus in central-south Chile. Several authors have stated that marine fish are likely to be less affected by an increase in oceanic CO2 and a corresponding decrease in pH compared with invertebrate groups, such as molluscs and corals (Orr, 2005). However, laboratory studies have revealed that manipulation of pH and CO2 can have dramatic consequences on the
physiology, metabolism, and reproductive biology of fish, with egg fertilization and survival of early developmental phases being primarily affected (Ishimatsu et al., 2005).

The majority of the scientific studies carried out in northern part of Gulf of Mannar encompassing the chain of 21 islands (Kumaraguru et al., 2006). Information on the southern part of the Gulf of Mannar is limited. So, the present study on “Hydrobiological fluctuations and fish productivity patterns in traditional fishing grounds off Tiruchendur coast, Gulf of Mannar” gains importance.