CHAPTER. 01:

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1.1INTRODUCTION:

Aquatic biodiversity, which spans around 75% of the earth's surface and it is one of the most diverse types of biodiversity. Because of its importance to the earth's metabolism, it has an impact on global change's physico-chemical and biological processes. In order to successfully manage global aquatic living resources, such as fisheries, it is also important to understand the functioning of aquatic ecosystems, their many types of habitats, and how they adapt to global change (Barad, 2012).

It encompasses our rivers and streams, ponds and lakes, seas and bays, swamps and marshes, and the organisms that live in them. They have developed and adapted to aquatic environments throughout millions of years, and they are still evolving now. Plants and animals that live in aquatic settings have access to food, water, shelter, and space that are important for their existence. The more habitat diversity there is, the more biodiversity there will be. So, coastal estuaries and mangrove swamps are edge ecosystems that connect salt- and freshwaters, trapping nutrients that allow them to maintain an incredible diversity of aquatic plants and creatures. An ocean's biodiversity is much greater than the biodiversity of a drop of water. From the poles to the equator, species variety tends to increase, as does rainfall and elevation. Compared to the surrounding mainland, islands tend to have a lesser species richness (Barad, 2012).

Overall, there are three types of aquatic ecosystems. 1) Marine - In the water, physical, chemical, and geological differences create a complex of habitats known as marine ecosystems. Near-shore habitats are the most productive, whereas the bottom of the deep sea is inhabited only by highly specialized creatures. Environmentally and economically, marine ecosystems are critical to humans, supplying various essential products and services and supporting the processes that maintain the biosphere as a whole. 2) Freshwater - In addition to providing humans with food and other living resources (such as medicinal plants and fuel), it also serves important ecological functions such as primary production and the provision of three-dimensional habitat as well as

biogeochemical recycling, pollutant remediation, and population control. 3) Brackish water– Brackish wateris an intermediate zone between marine and fresh waters which faces dramatic changes in temperature, salinity, and turbidity, and are regarded as one of the most dynamic aquatic habitats for fishes. Brackish water / estuarine ecosystem plays an important role in ichthyofaunal life cycles. Estuarine zone is a home to many fish
species as well as important breeding and nursery ground for certain fishes as it provides nutrient rich food and protection (Whitfield, 1994).

When we talk about biodiversity, we're talking about the variety and quantity of life in each region. The most frequent form of diversity is species diversity, which refers to the number of species occurring in a specific region (Gray, 1997). Many different levels of species variety exist, from the level of individual species to that of ecosystems and ecological components. Genetic, taxonomic and ecological diversity characterize marine environments (Ray and Grassle, 1991). Around 71 % of the Earth's surface is covered by ocean and major seas, with a coastline of around 1.6 million km, which offers up to more than 99 % of the space accessible for life in the eco-system (Brahmane et. al., 2014). A total of 123 nations has coastal and marine ecosystems. These ecosystems are comprised of estuaries, lagoons, dunes, near-shore coastal regions, and open sea environments. In terms of overall ocean area, the Indian Ocean is the third-largest ocean, with a 29% share of the total (Venkatraman & Raghunathan, 2015). Along with Bangladesh, Indonesia, the Maldives, Malaysia, Myanmar, Thailand and Sri Lanka, India is the largest and most important country in the central Indian Ocean area (Gopi & Mishra, 2015). Arabian Sea on one side, Bay of Bengal on another, and Indian Ocean to India's south are three different marine ecosystem zones in central Indian Ocean marine area (Gopi & Mishra, 2015). Andaman-Nicobar and Lakshadweep Islands are among India's coastal habitat (Venkatraman & Raghunathan, 2015). Water-dwelling lower chordates may have developed into fishes. Terrestrial vertebrates originated from fishes. Most vertebrates belong to the phylum of fishes, which is distinguished by a wide range of morphological and biological adaptations.Around 50 species of Chondrichthyes fish are classed as Agnatha (jawless fishes), while there are around 600 species of Osteichthyes (bony fishes) that dominate with 30,000 species, with the majority of them belonging to the ray fined group.Eels, minnows, suckers, and catfish; sharks and rays; sturgeon and gars; salmon and trout, herring-like fishes; eels, minnows, suckers, and catfish; The most common fishes include flying fish and their

relatives, flatfish, Seahorses and relatives, cod like fish mullets, silversides, and barracuda, tunas, and mackerels.

According to Dulvy et. al., (2003) genetic variety in the fish population, which may help them protect themselves from numerous environmental stressors and the development of illness. By 2021, the IUCN Red Data List estimates that 22,005 extant fish species will have been surveyed (IUCN Red List version 2021-1) 3,210 species have been identified as threatened. Out of all the species, 79 extinct (Ex), 10 extinct in wild (EW), 121 critically endangered (CR(PE) - possibly extinct), 06 critically endangered (CR(PEW) - possibly extinct in wild), 707critically endangered (CR), 1,108endangered (EN), 1,395vulnerable (VU), 01 lower risk/conservation dependent (LR/cd), 628 near threatened (NT - includes LR/nt - lower risk/near threatened), 4,251 data deficient (DD), 12,881 least concern (LC - includes LR/lc - lower risk/least concern) are recorded (IUCN, 2021).

For many countries, fisheries and fishing are a major source of revenue and employment. Due to the development of new technology to boost the yield per unit area of water and due to its function in earning foreign money, the importance of fisheries in the Indian economy is increasing speed. Another way to deal with unemployment and malnutrition in India's rural is to properly and strategically utilize local resources, with the help from the people who live there. (Datta and Kundu, 2007).

Indian marine fisheries growth is dependent on the rational utilization of the potential yield in India's Exclusive Economic Zone (EEZ) (2.02 million sq. km) (Vyshnavi, and Venkata Rao, 2016). Aside from maximizing fish output, the development of fisheries must improve the nutritional status of the population and the socio-economic status of the fishermen. - There is a social and economic backwardness among Indian marine fishermen as a whole. Marine fisheries innovations including new technology be both economically and technically efficient as well as socially acceptable in order to increase the output from the capturing and culture sector, There is a need to examine the socio-economic, environmental, and ecological effect of every technical development, financial plan as well as management practiceSocio-economic characteristics such as family size, age structure and job potential as well as educational and living conditions of fisherman can assist identify the obstacles preventing development plans from reaching their full potential and new technologies from being adopted.

Not only is it important for a country to have a healthy fisheries industry, but its resources and products are essential for human nutrition and employment as well. Fisheries resources are also significant since they are self-renewable. Fisheries and other biological resources have a far longer shelf life than mineral resources because they are well-managed. An essential conclusion is that biological features provide the fundamental basis for conservation and management of fisheries resources.

As one of India's maritime states with 11 coastal districts, Gujarat has the longest coastline as well as the widest continental shelf in the Arabian Sea, due to the fact that it is the furthest from the shore than any other part of the country, and the continental shelf in this part of the Arabian Sea is the furthest from the shore than any other part of the country. About 1640 km of coastline includes 173 landing locations. Approximately 164,000 km² of the shelf are in the depth range of 0-60 meters, which may be utilized by both traditional and automated boats. When it comes to coastal contributions, Saurashtra accounts for more than 90% of the fish output in Gujarat State (Barad, 2012). The state of Gujarat produced 7.88 lakh tons of fish in 2012-13, valued Rs.5,130.68 crore. Total fish output in the state is made up of 87.96 percent marine fish. Statewide, there were 36,770 fishing boats with 24,612 being motorized and 12,158 being non-mechanized (Statistical Report CoF, Gujarat, 2020). There were 2,420,000 metric tonnes of seafood exports in 2012-13 (CMFRI, 2013).

On the other hand, a few country craft with outboard engines had been in service since 1953. In 1956, the first automated boats equipped with inboard engines were introduced at Veraval, one of the state's most significant fishing harbors. The traditional fisheries, however, accounted for most of the state's catches until the end of the 1960s. It wasn't until around 1970 that things began to change, when a growing number of commercial fishermen began using trawlers, Dol neters and gill nets. The improvement in boat design and kinds, as well as the development of motorized fishing vessels, are largely responsible for the development and increase in marine fish output in India and its coastal region. According to their manner of operation, traditional fishing gear is divided into five categories: seine nets, gill nets, encircling nets, bag nets, hook & lines, and traps, to name a few (Pillai et al., 2000). Gill net fishing dominates in Gujarat, and fishing vessels include mechanised boats, traditional craft (plank-built boats) with IBM and OBM, and FRP dugout canoes. 28 villages were in the Kutch region, followed by Valsad (23%), Junagadh (13%),

Jamnagar (11%), and Surat (8%). Less than 7% of the communities in the rest of the district are in each of the other districts (Balan et al., 1987).

Sutrapada is a fishing village in the Gir-Somnath district of Gujarat, which is a municipality. Sutrapada is 92 kilometers from Junagadh, the district's capital, and 14 kilometers from Somnath. This area is known for the Gujarat Heavy Chemicals LTD (GHCL) factory, which is the world's largest producer of "Soda Ash." For the locals, fishing is an important source of income. About 300 families work in fishing and related industries. "Koli-Kharawa" is a primitive Hindu community that makes its living through fishing. Sutrapada Bunder is a fishing community about 1 km from the main Sutrapada village, where all the fishermen have moved in. Approximately 272 households are involved in fishing and related activities. 90.5 percent of respondents reported fishing as their only occupation, 5.4 % had fishing as their primary occupation and non-fishing was secondary, and 4.1 % had non-fishing as their primary occupation and fishing as their secondary occupation. As a result, they have a restricted amount of knowledge and resources (Sehara, et. al., 1986).

Ichthyofaunal diversity accounts for roughly half of all vertebrate species, with 35,797 genuine fish species worldwide (Fricke et al., 2021). Many species of teleost fishes exist in freshwater, but the most of fishes inhabit in marine water. Freshwater and marine water that are both regarded to be stenohaline contain the bulk of Teleost fish (Schultz & McCormick, 2013). The rest of the teleost fishes (less than 10%) are euryhaline fishes, which are able to migrate between fresh and saltwater habitats (Nordlie, 2015). Aquatic species from both fresh and saltwater habitats make for 9.7% of India's total ichthyofauna population (Eschmeyer & Fong, 2014). Day (1899 a, b) There are 1418 different species of fish in 342 genera in British India. Talwar (1991) described that Ichthyofaunal diversity is represented by 2546 species in 969 genera, 254 families, and 40 orders. An estimated 3231 freshwater, brackish water and marine species have been discovered recently in India. (Gopi & Mishra, 2015). There are 2443 species in sea water and 675 species in freshwater, making up the overall fish variety (Gopi & Mishra, 2015) and there are roughly 113 species in brackish water (Sarkar et al., 2012). The post-independence period in Gujarat saw few isolated research conducted by a few individuals. Ranade (1952) published a checklist for Baroda district freshwater fishes. In 1973, Ramachandran published a list of marine and freshwater fishes of Gujarat. Well along, the Gujarat Fisheries Aquatic Science Research Institute carried out identification and description of marine and freshwater fish. Patel and Chhaya (1979) published a

field key to the identification of fishes in Gujarat. Later, various studies were conducted on the diversity of the fish fauna found in marine habitat across the Gujarat coast line (Koya and Vivekanandan, 1992; Brahmane et al. 2014; Katira and Kardani, 2017; Joshi et al., 2018; Tank et al., 2019; Sidat et al., 2021). But there were no studies reported from the Sutrapada Coast which is second largest fish landing center of the Gir-Somnath District. Thus, the study was planned to observe the Ichthyofaunal diversity and fisheries status at Sutrapada Coast.

1 REVIEW OF LITERATURE:

The variety of fish species is referred to as ichthyofaunal diversity. As a country with a relatively small land area, India is one of the world's seventeen mega biodiversity countries. As a result, species diversity within a species population is included in the variety of fish (Johnson et. al., 2016). About 7.4 % of the world's marine fish resources come from India, which has 2492 marine fish species out of 33,059 species. The marine fishes make up 76 % fish variety in India, with 2492 species in 941 orders and 240 families (Joshi et. al., 2017). Small Goby fish (up to 8 mm in length) to the *Rhincodontypus*, Whale Shark, were among the marine fishes that might be found there (may be reach up to 12 m) (Joshiet. al., 2018). With 1431 species, the Andaman and Nicobar archipelago has the most fish variety in India's maritime waters. India's coastal waters are home to 91 species of indigenous marine fishes. According to the IUCN Red List, around 50 marine fish species found in India are threatened, while another 45 are Near-Threatened and on the verge of extinction (Joshi et. al., 2017). Damsel fish, butterfly fish, sweet lips and angel fish are all found in India along with snappers (42 species), wrasses (53 species), groupers (43 species) and surgeon fish (18 species).

There have been extensive studies on the Freshwater fishes of India, notably by, Hamilton (1822); Shaw and Shebbeare (1937); Hora (1921a, b, 1930, 1937, 1939, 1940, 1943, 1951, 1953); Misra (1959); Menon (1974, 1999); Dey (1973); Jayaram (1981, 1999); Sen (1982); Sen (1985); Talwar and Jhingran (1991); Nath and Dey (2000); Dey and Kar (1989a, b, c, 1990); Kar and Dey (1986, 2000, 2002); Kar and Barbhuiya (2000a, b; 2004). But most of them were concerned with taxonomy, biology, and aquaculture (Kar *et. al.*, 2006).

More than, 2701 new marine fish species identified in the previous 20 years (from 1990 to 2009) have been confirmed as genuine by the Catlog of Fishes. As a result of this, the number of new marine species is on the rise (average of 119 per year for 1990-1999 and 151 per year for 2000-2008). 2,500 new species will be described in the next 20 years, and another 2,500 in the next 20 years (Eschmeyer et al., 2010).

Bhattacharya & Dutta (2012) has done work onfisheries condition of the undivided Goalpara district in Assam.Numerous landing sites in the district have recorded 97 species from 56 genera and 26 families. Winter fishing intensity was also highlighted.According to Mondal and Patra's (2015) study of the fish fauna in Purlia district in West Bengal, they found 52 species in 8 orders and 20 families. A total of 23 species of Cypriniforms are found in the world, followed by Siluriform with 15 species, and Perciformes with nine species.

Seafood and marine fisheries are vital to coastal communities' economies and well-being, ensuring food security and livelihoods as well as maintaining their traditional cultural identity. When it comes to fish production, they produced 80 million metric tonnes in 2009 and directly employed 34 million people in fishing activities in 2008 (FAO, 2010). Especially in the world's poorest nations, fish and fishery products constitute an essential and inexpensive source of high-quality protein. In 2008, fish provided at least 15 percent of the average animal protein diet for more than 3 billion people worldwide (FAO, 2010). Marine fisheries are therefore important from a political as well as an economic and ecological standpoint. The United Nations Convention on the Law of the Sea (UNCLOS), the United Nations Fish Stocks Agreement (UNFSA 1995) and the FAO Code of Conduct for Responsible Fisheries (FAO, 1995a) fisheries must be maintained or re-established at levels that allow them to generate their maximum sustainable output (MSY).When it comes to these international agreements, fisheries management authorities must analyse the status of fish populations and create policies and management plans that will help them reach their objectives. An agency of United Nations (UN), FAO has a responsibility to provide the world community with accurate information on marine fisheries resources, which it does. West Africa is one of the world's most varied and commercially significant fishing regions.Marine fishing has been a major source of foreign money in the West African region as landings have grown from 600,000 tonnes of fish landings in 1960 to 4.5 million tonnes by 2000. Fishes are also very popular commodities in the market, and they are among Africa's most valuable exported products, with an

annual export value of about USD 3 billion dollars. African marine fisheries have been increasingly exploited in recent years.

A study conducted by Gupta (1984) and Srivastava (1985) looked at the marketing of fish and fisheries products in India.According to Rao (1983), an efficient fish marketing system might remove some of the malnutrition pockets by delivering fish at affordable rates to individuals living below the subsistence level. When it comes to the economics of fisheries and livelihood in the coastal belt of West Bengal, Saha (2016) has worked on a collection of inter-related themes, such as economic analysis of sustainability of fisheries in its different forms.

Bhsavakumar et. al., (2011) Fishermen's status may be enhanced by adopting improved fishing and fish farming practises and by providing education, according to the research on the socio-economic condition of a hamlet in Dharwad, Karnataka A study conducted by Biswal et. al. (2017) in Gir Somnath, Gujarat, examined social well-being and common management failures in small-scale bag net fishing. The town of Saiyad Rajpapra, as well as the adjacent ports of Simar and Navabandar, are the three primary bag net landing locations.Due to the favorable aquatic conditions of strong currents and shallow bottom, bag net fishing is a frequently practiced stationary fishery in the area. Two metal pipes linked to the sea bottom secure the funnel-shaped bag net with a wide mouth and a closed tail end with a smaller mesh size, which is put in the opposite direction of water movement within the water. For example, the study identifies ways to improve education and skill development so that there is a greater chance for career diversity. Renewed commons institutions may be more likely to flourish if local capability in these areas is strengthened.

To stimulate the usage of 30 and 32-mm-mesh tiny mesh gill nets, Thomas and Hridayanathan (2003) conducted a catch analysis of the small mesh gill nets. From March 1998 to February 2000, data was collected weekly from beach road Kannamaly in Cochin. We used the following mesh sizes for gill nets: 30 mm. Depending on the availability of fish, the fisherman employed a variety of mesh sizes at different times of the year.Gill net mesh sizes of 34, 36, and 38 mm utilized nearly all year round. In gill nets of all mesh sizes except 30 and 32 mm, the majority of fish collected. Whereas adult fishes juveniles of seer and Polynemas were captured in all mesh sizes whereas mackerel were caught at a smaller size.

Recently, gillnetting, a centuries-old method of fishing, has seen a dramatic surge in use (Luther et al., 1997). Giblets are rectangular netting walls that are suspended in the water column by means of floats or sinkers. Floats, sinkers, buoys, and buoy lines are all part of the net. According to the size of the target species and the size of the operational region, the needed number of units is linked end-to-end. An individual fish is captured when it attempts to pass through the gill net's single mesh and is gilled in the gill area. The gear is termed a "gill net" for this reason. Simple, energy efficient, and highly selective, gill nets are the most widely used fishing gear. It is possible to use the nets in both inland and coastal waters (Pravin et al., 2011).

Construction, operation, and depth of operation are used to categories gill nets. To classify them based on the manner of construction, there is the basic gill net, the vertical-line net, the frame net, and the trammel net. A set gill net is a type of fishing net, whereas drift nets and encircling nets are gill nets that are used at a shallow depth (Hameed and Boopendranath, 2000).

In Gujarat's fisheries industry, gill nets account for a large percentage of fish output. Many small-scale or municipal fishers who use OBM gillnets live below the poverty line, according to research.As a result of a lesser level of mechanization, fisheries infrastructure in rural regions is likewise less developed. Traders and middlemen exploit rural fishermen since they are unable to purchase, own, and operate motorized boats and must rely on 'middlemen' to dispose of their catch.More research and secondary data revealed the socio-economic situation of the fishing community. It is difficult to determine the economic state and catch trends of OBM gillnetters operating off Sutrapada fishing harbour since there are no conclusive scientific records available.

The drift gillnet fishing off Cochin was examined by Silas et al. (1984) in their study. Samples were taken in Cochin Fishing Harbor in 1981 and 1982 to determine the composition of catches on a daily, monthly and annual basis. Each week, the Fisheries Harbor was visited on four separate occasions, for a total of 16 field sampling days every month. Random sampling of the catch and species composition was used to keep track of the catch and effort data on a regular basis.By multiplying average catch weight per unit on observation days by number of units in operation on that day, and then multiplying that result by the total number of fishing days for that month, we may estimate the monthly species composition and capture. We computed price per pound and boat income by calculating number and price per fish in each lot in a boat. After interviewing 25

boat owners and fishermen, we were able to gather information on the cost of the boat, net, and other accessories, as well as operational expenses.During both years, the most productive months were April and July to October, with the exception of May in 1982. There were 2,476 and 1,849 tonnes of drift-gillnet landings in 1981 and 1982, respectively. This means that the yearly landings in 1982 were 25.3 percent lower than in 1981, indicating a substantial decline in the annual landings. From 109.3 kg in 1981 to 93.2 kg in 1982, the yearly catch per unit effort fell.

In 1986-87, Sehara and Karbhari (1989a) conducted research on the economic efficiency of OBM units operating gill nets in the northwest coast of Maharashtra and Gujarat. A sample of 20 units was used to get the data. The specifics of the craft, gear, labour, infrastructure, credit, marketing, preservation of catch, fixed cost, operational expenditure, catch composition, and price of fish were gathered and analysed by the team of researchers.It was determined that the majority of fish caught in gill nets on the northwest coast were Pomfret, Seer Fish, Catfishes and Sharks as well as Hilsa (Croakers), Silver Bar (Parches) and Ribbon Fishes (Parches). Other economically important species of gillnet fishing include lobster during the post-monsoon at Dhamlej and prawn during the monsoon at Kochra-Nivti. At Kochra-Nivti, the yearly catch per unit was computed at 14,773 kg, and at Dhamlej, it was calculated at 16,947 kg. According to Kochra-OBM Nivti's gill net unit's gross yearly income, it comes to Rs. 1,16,932.After subtracting operational costs (Rs. 88,643) from the gross income, a boat owner earned Rs. 28,289 for the year in question. For a 212-day fishing season, an OBM gill net unit at Dhamlej brought in Rs. 1,49,256. As a result of subtracting operational costs from residual revenue, the owners' net profit came to Rs. 2,939, or roughly 2% of the gross income.

"Gillnet fishing by automated boats and profitability in selected places in Maharashtra" by Sehara and Karbhari (1989b). Mechanized gillnetters were studied from September 1986 to August 1987 in two major centres on the Maharashtra coast. The data was collected from selected units and analysed month-by-month for different parameters like fishing days, catch composition, quantity and value of catch, operating costs and net returns.Accordingly, factors were compared and pooled to provide yearly results. Pomfret was the most important fish, accounting for 12-30% of the total catch each year. Seer fish, catfish, shark, hilsa, croakers, and silver bar were among the other important species. Forty-five to sixty percent of annual revenue came from pomfret sales alone.To be exact, 43-45% was available in the post-monsoon quarter, whereas the winter and pre-

monsoon quarters each had 28-30%. Post-monsoon quarter brought in 41-42% of income, whereas winter and pre-monsoon periods brought in 28-30 percent each.

Data and Dan (1992) analyzed the economics of gillnet fishing in West Bengal and came up with a model. Between May 1983 and April 1984, the field research was conducted. Digha and Frasergunj were chosen for the cost of income and return on investment research because only at this center is fishing done practically all year round. In each centre, a random sample of 20 mechanized and non-mechanized units was taken. Mechanized gillnets caught 70 to 250 kg of fish each trip at Digha, and 33 to 44 kilograms of fish per trip in Frasergunj, whereas non-mechanized gillnets at Digha caught 60-131 kg of fish per trip.There was an average catch of 183 & 40 kg each year in gillnets. Comparatively, a year's worth of non-mechanized gillnet capture averages 93.5 kg. Mechanized unit gross earnings (per trip) in 1983-84 were Rs. 1355.53, while non-mechanized unit gross earnings were Rs. 209.43.

It was estimated by Mohamad and Khan (1986) that between 1979 and 1982, Veraval's Gillnet Fishery caught about a million fish. A minimum of 10% of the boats gathered data on effort, catch, and species composition. On each sample day's effort, catch and species composition were calculated, which were then weighted to generate the monthly numbers for each sampling day. Overall catch was virtually the same despite an increase in fishing effort.Fish such as elasmobranchs (26 % catch), clupeids (25.8%), pomfrets (11.1 %), Chirocentrus species (8.8 %), seer fish (7.6 %) catfish (5.6 %), tuna (3.2 %), ribbon fish (3 %) and carangids (3%) dominated the capture (2 %). The abundance of *Hilsa toli*, *Parastromateus niger*, *Chirocentrus dorab*, *Scomberomorus guttatus*, and carangids, on the other hand, was on the rise. A decent fishing season usually begins and ends in September-October, and May-June.

The research done by Koya and Vivekanandan (1992) examined the landings of several fish species by gillnet along the Veraval coast between 1982 and 1990. There were two types of vessels studied: wooden or FRP dugout canoes with outboard engines and planked boats with inboard engines. Their data showed that the overall catch peaked in September (4,925 t) and was followed closely by April (4,039 t). After 9 years, OBM's fleet grew from 18,482 boats to 26,476 canoes! On the other hand, the number of IBM boats in operation dropped from 9,211 to 6,622.

Among other things, Luther et al. investigated the gillnet fishery in India (1997). The Fishery Resources Assessment Division (FRAD) of the CMFRI supplied data on state-by-state gillnet landings from 1989 to 1992, which was used to investigate production trends, state-by-state contribution, catch, catch per effort, and species composition. These findings are from economics research conducted out from July 1991 to June 1992 in Madras and Tuticorin. The gillnet landed 2.9 - 3.5 lakh tonnes of marine fish accounting for 15 % of the total marine fish landings in India during 1989-92. With an annual capture rate between 110 and 220 kg, large-mesh fisherman's nets account for 65-79 percent (avg. 71%), or 65-79 percent of the total fisherman's net landings (Av. 113 kg). For example, the tiny mesh gillnet had a CPUE of 26-41 kg and contributed 21-35 percent (Av.33 kg).

Saurashtra trawl fisheries were examined by Sehara and Karbhari in 1991. Porbandar's key landing places were studied. As a result, three types of questionnaires were created to collect information on the centre, boat & gear, as well as cost & income of fishing activities, among other things They found that a trawler fishing expedition lasted 4-6 days. Trawlers of various sizes had crews of 5-8 people. As a result of this study's trawl fisheries, roughly 90% of the catch consisted of shrimp, lobsters, croakers and cephalopods.There were an average of 45 trips every fishing season, excluding the monsoon season (June-August). The yearly catch was computed at 67,790 kg, which is worth Rs. 4,53,638 in rupees. Over the course of the research, a single trawl trip brought in an average gross profit of Rs. 10,081. The total cost each trip was determined to be Rs. 9,582, while the net profit per unit was found to be Rs. 232.

Mangalore is known for its deep-sea fishing with gillnets and hook and line gear (Rohit et al., 2006). As you can see, it's a little different from the typical motorized vessels of the area. With 125 horsepower engines, they are rounder in front and have a larger deck area. Having an 800-meter length, the net typically consists of 20 to 23 panels, each with a mesh size of 110 to 140 millimetres, and is made up of 20 to 23 panels in total. As you can see, each panel has a 36 m length. In order to make the net, nylon twine (no.1) must be utilized. 100 to 200 floats are needed to keep the net from sinking.Sharks, seer fish, billfishes, tunas, perches, lances, etc., were the most common species caught. Scoliodon, Rhizoprionodon, Pristis and Alopias were among the shark genera. *Scomberomorus commerson* and *Acanthocybium solandri* were the most common seer fish species. Six species of tuna were present. *Katsuwonus pelamis*, *Euthynnus affinis*, *Auxis thazard*,

Sarda orientalis and *Thunnus tonggol* were the top five species. There were two species of *Istiophorus platypterus* and one species of Makaira indica among the bill fishes represented.Fishermen from Mangalore harbors use drift-gillnets to catch seer fish and tunas. Mechanized gillnets, on the other hand, caught bigger fishes than hand nets.

The research by Koya and Vivekanandan (1992) on gill net fishing off Veraval between 1982 and 1990 was conducted. For gill net fishing, two types of vessels are used: wooden and FRP dugout canoes (without a motor) and plank-built boats (with a motor). Gill nets utilised include Kandari (surface drift net; mesh size: 65-85 mm) and Jadajal (mesh size: 170- 215 mm). Additionally, during the monsoon, a specialized net called Dakkal (surface or bottom drift net with a mesh size of 140-160 mm) is employed exclusively for Pomfret.The number of OBM canoes in service grew from 18,482 in 1982 to 26,476 in 1990. In contrast, the number of IBM boats in service dropped from 9,211 to 6,622 throughout the same period. There were 4,192 tonnes and 381.2 kilograms/100 nets in the average yearly catch. Seer fish and Pomfret landed a lot in the years 1985, 1989 and 1990. Elasmobranchs landed a lot also. Topping out at 4,925 t in September, April had the second-highest overall capture (4,039 t).

During 1983, the economic condition of the fishermen in some selected villages of Maharashtra and Gujarat were evaluated. The illiteracy rate ranged from 48 to 75% and among the literate'smajority had primary education only. The size of the family was 7-8 and the earning members in different categories were 40-59%. The number of annual fishing days ranged from 200 to 244. The average annual net fishery income for mechanized group, non-mechanized group, gear owners, fishery and allied group was Rs. 10000, Rs. 4500, Rs. 3800 and Rs. 3500 respectively in Maharashtra and Rs. 12000, Rs. 5600, Rs. 4400 and Rs. 3500 respectively in Gujarat. Significant difference in annual Income was observed between categories and between villages. For different categories 53-91% of the total Income in Maharashtra and 57-91% in Gujarat were obtained from fishery. The proportion of total income spent on household items ranged from 60 to 94% in Maharashtra and 57 to 93% in Gujarat. In Maharashtra, 62-84% and in Gujarat 58-78% of the total number of families in different categories were indebted. The average outstanding loan per family was about Rs. 4000 in Maharashtra and Rs. 3000 in Gujarat. The regression analysis showed that one rupee increase in operational fishing expenditure was responsible for Rs. 0.15 and Rs. 0.13

increase in net fishery Income in Maharashtra and Gujarat respectively (Narayanakumar *et. al.*, 2000).

The importance of fisheries in a country cannot only be measured by the contribution of the GDP, but one must also take into consideration that fisheries resources and products are the fundamental components of human feeding and employment (Cadima, 2003). As per the Central Marine Fisheries Research Institute report Gujarat is top fish producing state in India, this highest landing rank was maintained by Gujarat since from last 4 years constantly (CMFRI, 2017). They reported that in the year of 2016 landings of Gujarat state was 0.77 mt, which contributed around 21.32% to the total fish landings of India. In Gujarat, the Gir-Somnath district contributes the maximum landings of marine fishes, i.e., 0.34 lakh tones approx. The number of estimated living fish species might be close to 28,000 in the world. Day has described 1418 species of fish under 342 genera from the British India. Talwar, P. K. (1991) has described 2546 species of fish belonging to 969 genera, 254 families and 40 orders. The distribution of marine fishes is rather wide, and some genera are common to the Indo-Pacific and the Atlantic regions. 57 percent of the Indian marine fish genera are common to the Indian Ocean and to the Atlantic and Mediterranean. The exact number of species associated with coral reefs of India is still to be found, however the number of fishes in Indian Ocean is 1367 species. The Lakshadweep Islands have a total of 603 species of fishes191. Over 1000 species are found in the Andaman and Nicobar Islands and about 538 in the Gulf of Munnar Biosphere Reserve. The categories of fishes occurring in coral reef ecosystem of India includes groups such as the damselfishes (52 species), butterfly fishes (32 species), sweet lips (16 species), angelfishes (16 species), parrot fishes (14 species), snappers (42 species) and most of the wrasses (53species), groupers (43 species) and surgeonfish (18species). Another 20% are composed of cryptic and nocturnal species that are confined primarily to caverns and reef crevices during daylight periods. (Venkataraman and Raghunathan, 2015).

In the marine fisheries sector of India, there are 194,490 numbers of crafts. Out of these 72,559 numbers (37.3%) are mechanized,71,313 numbers (36.7%) are motorized and 50, 618 numbers (26.0%) are non-motorized. It is also observed that 167,957 numbers of crafts are owned by fisherfolk. 52.6% of them are non-motorized, 24.2% are motorized and 23.1% are mechanized. From the mechanized crafts owned by fishermen, 28.9% are trawlers, 42.8% gillnetters and 19.1% dol-netters (Kumar & Shivani, 2014).

2 LACUNA:

The marine biodiversity conservation in India requires such mitigatory steps such as assessment of its status, identification of hotspots and threats to them. Despite a huge knowledge base on the biodiversity of Indian Coast, still some lacuna persists. There are some stretches of coastal zones in India which are still unexplored or under explored on several aspects of biodiversity. Sutrapada coast is one of such coastal zones where a huge gap exists in the knowledge on the biodiversity of the Ichthyofauna. Sutrapada is the second major landing center of the Gir-Somnath district, Gujarat. There are no such studies carried out on the diversity of the ichthyofauna from Sutrapada coast. In past, the studies were carried out on the biodiversity of Invertebratesand ecological aspects of the Sutrapada Coast for the purpose of specific industrial assessments. But there were no such studies reported on the Ichthyofaunal diversity of this coastal zone. Sutrapada is one of the important fish landing centers. Where great variety of fishes are landed and commercially utilized. If the scientific understanding of this Ichthyofaunal diversity if available, then proper economical utilization of such resource is possible. Therefore, the ichthyofaunal diversity study was very much essential. Based on this developing scenario, Sutrapada fishing center requires to be attended with scientific approach for fish diversity, fishing operation and socio-economic status of fisherman community. The aim of this study was to investigate the current ichthyofaunal diversity of Sutrapada. The present study will be helpful in the management and conservation of the commercially and ecologically important fishes.

3 AIMS & OBJECTIVES:

AIM:

To study the diversity of fishes and fishery of Sutrapada

OBJECTIVES:

1. Species and genetic diversity of fishes
2. Status of fisheries of Sutrapada
3. Socio-economic status of fisherman