For several centuries humans have existed as a dominant species known as *Homo sapiens.* Only during this century of their total measurable tenure impact is observed on the oceans and many ecosystems. **Industrial Revolution is the main instigator of chemical and physical changes that have modified rivers, estuaries, and localized segments of coastal waters.**

Ample examples persist in demonstrating that pollution of coastal waters in the world is increasing; high coliform levels in coastal waters, increased organic content in coastal sediments, coastal algal blooms, significant levels of chlorinated hydrocarbons, petroleum residues, and heavy metals in ocean waters, sediments and in organisms.

Environment (either at the waste site, in the aquatic bodies, soil, or the air environment) consist of chemical mixtures of several different compounds that are not produced together but may occur together. For example, a waste site might contain several heavy metals with pesticides and solvents.

Therefore, studies on the toxicity of mixture derived from different compounds (in terms of their nature and structure) are essentially required. **Gujarat is one of the top industrialized states in India, and consistently, it has maintained a higher pace of industrialization.** This rapid industrial development throughout the state, especially along the gulfs of Kachchh and Khambhat, has generated abundant industrial wastes having both organic and metal contents (Labunska et al., 1999). The effluent released in estuaries or near shore regions contains a high amount of heavy metals and organics.

Contamination is a particular chemical compound present at a concentration higher than average value, due to non-natural causes, with a harmful impact upon the organisms in this ecosystem, by changing the growth rate of plant or animal species.

There are numerous toxic chemicals present in the environment, and over the past century, humans have introduced a large number of chemical substances. Many such chemicals are essential for life and are helpful in many ways, but many are toxic and can cause hazards to health and the environment. **Heavy metals from the effluent eventually accumulate in the aquatic system and get deposited in sediments and benthic animal tissues.** The benthic invertebrates exhibit habitat and substratum preference and thus indicate sediment quality and water quality. On the other hand, these habitat components regulate the diversity, number, and life cycle of invertebrates. Macroinvertebrates play the role of keystone species in the benthic environment. **Thus, the diversity, distribution, density, behavior, reproduction, larval settlement, and population dynamics of the benthic zone macroinvertebrates can denote whether the community is stressed (Pandya and Vachhrajani, 2009).**

Muddy beaches are one of the major habitat types in the Gujarat coastline. The Gulf of Khambhat is one such habitat in which the estuarine mudflats of Kamboi hold a center for tourists having mythological importance. It has an unusual inverted funnel-like geomorphological structure. The numerically dominant fauna on this beach is crabs from genus *Dotilla, Ilyoplax, and Uca,* of which ***Ilyoplax sayajiraoi*** **is a newly discovered species by Trivedi et al. in 2015.** However, no ecological or physiological studies are carried out for this species. This study employs a range of methods to increase our knowledge of *Ilyoplax* species. Mudflat coastlines are very dynamic, with faunal zonation patterns worked upon by physical factors. *Ilyoplax* occupies a very well-defined zone on the muddy beach of Kavi-Kamboi. **Examination of crab ecology will offer an opportunity to investigate what physical factors structured the distribution of these crabs**

on mudflats of Kamboi. The species population is restricted to a particular area and requires specific habitat to perish, making species *Ilyoplax sayajiraoi* highly habitat-specific, limiting its distribution. **A slight change in *I.sayajiraoi's* habitat will affect its population and distribution. Thus, species' population structure will act as baseline data for research, establishing it as a bioindicator.**

Many industries in the present scenario border the Gulf of Khambhat. Attempts have been made to investigate and develop pollution bioindicator systems by Mohandass *et al.* in 2000. We realized that macrofaunal bio-monitors are yet to be explored during our research. Our study focused on some basic ecotoxicological studies in the Gulf of Khambhat, particularly analyzing the abiotic components. Crabs of the burrows around which chemical was sprayed had increased popping out activity and foraging activity compared to untreated in-situ crabs. **If a sudden rush can affect the present behavioral activity, then layover of huge chemical (heavy metals) contamination can have caused or is causing a significant impact on present and previous species.**