



TATA CHEMICALS LIMITED

COMMIT. CONSERVE. SUSTAIN!

Tata Chemicals took a vital step in the right direction and committed to coral conservation, and the restoration in Gujarat.

OVERVIEW

Coral reefs are one of the most diverse and valued ecosystems present in the world today. Not only do they have their own unique biodiversity, but they are of incredible economic, social and cultural importance to this planet and its inhabitants. However, the survival and mere existence of the reefs have been called into question – being in a state of uncertainty due to a number of factors such as our increasingly growing population and global warming. At present, an alarming 50% of all the coral reefs are attempting to sustain themselves in less than 0.2% of the planet's oceans. The equilibrium the ecological health and the base of economic growth for small island nations are dependant on these productive ecosystems - and the need for conservation and protection of the remaining reef area is growing everyday.

Coral reef areas in Gujarat are part of the same pressing issue and are in direct need of conservation. Tata Chemicals narrowed their focus on the Mithapur Reef as their chosen site to begin preservation and reef recovery. The process was far from straightforward, and the company had to employ inventive transportation approaches, precise scientific techniques and radical transplantation methods to successfully restore the corals present in that particular region. There has been a remarkable recovery in the health of the reef since the company took on the project.

INNOVATION

In terms of an inventive restoration process, the location selection was key in the project's success. An initial survey of Mithapur reef was carried out to assess and identify the extent of degradation and damage to the reefs in the region. The results of the surveys conducted over a 2.5 sq.km area displayed that the best method for reef recovery was to restore corals through Transplantation (asexual method) and Artificial Reef Building (sexual method). The hope was that the Transplantation process would be carried out effectively and would attract a large number of organisms to the reef, which would eventually lead to reef recovery.

While the importance of the coral conservation has been largely documented, their protection in this scenario required some novel ideas and practices. With the field observation conducted along the Gulf of Kutch and Mithapur coast, the Literature Review revealed that the coral reefs in Gujarat had lost their ability to regenerate. Tata Chemicals determined that the main focus should be to control existing pressures on the reef and allow it to recover naturally.

Unfortunately, this course of action is typically time-consuming, so mitigation and rehabilitation measures became necessary to aid the reef in its recovery process. The initial survey suggested that there were approximately 27 varieties of reef-building coral species present in the region out of which plat, flat and boulder forms made up majority of the species. Unlike the coral reef habitats of Lakshadweep, Gulf of Mannar and the Andaman & Nicobar Islands, branching here was present in less than 10% of the surveyed area. This was vital for the reef since the branching form attracts more fauna than other forms and was

CASE STUDY

YEAR OF IMPLEMENTATION: 2014

INNOVATION IN A NUTSHELL

Using perseverance, meticulous scientific method and inventive transportation techniques, Tata Chemicals took on the seemingly impossible task of restoring and conserving the Mithapur Coral Reef.

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essential for the recovery process of the reef. Therefore, Tata Chemicals innovated and planned to transplant one of the fastest-growing branching forms of *Acropora* that was present in Lakshadweep into Gujarat waters. The decision was seen as the most logical option for initial transplantation as this type of species had already been once present in the Mithapur reef and had only recently become extinct.



To initiate the process of recovery, 100 *Acropora* fragments were collected from the Agatti Island and transplanted locally at the nursery site for a little over 2 months. 22 of these coral fragments were carried by a ship, train and car to Gujarat over a period of four days to test the success of transportation. The experiment was considered successful as almost 80% of the fragments survived, with only 20% of the fragments resulting in deterioration due to transportation. The coral fragments that withstood the journey were used to begin the acclimatization process over a period of two days at Mithapur.

After 6 days, 10 fragments were transplanted to the Mithapur reef and the remaining 8 fragments were transplanted at Laku, inside Gulf of Kutch, with the intention to use them for comparative survival studies. The results were great! The coral fragments survived for over half a year at the Mithapur reef and only 4 months at the Gulf of Kutch, which essentially proved that the water in the former location was safer than the water present at Laku.

THE CHALLENGE

Given the nature of the task at hand, and what was at stake, there were a number of challenges that had to be dealt with and overcome effectively. One of the first issues that Tata Chemicals faced was identifying the *Acropora Humilis* colony underwater. In the area of the Agatti Lagoon, 80 colonies of *Acropora Humilis* were uncovered over a three-month time period, with 6 species falling under the *Acropora Humilis* Group. Since the existing transportation protocols Tata Chemicals had in place were unsuitable for the task at hand, new protocols had to be developed to facilitate the journey of the coral fragments.



The new protocol allowed the fragments to establish themselves in Lakshadweep waters over a two-month period. One biologist took care of the Lakshadweep waters while simultaneously monitoring the oceanography parameters once a month for five months. All of the transplanted corals were monitored once every five days so that any harmful materials or dangerous organisms could be removed in a timely and effective manner.

THE IMPACT

No one in India had ever attempted to transport corals over a long distance, let alone traverse a 1,200-kilometre journey to transplant them into another area. A project of this scale required careful investigation and immense planning.

In the past, corals were directly harvested from wild colonies and transplanted into the new site. Due to external factors such as constraints in logistics and long travel distances, the corals were first acclimatized locally and then transported to Gujarat through unfamiliar transportation means. The success of this pioneering effort is evidenced by the fact that these transplanted coral fragments survived for more than 6 months in their new environment.

Previously, it was assumed that *Acropora* could not survive in Gujarat waters and that they would die within a few days. It has since been proven that these corals could indeed survive in the region, as long as there were some mitigation measures in place to ensure their long-term survival. There has been a shift in perspective since the successful transplantation and its phenomenal results, with experts and organizations within the field having taken notice.

CHALLENGES FACED

- Identification of the *Acropora Humilis* colony in an underwater setting
- The use of existing transportation protocol to move the coral fragments from one location to another

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THE SOLUTION

- Innovative transportation solutions were developed and tested for potential success. Once successful, the transported fragments were regularly assessed so that they could remain viable for transplantation and avoid any damage or harm.

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THEIR JOURNEY POST-INNOVISTA

The initiative known as “Transplantation of Live Corals from a 1,200 Kilometre Distance” taken on by Tata Chemicals won the Tata Innovista Award in April 2014 for its coral conservation efforts and restoration of the Mithapur Reef. Since then, there has been an increasing level of responsiveness from the masses with regards to coral reef conservation through active participation.

Awareness was the first step in achieving a much larger universal goal. Aside from the huge dependency to extract resources from the reef of Mithapur, the sheer significance of coral reefs, and the benefits that their ecosystems provide to humans, made it necessary to educate and prompt individuals to help conserve these wildlife habitats.



Periodic workshops were conducted twice a year to sensitize the artisanal fishing sector that was dependant on the Mithapur Reef. The workshops targeted fishermen of the Arambhada, Suajkaradi, and Bhimrana villages. Fishermen were initially given a basic understanding of the dynamics of the reef ecosystem through presentations and video documentaries, after which they attended sessions on the need to conserve these reefs. In these sessions, it was stressed that the fishing community had a large role to play in coral reef conservation. Fishermen were taken for some hands-on training to the Mithapur Reef and were shown safe and healthy fishing practices, such as how to avoid causing physical harm to corals by trampling and steering boats with bamboo poles in shallow waters. In addition to this, rescue missions were carried out five times between 2014-15 to collect disoriented or partially damaged corals from intertidal areas. Close to 350 fishermen were made aware of the problems faced.



For any ongoing conservation effort to be successful and sustainable, it requires regular assessment in terms of monitoring the health of the ecosystem. While largely valuable to the world and its citizens, coral reefs are also one of the most fragile ecosystems, which require continuous monitoring and timely scientific intervention to reduce the chances of damage from an anthropological standpoint.

Colour-coded charts were specifically designed by the University of Queensland, Australia, and its Citizen Science Project, Coral Watch, to monitor the health of the Mithapur Coral Reefs. Observers used the charts to match the colour of the coral reef with a colour on the charts, after which they uploaded the data to the Coral Watch Website. New technology and user-friendly methods made real-time analysis of the results possible once they were transferred from the website and uploaded to a global Coral Watch database.

Employees of TCL tested the efficacy of the charts and participated in two exercises in which they administered 349 corals, and made a total of 413 observations. Conducted on 27th September, 2015, the first survey demonstrated that the corals of Mithapur were facing a 70% probability of a severe bleaching effect. The second survey was administered on 27th October, 2016, and revealed that the threat of the bleaching effect had decreased, and that the corals in Mithapur were in the clear. The impressive change illustrates the success of the recovery process and the positive influence it had on the health of the ecosystem.

Year	Coral Garden Nurseries	Artificial Reefs	Total area (sq.m)
Before 2014	-	50	125
2014-15	15	130	325
2015-16	18	150	375
2016-2017	20 (final coral garden)	70	177.8
Total	53	400	1002.8

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RESULTS ACHIEVED

- Recovery of the health of the corals in the Mithapur Reef
- Innovative and improved transportation methods for coral fragments
- Awareness amongst the masses and an increase in active community participation in conservation efforts

ABOUT TATA CHEMICALS LIMITED

A part of the Tata Group, Tata Chemicals Limited is a global company with interests in businesses that focus on essentials for LIFE: Living, Industry and Farm Essentials. Tata Chemicals' vision is to be a leader in corporate sustainability, focussing on all three elements of 'people, planet and profits'.

