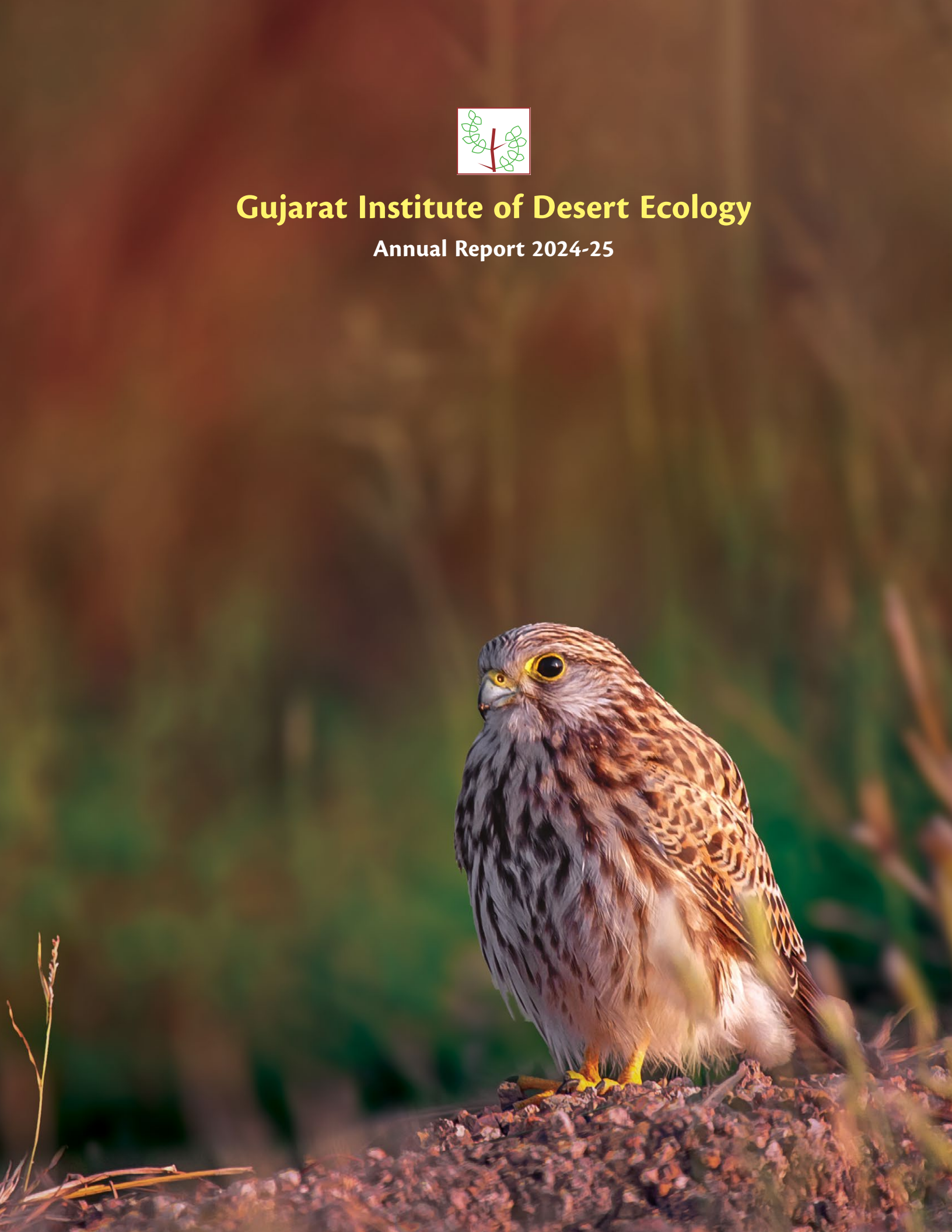
Gujarat Institute of Desert Ecology

Annual Report 2024-25



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Front and Back cover photos: Mr. Manoj Dholakia

GENESIS

Gujarat Ecology Commission set up by the Government of Gujarat signed a Memorandum of Understanding, in the gracious presence of the Hon. Chief Minister of Gujarat, with The Jacob Blaustein Institute for Desert Research, Israel, on 9th September 1993, for (i) rehabilitation of degraded soils to increase production of biomass, (ii) to assist in preparing plan for restoration of degraded eco-systems, and (iii) to assist in planning of a Centre of Desert Ecology in Kachchh. Subsequently, Prof. Uriel Safriel, Director of Mitrani Centre of Desert Ecology, Israel visited Kachchh in May 1994. Based on his recommendations, Forests and Environment Department of the Government of Gujarat vide Resolution dated 10th January 1995 accorded administrative sanction to establish Institute of Desert Ecology. Thus, Gujarat Institute of Desert Ecology was established at Bhuj, Kachchh district as an autonomous body and was registered as a Society and a Public Trust.

MISSION

GUIDE will catalyse the process of ameliorating hardships to human beings in desert ecosystems of Gujarat, following sound ecological principles and carefully using scientific knowledge, imaginative technology and capital.

MANDATE

- Focus on desert and arid ecosystems of Gujarat, with special emphasis on Kachchh,
- Develop a benchmark database for ecosystems of Kachchh and thereafter undertake continuous monitoring and trend-analysis through specific research activities,
- Identify problem areas and evolve appropriate solutions and management strategies, with the help of applied research
- Formulate and implement relevant projects that would provide models for emulation,
- Disseminate ecological information and communicate action plans to suit local conditions, through extension and other programs, and
- Provide consultancy and training to NGOs, Government officials, corporate sectors and other natural resource managers, in the principles of ecology, integrated management and sustainable development.

DIRECTOR'S NOTE

Gujarat Institute of Desert Ecology (GUIDE), stepping into its 30th year of establishment, continues to function as a pioneering research institution committed to addressing community needs through a focused and socially relevant research agenda. The Foundation Day was celebrated by the members and well-wishers of the Institute at Hotel Floating Deck Resort, Bhuj.

In pursuit of its stated mandate of fostering synergy between scientific research and community engagement in the fields of ecology and environment, the Institute has made notable

progress during the year. Consistent with previous years, GUIDE's institutional infrastructure has witnessed both qualitative and quantitative enhancement. At present, the Institute is spread over an area of approximately four acres and is equipped with a modern administrative building, hostel facilities, and a well-established Environmental Laboratory furnished with state-of-the-art equipment. The Institute provides a conducive working environment supported by over three dozen computers, advanced software systems, a digital herbarium centre documenting the flora of Gujarat, GIS Cell with satellite data processing software and facilities, online meeting facilities, and a well-stocked library with access to a wide range of books and online scientific journals.

In order to further strengthen its scientific manpower and enhance institutional capacity to achieve its targeted objectives, GUIDE appointed Dr. Rachna Chandra as Principal Scientist in the Terrestrial Ecology Division and Dr. Rupak Dey as Project Scientist in the Coastal and Marine Ecology Division during the reporting period. In addition, supporting field personnel, including Junior Research Fellows (JRFs) and Project Assistants, were engaged across various divisions to assist the scientific teams in project implementation and field activities. As a result, GUIDE now comprises a multidisciplinary team of professionals actively engaged in research, monitoring, and evaluation of programmes across diverse ecosystems under the Terrestrial Ecology, Coastal & Marine Ecology, Environmental Monitoring and Assessment Divisions, Natural Resource Management and GIS Cell of the Institute.

The tenure of Shri. P. K. Taneja, IAS (*Retd.*) as Chairman of the Board and Society of GUIDE ended on 18th December, 2024 and as per the Search Committee's recommendations, Sh. V. S.

Gadhavi, IAS (*Retd.*) has taken over as the Chairman of the Society and its Board of GUIDE. The 92nd meeting of the Board of Governors was held on 28th September 2024 under the Chairmanship of Sh. P. K. Taneja, IAS (Retd) and the 93rd and 94th meetings of the Board of Governors (BoG) of GUIDE were held on 16th December 2024 and 22nd February 2025 respectively and the 28th Annual General Meetings (AGM) of GUIDE was held on 22nd February 2025 under the Chairmanship of Sh. V. S. Gadhavi, IAS (*Retd.*).

The stewardship and unflinching efforts rendered by our Chairman Sh. V. S. Gadhvi, IAS (*Retd.*) and the Board of Governors of GUIDE has enabled us to function with robustness and quality over the previous years.

GUIDE's mission on ameliorating hardships to human beings in desert ecosystems of Gujarat, using scientific knowledge and imaginative technology has received several awards for its exemplary scientific achievements. An added feather on the cap, GUIDE has been awarded with Climate Change Awards for the year 2024-25 by the Climate Change Department, Govt. of Gujarat for the multitude of work on "Climate Change Mitigation and Adaptation Projects" under the Institutional Category. The Award was presented by the Hon. Minister, Sh. Mulubhai Bera Ji, Minister for Tourism, Cultural activities, Forests, Environment & Climate Change and Sh. Mukeshbhai Patel Ji, Minister of State for Forest & Environment, Climate Change, Water Resources & Water Supply.

To enhance the global outreach and draw World's attention for the Kachchh dryland issues, GUIDE has established collaboration with International and National Universities/ Institutes. A MoU was inked with M/s Shree Green Consultants, Surat on 2nd April 2024 and another MoU was signed with Govt. Polytechnic, Bhuj-Kachchh on 6th May 2024. Prof M. M. Saxena, Vice Chancellor, Tantia University, Sri Ganganagar, Rajasthan has visited GUIDE on 20th June 2024 and a MoU was signed with the Tantia University. As part of project collaboration, a MoU was signed on 9th January 2025 with Research & Development Wing, Coastal Management Cell, State Pollution Control Board, Odisha.

Further, another important collaboration was discussed between GUIDE and LexApez, and as a follow-up a MoU was signed on 3rd April 2025 with LexApex Advisory, Ahmedabad for the Empanelment of Advisory firms for providing Advisory and Consultancy Services on Environmental, Social, and Governance (ESG), Biodiversity, Climate Change (CC), Renewable Energy (RE), Sustainable Development (SD), etc.

The PGVCL organized a programme on 5th October 2024 at PGVCL, Bhuj under the Chair of Mrs. Preeti Sharma, IP&TAFS, Managing Director to appreciate the GUIDE's Ecological Study in Abdasa Taluka with the presence senior officials of PGVCL and GETCO along with scientists from the Terrestrial Ecology Division of GUIDE.

As part of international recognition of GUIDE, Dr. V. Vijay Kumar, attended the IUCN-Regional Conservation Forum held at Hotel Sheraton, Bangkok and interacted with Asia Regional Members of the IUCN on various programs including IUCN 20-Year Strategic Vision for the Union and Programme 2026-29 which was held during the period between 2nd and 6th September 2024. He has also participated in a meeting on Indian IUCN regional members held on 4th September 2024.

To address the biodiversity, environmental conservation and management issues, GUIDE has organized several programs during the year 2024-25. Akin to previous years, the Environment Day was celebrated on 5th June 2024 within the campus, where in about 250 saplings were planted as part of the green campus mission. The "International Mangrove Day" was celebrated on 26th July 2024 at GUIDE.

On 17th September 2024, GUIDE organized a coastal cleanup drive at Mandvi beach, Kachchh as a part of International Coastal Cleanup Day, in collaboration with NCCR, Chennai. The event was attended by over 140 members which includes members from NGOs, Volunteers, School and College students. During this event,

a total of 157 kg of debris was collected from the beach areas.

GUIDE along with Gujarat Biodiversity Board has organized a District level Biodiversity Awareness Workshop on 10th January, 2025 as part of People's Biodiversity Register of Gujarat Biodiversity Board, at Bhuj-Kachchh. The meeting was attended by the officials from Gujarat Biodiversity Board, Gandhinagar, Scientists and Researchers from GUIDE, Officials from the Forest Department, Faculties from Lalan College and KSKV Kachchh University, Bhuj; NGO Representatives and Members of the Biodiversity Monitoring Committee, Kachchh.

As part of academic advancement, faculties and students from various universities and colleges visited GUIDE. As a part of the State level training on "Community Driven Sustainability-Field Studies in Innovative Development", total 45 engineering faculty members from Gujarat have visited GUIDE on 9th August 2024, which was organized by Govt. Polytechnic, Bhuj-Kachchh. In the event, Dr. V. Vijay Kumar, Director, GUIDE delivered a talk on "Climate Change Perspectives".

Dr. V. Vijay Kumar, Dr. K. Karthikeyan and other scientists have attended many conferences/ meetings/workshops and also delivered lectures. Few important meetings/lecture details are given below;

On 11th July 2024, Dr. K. Karthikeyan attended the Comprehensive Performance Review for Scientific / Technical, Financial and Accounting in the Grant-In-Aid project sponsored by the MoES, Govt. of India through the Nodal agency NCCR, Chennai and he presented the two-years work progress to the Project Appraisal and Monitoring Committee. Dr. V. Vijay Kumar, attended the meeting on "District level consultation on enhancing emergency response coordination" as a special invitee held at Collector's office, Bhuj-Kachchh on 12th July 2024 and delivered a talk on "Climate Change Related Risks Under the Present Scenario". On 5th August 2024, Dr. K. Karthikeyan was invited as a Resource Person in the workshop on Advances in Environmental Sciences, organized by Cent. Univ. of Gujarat, and he delivered a talk on the topic, "Microorganisms from Extreme Environment and Their Functional Capacities and Research Prospects".

Dr. V. Vijay Kumar has participated in the 13th Edition of Environment Shikhar organized by APSEZL, Ahmedabad on 8th August 2024 for all Adani Port Senior Officials and delivered a talk on "Desertification/Land Degradation and Climate Change, How to Act?".

13th Environment Shikhar - 2024, 8th - 10th August 2024
Adani Corporate House (ACH), Ahmedabad.

On 8th August to 10th August 2024, as a part of the DST-WWF project, Dr. Durga Prasad Behera and Dr. Jayesh Bhatt attended the training on "Peoples and Protected Areas: A SEED DST-WWF India Initiative".

Dr. V. Vijay Kumar participated as special guest in the programme on "Inauguration of New Nursing Assistant Training Batch & Training Kit distribution" along with guest talk on "Plastic and Waste Management" organised by Adani Saksham on 10th September 2024, at Lecture Hall - 2, GAIMS Campus, Bhuj and was attended by more than 60 students.

Mr. Nischal Joshi, Manager (Projects) from Gujarat Ecology Commission has been deputed to Gujarat Institute of Desert Ecology by Gujarat State Forest Department, Gandhinagar on 28th August 2023. Mr. Nischal Joshi joined the Institute on 11th Sep 2023 and was relieved from the duties of Gujarat Institute of Desert Ecology on 25th Sep 2024.

Dr K. Karthikeyan was invited as a Resource person to deliver two Invited talks on "Multifaceted role and functional capacities of Microorganisms in Environmental Sustainability" and "Role of plant growth promoting Rhizobacteria in enhancement of plant growth in soil and soilless medium" in the UGC-Sponsored Online Programme in Environment & Sustainable Development organized by UGC-Malaviya Mission Teacher Training Centre, Bharathidasan University, Trichy, Tamil Nadu held on 11th Dec., 2024. Dr. G. Jayanthi has participated in the International Conference of the 14th IconSWM-CE & IPLA Global Forum and presented a research paper on "Vermicomposting for Zero Waste: Upcycling Spent Mushroom Substrate and Paper Waste" on 1st December 2024.

Further, Dr. V. Vijay Kumar participated in the Panel Session titled "Ecosystems in Action: Collaborative Strategies for Biodiversity Conservation" in the International Conference on "Educating for Sustainability Action," organized by Centre for Environment Education, Ahmedabad on 11th Jan' 2025. Dr. L. Prabhadevi

has participated in the National conference on Advancing Science and Innovation for Sustainability and delivered a lecture on "Bioluminescence and Its Applications in Biological Research "at the MS University, Baroda on 11th March 2025. She also attended the Workshop, "WEkEO for Atmosphere Monitoring" organized by Copernicus and Mercator Ocean International, held online on 24th – 26th March 2025. On 25th March 2025, Dr. V. Vijay Kumar attended the Climate Change Workshop at Smrutivan, Bhuj organised by the Reliance Foundation and UNDP and is chaired by Dr. Jayanti Ravi, IAS, ACS-Revenue Department, Gandhinagar.

Among the researchers in GUIDE, Ms. Fakhra Sarwat, Ph.D Research Scholar in GUIDE has presented on, "Diversity of Benthic Faunal Community in the Sediment and Water of Mangrove Ecosystem of Gulf of Kachchh with Special reference to Bioaccumulation of Heavy Metals" in the 10th International Conference on Environment and Ecology (10th ICEE-2024) on the theme "Forest and Environmental Management towards Sustainable Development", Organized by Guru Ghasidas Vishwavidyalaya campus, Bilaspur, Chhattisgarh, India during 18th - 20th September, 2024 and she has been awarded Best Oral Presentation. Ms. Monika Sharma's PhD. viva voce was conducted on 3rd May 2024 and awarded degree certificate on 18th December 2024 under the Guidance of Dr. Kalpesh Sorathia, Tolani College of Arts and Science and Co-Guidance by Dr. K. Karthikeyan.

Following the directions of the Chairman, GUIDE, various initiatives were undertaken at GUIDE campus in the areas of training on "Mushroom cultivation" and 'Hydroponics'. These programmes are significant in generating the livelihood options for the local communities.

During 2nd – 6th January 2025, Dr. G. Jayanthi and team have conducted Hydroponics training program in four villages (Zarpara, Bhujpur, Gundala and Bhadreshwar) in Kachchh in the event organized by the Integrated Child Development Services (ICDS). The participants include women from the villages, Anganwadi women and School students. The team in collaboration with Dr. Chetan Mistry, successfully conducted a two-day advanced training workshop on value-added products from mushroom cultivation at GUIDE on 17th and 18th January 2025, focused mushroom processing techniques, value addition methods, product development, quality control and packaging standards, as well as market linkages and commercialization strategies. The training was designed to enhance rural entrepreneurship and livelihood development in the region.

In the areas of research, GUIDE has submitted International Collaborative Research Proposals under the Indo-German Science and Technology Centre in collaboration with Scientists from Helmholtz Centre for Environmental Research – UFZ, Leipzig, Germany. As a part of Doctoral Research, a total of five students from various Universities (Saurashtra University, Rajkot; Gujarat University, Ahmedabad; Annamalai University, Tamil Nadu) were co-guided by Dr. K. Karthikeyan and Dr. G. Jayanthi.

Apart from this, eminent scientists and officials have visited GUIDE during the year 2024-25 including experts from the Universities, Institutes and Government Departments. Dr. Deepak Samuel, Dr C. Visvanathan and Dr. K. O. Badarees, NCSCM, Chennai visited GUIDE in connection with CRZ-GMB projects. Dr. M. L. Meena from Regional Station of BSI, Jodhpur; Prof M. M. Saxena, Vice Chancellor, Tantia University, Ganganagar, Rajasthan.

THRUST AREAS

- Desertification and land degradation process
- Biodiversity assessment and its conservation and management
- Restoration of degraded ecosystems including grassland, forests, wetlands, mangroves, etc.
- Ecological restoration of mining and industrial areas
- Regional environmental assessment and planning
- Socio-economic studies for development options
- Natural resource management in arid and semi-arid zones (rangeland ecology, agro-ecology)
- Impact of invasion by exotic and introduced species
- Remote sensing & GIS applications for biodiversity conservation and environmental planning
- Coastal biodiversity and coastal monitoring
- Seaweed and Polyculture activity
- Development and conservation options for Rann of Kachchh
- Watershed development and management

SERVICES OFFERED BY GUIDE

Research

- Terrestrial Biodiversity assessment and conservation studies (Biodiversity Action Plan-BAP)
- Climate vulnerability studies
- Restoration of degraded lands (Grassland and saline kinds)
- Remote sensing & GIS applications for biodiversity conservation & environmental planning
- Social Impact Assessment (SIA) and Social Impact Management Plan (SIMP) and Social Audit (SA)
- Feasibility studies for Community Development projects
- Monitoring and Evaluation:
- Third party evaluation for CSR projects
- Geo-tagged, mobile app-based surveys
- Data analysis and visualisation
- Marine Ecological Impact Assessment studies of port and coastal industries
- Ecological health assessment (Benthic faunal diversity)
- Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP)
- Environmental monitoring of matrices such as Air, Stack, Water, Soil, Sediment & Industrial effluents, etc.
- Environmental Auditing

Capacity Building and Knowledge Management

- Provide training, develop knowledge products, education and communication (IEC) materials in the areas of sanitation, hygiene, health, water conservation and safe usage, environmental awareness, biodiversity conservation, and natural resource management, seaweed and polyculture, laboratory analytics and mushroom cultivation
- Capacity Building of NGOs in real time data collection and motivate to take data driven decisions

Community Outreach and Implementation Activities

- Mangrove Restoration and plantation activities
- Implementing Government / CSR funded Watershed development, carbon neutral livelihood projects and environmental conservation initiatives.
- Build community-based climate resilience technologies and cool roofs.
- Promote social / village forestry in the rural and urban areas to increase biodiversity and to reduce heat stress.

Teaching and Research

GUIDE scientists are actively involved in guiding Ph.D. and Master's degree students from various Universities across the country. They are also guiding Bachelor students in Marine Sciences from the Government Science College, Mandvi, and Government Engineering College, Bhuj, Gujarat and various other Universities and Colleges within and outside the State.

INFRASTRUCTURE

Campus

GUIDE campus is spread over 04 acres with substantial green cover. The campus encompasses earthquake resistant main Institute building with administrative block, five different Environmental laboratory is of EMA division, RS and GIS Cell, Environmental Audit Cell, library, Herbarium unit and board room. Earthquake resistant hostel block with 08 double occupancy is located adjacent to the Institute, with well-furnished accommodation and dining facilities to researchers.

There are also 12 quarters for Scientists and the Director's bungalow at the backside to the main building. Green house, pot culture studies and experimental pots for the cultivation of mushroom is situated within the premises for experimental and training purposes. The campus is rich in biodiversity with more than 252 species of plants and 76 bird species. Many birds breed within the campus with more than 100 nests of house sparrows and other birds. The Scientists of GUIDE have identified and cultivated rare medicinal plants within the campus.

About 132 medicinal plants are present within the campus including *Commiphora stocksiana, C. wightii, Grewia tenax, Cassia fistula, Azadirachta indica, Tinospora cordifolia, Tecoma undulata, Capparis cartilaginea, Adansonia digitata, Acacia nilotica, Prosopis cineraria, Vitex negundo, Cassia auriculata. etc.* GUIDE is also propagating endangered and uncommon plants of Kachchh at the campus to establish a seed bank for subsequent plantations.

Analytical Laboratory

The laboratory is equipped with State-of-the-art instruments/equipment viz., Atomic Absorption Spectrophotometer, UV-Vis Spectrophotometer, Flame photometer, Respirable Dust Samplers, Spectrofluorometer and Ion Chromatograph, etc., to facilitate analysis of air, water, wastewater, soil, sediment for physical, chemical, microbial and biological parameters. The laboratory facilities at GUIDE cater to its in-house research activities, industrial sectors, agriculturists and NGOs. The laboratory consists of internal units like Water and Soil Laboratory, Microbiology Laboratory, Marine Biology Laboratory, Chemistry Laboratory,

Instrumentation Room and Environmental Engineering, Monitoring and Audit Cell.

Herbarium and Museum

The Herbarium has great significance and is essential for the study of plant taxonomy, geographic distributions, and the stability of nomenclature. Well established herbarium facility with vast collection of angiosperms of Gujarat state is available as a reference Centre for students and researchers. A total of 1011 floral species authenticated by the BSI and around 5000 herbarium sheets are stored scientifically at GUIDE. Specimens of intertidal molluscan shells from Kachchh and Jamnagar coastal habitats are preserved as ready reference materials. Efforts are also being made to set up a museum of marine fauna of the Gulf of Kachchh.

Library and Documentation

GUIDE's library houses 1519 books on different aspects of environment including ecology and climate change. A separate documentation unit with around 603 technical and research reports is also maintained.

PROJECT HIGHLIGHTS
TERRESTRIAL ECOLOGY DIVISION - COMPLETED PROJECTS

1. Biodiversity and Ecological Survey in the Atul Ltd. Campus, Gujarat

Funding Agency Atul Ltd. Valsad

Project Team Nikunj B. Gajera, Jayesh B. Bhatt, Dayesh Parmar, Viral D. Vadodariya, Vivek Chauhan

Project Duration August 2023 – July 2024

The biodiversity study at Atul Ltd. recorded 328 plant species and 141 faunal species (115 birds, 13 reptiles/amphibians, and 13 mammals), with seasonal and zone-specific diversity observed. Key species of conservation concern included Aegle marmelos, Dalbergia latifolia, and the Near Threatened Black-headed Ibis. The Residential Zone showed the highest biodiversity, especially during winter, supported by consistent water availability. Conservation efforts, including the 'Sanjeevani' plantation drive and a Miyawaki forest initiative, reflect Atul Ltd.'s commitment to integrating biodiversity into its operations and promoting sustainable development through native afforestation and ecosystem resilience.

2. Study on the Ecological Feasibility in Priority between two Priority areas and Potential areas under GIB Habitats & Lesser Florican Habitats in Abdasa taluka, Kachchh

Funding Agency PGVCL & GETCO - Bhuj

Project Team Nikunj B. Gajera, Jayesh B. Bhatt, S. K. Sajan, M. Kripa, Mukesh H. Koladiya, Dayesh Parmar, Viral D. Vadodariya, Rakesh A. Poptani, Vivek Chauhan, Kaksha Soni, Mohsin Khatri

Project Duration January 2024 – July 2024

India's increasing energy needs have driven the expansion of power transmission lines, impacting biodiversity, especially in habitats essential for the endangered Great Indian Bustard (GIB). A Supreme Court order now mandates that these lines be installed underground in priority GIB areas where possible. The study by the Gujarat Institute of Desert Ecology in Abdasa Taluka, Kachchh, revealed significant land use changes from 2000 to 2023, including a 54% decline in grasslands due to expanding agriculture and thorn forest growth, which threatens GIB habitats. The study documented 198 plant and 150 animal species, including critically endangered and vulnerable species, with invasive species like *Prosopis juliflora* affecting grassland diversity.

3. Technical Support for publication of Book on Flora and Fauna of Welspun campus

Funding Agency Welspun World Ltd.

Project Team Nikunj B. Gajera, Jayesh B, Bhatt, Mukesh H. Koladiya, Rakesh A. Poptani, Vivek U. Chauhan

Project Duration October 2024 – December 2024

Urban biodiversity refers to the variety of wild animals, plants, microorganisms, and other species within urban areas. It is crucial for maintaining urban ecosystems, enhancing landscape beauty, providing economic benefits, and promoting human well-being.

A floral biodiversity assessment in Welspun City found 328 plant species from 214 genera, 63 families, and 30 orders across three seasons. The faunal study documented 105 species, including 10 herpetofauna, 85 avifauna, and 10 mammals.

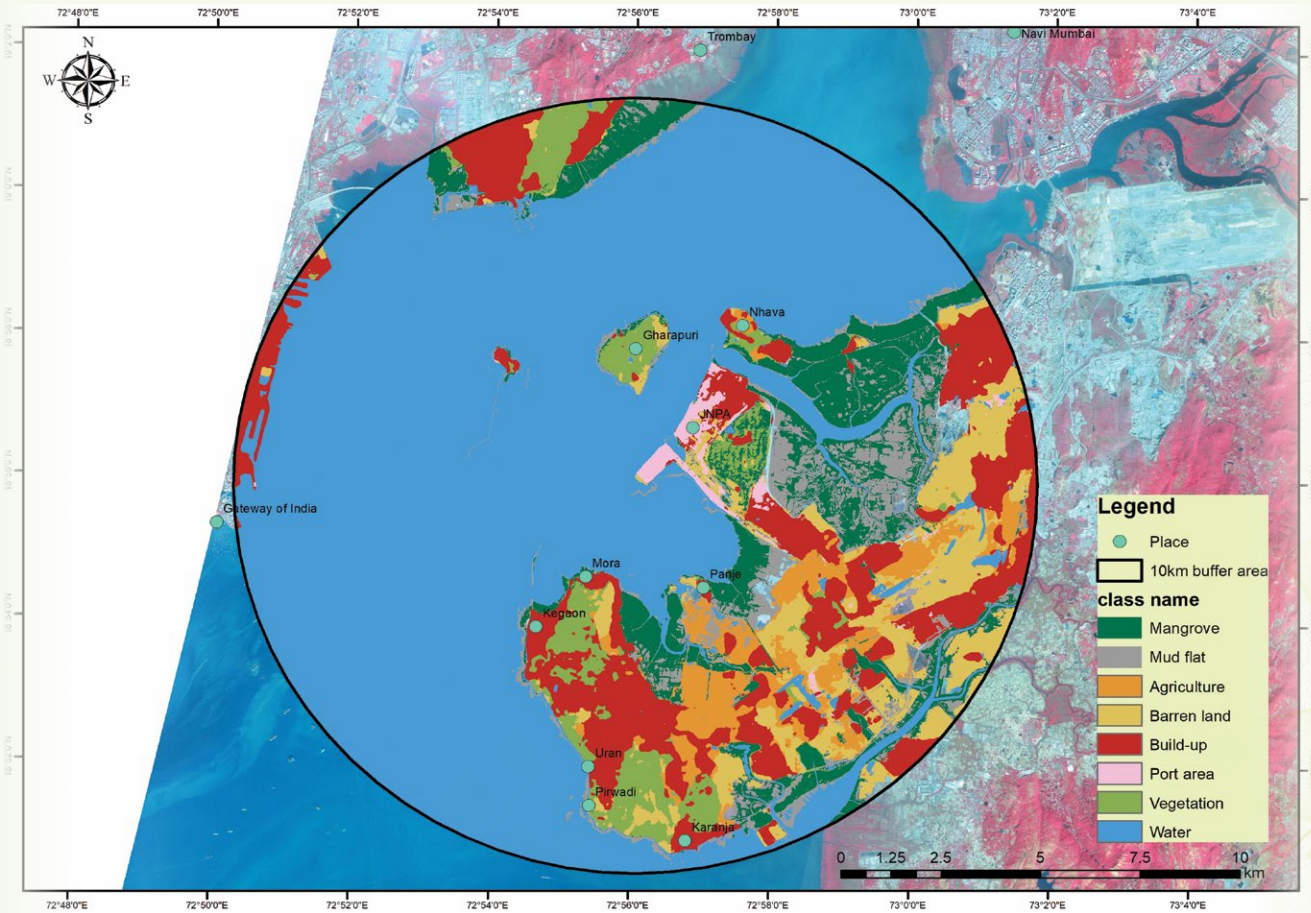
4. Long-term monitoring and study on Migratory Birds and their habitat at Jawaharlal Nehru Port Trust, Navi Mumbai

Funding Agency Jawaharlal Nehru Port Authority – New Mumbai

Project Team Nikunj B. Gajera, V. Kannan, Dayesh Parmar, Mukesh H. Koladiya, Viral D. Vadodariya

Project Duration September 2024 – March 2025

This report presents findings from an avifaunal study conducted from October 2024 to March 2025, detailing bird diversity, species assemblage, and conservation status based on IWPA-1972 and IUCN 2024. Despite habitat disturbance from development, bird biodiversity remains high, particularly among migratory species near the coastline and waterbodies around the port. A total of 160 bird species, including 59 migratory and 20 conservation-significant species, were recorded, with Lesser Flamingo being the most abundant. Minimal impact from urbanization was noted, and tidal movements influenced migratory and wader bird patterns. Long-term conservation planning is recommended to sustain biodiversity alongside development.



5. Social Impact Assessment of Gujarat Mineral Development Corporation (GMDC) for three blocks Valiya, Kadipani, and Lakhpat- Gujarat

Funding Agency Gujarat Mineral Development Corporation - Ahmedabad

Project Team Jayesh Bhatt, Ajay K. Gohel, Viral D. Vadodariya, Kaksha Soni

Project Duration September 2023 – March 2025

GMDC is state Government undertaking company with its business portfolio in the field of exploration and exploitation of various minerals/ores green energy generation and captive/merchant selling of minerals to cater the need of industries across the state. GMDC is currently operating 5 lignite mines in Kachchh, Bhavnagar and South Gujarat, 10 bauxite mining leases Kachchh District and 1 fluorspar-mining lease at village- Ambadungar, Taluka-Kavant, District-Chhotaudepur.

To fulfil the Statutory requirement as per the RFCTLAR & R Act 2013 and subsequently Rules by the Govt. of Gujarat, GMDC allotted the work for conducting Social Impact Assessment (SIA) study and associated activities as per the Right to fair compensation, Transparency in land Acquisition, Rehabilitation and Resettlement Act, 2013. The field study of SIA has been completed in three blocks namely Kavant, Lakhpat and Valiya of Chhotaudepur, Kachchh and Bharuch District covering 22 villages.

6. Technical Support for Greenbelt Development at AMNS Ltd. Hazira

Funding Agency AMNS Ltd., Hazira

Project Team Jayesh B. Bhatt, Dr. Karthikeyan, Mr. Vivek Chauhan

Project Duration February 2004 – July 2024

The Gujarat Institute of Desert Ecology have been allotted to a project to provide Technical Support for Greenbelt Development at AMNS Ltd. Hazira. The identified site of AMNS Ltd. have been visited and surveyed. The soil samples from different locations have also been collected for further analysis. The area is highly saline with patches of *Prosopis juliflora* and *Salvadora persica*. Few halophytes such as *Aeluropus lagopoides*, *Urochondra setulosa*, *Suaeda nudiflora*, *Salsola barryosma* etc. have also been observed during the survey. The suitable plants appropriate to the soil conditions for the greenbelt development have been identified.

7. Maintenance of Greenbelt (Phase-I) Development in Deendayal Port Authority at Kandla" for a period of two years

Funding Agency Deendayal Port Authority- Kandla

Project Team Jayesh Bhatt, Bhagirath Paradva, Rakesh Poptani

Project Duration November 2023 – October 2024

Deendayal Port Authority is committed towards environment protection since its establishment and has taken many initiatives towards increasing green cover and greenbelt development. To enhance and strengthen Greenbelt Development, the GUIDE has been allotted to develop a greenbelt area within the port area in phase wise manner. During the first phase 5000 plants have been raised at suitable site during the year 2022-23. GUIDE has been allotted to maintain and monitor the plantation raised during the 1st phase of 5,000 plants. Regular monitoring and watering under progress. The annual reports have been submitted to DPA.

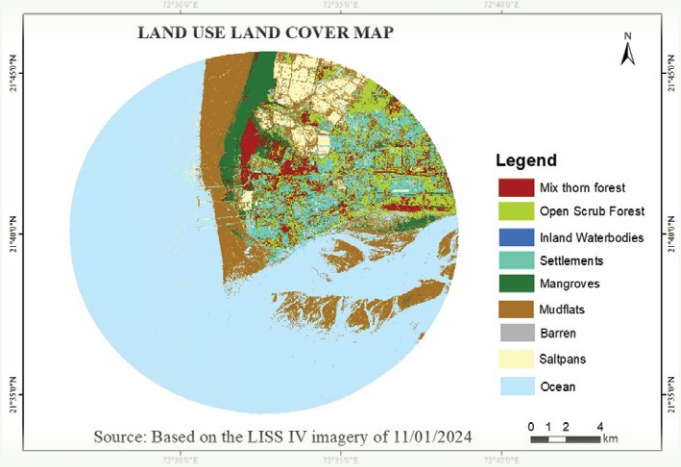
8. Rapid Biodiversity Assessment and Wildlife Conservation and Management Plan for the Third Berth (Jetty) at Petronet LNG Ltd, Dahej-Bharuch

Funding Agency Petronet LNG Limited (PLL), New Delhi

Project Team Nikunj Gajera, Balaji Prasath, Durga Prasad Behra, Mukesh H. Koladiya, Viral D. Vadodariya

Project Duration September 2024 – August 2025

A study conducted between October 2024 and March 2025 assessed biodiversity near the Third Berth (Jetty) at Petronet LNG Ltd, Dahej-Bharuch. It identified 110 plant species, 113 terrestrial vertebrate species (including 10 herpetofauna, 91 birds, and 12 mammals), with 18 species of high conservation importance. Among these, 5 are IUCN-listed Threatened species, and 16 are listed under Schedule-I of the Wildlife Protection Act 1972 (Amendment 2022). The report proposes a conservation plan with a budget of Rs. 127 Lakhs to protect these species and habitats. Petronet LNG Ltd will support Bharuch Forest Division financially for implementing conservation activities.



9. Rapid Biodiversity Assessment and Wildlife Conservation and Management Plan for the Petrochemical Complex at Petronet LNG Ltd, Dahej-Bharuch

Funding Agency Petronet LNG Limited (PLL), New Delhi

Project Team Nikunj Gajera, Mukesh H. Koladiya, Viral D. Vadodariya, Rakesh Poptani

Project Duration September 2024 – August 2025

A study conducted between October 2024 and March 2025 assessed Biodiversity of petrochemical Complex at Petronet LNG Ltd., Dahej-Bharuch. Based on the preliminary survey of flora of the study area, a total of 104 species of plants belonging to 91 genera and 36 families were recorded. The survey recorded 113 terrestrial vertebrate faunal species including 10 species of herpetofauna, 91 species of birds, and 12 species of mammals. All 113 faunal species were recorded from the buffer area, whereas 65 species were recorded from the core area. Based on our extensive field visits, literature survey, and consultation with experts & local people, we found the 15 species of high conservation significance. Of these, 4 species belong to Threatened categories (Vulnerable and Near Threatened) by IUCN and a total of 13 species belong to Schedule-I under the Wildlife Protection Act 1972 (amendment 2022).

10. Study on non-vegetated mudflats for Migratory birds within 10 km of the perimeter from the proposed project of construction of out fitting jetty & floating dry rock with allied infrastructure and preparation of long-term mudflat conservation and monitoring plan in the proposed project in Vadinar, Devbhumi Dwarka, Gujarat

Funding Agency Deendayal Port Authority - Vadinar

Project Team Nikunj B. Gajera, V. Kannan, Durga Prasad Behra, Kapil Kumar Ingle, Mukesh H. Koladiya, Dayesh Parmar

Project Duration August 2023 – September 2025

A study around the DPA Port area at Vadinar recorded 109 bird species within a 10 km radius, including 19 long-distance migratory, 81 resident, and 9 local migratory species, highlighting the region's rich avifauna despite ongoing development. The peak inward migration in Gujarat's coastal areas occurs in September, with the highest bird presence noted in December, particularly near creeks that attract large migratory populations like flamingos and waders. Thirteen threatened species were observed, emphasizing the area's conservation importance. Additionally, intertidal mudflats, vital for various benthic organisms and shorebirds, showed diverse fauna across six phyla, with molluscs as the dominant group. Pre-monsoon data indicated the highest species density at site S-1. Moving forward, the study will focus on conservation strategies for mudflats and migratory bird habitats, using data from both pre- and post-monsoon surveys.

11. Maintenance of Greenbelt (Phase-I) Development in Deendayal Port Authority at Kandla for a period of two years

Funding Agency Deendayal Port Authority - Kandla

Project Team Jayesh Bhatt, Bhagirath Paradva, Rakesh Poptani

Project Duration November 2023 – October 2025

Deendayal Port Authority is committed towards environment protection since its establishment and has taken many initiatives towards increasing green cover and greenbelt development. To enhance and strengthen Greenbelt Development, the GUIDE has been allotted to develop a greenbelt area within the port area in phase wise manner. During the first phase 5000 plants have been raised at suitable site during the year 2022-23. GUIDE has been allotted to maintain and monitor the plantation raised during the 1st phase. SMC work and watering have been going on and survival assessments have been made periodically.

12. To Carry Out Detailed Assessment of Biodiversity Status and Preparation of Conservation and Management Plan for Wildlife in the Core and Buffer Zone of the GMDC Mothala Balachod Bauxite Mine, Taluka Abdasa, Dist. Kachchh

Funding Agency Gujarat Mineral Development Corporation (GMDC), Ahmedabad

Project Team S. K. Sajan, Nikunj B. Gajera, Kripa M. K, Mukesh H. Koladiya, Viral D. Vadodariya, Rakesh Poptani, Bhagirath R. Paradva, Vivek Chauhan, Kaksha Soni, Mosin Khatri

Project Duration July 2024 - April 2025

The GMDC Mothala Balachod Bauxite mine operated by the Gujarat Mineral Development Corporation (GMDC), is significant source of both plant-grade and non-plant-grade bauxite. The mining lease covers an area of 280.7686 ha across the villages of Balachod, Mothala, Khandai and has a production capacity of 42,000 tons per annum (TPA). This study provides a detailed assessment of the floral and faunal diversity in the study area. A large variety of floral species belonging to 25 orders, 49 families, 172 genera and 217 species were recorded and 147 terrestrial vertebrate faunal species including 117 species of birds, 15 species of herpetofauna and 15 species of mammals were documented from the study area. We found that total 31 species (both flora and fauna) are of high conservation significance. Of these, 13 species belonged to Threatened categories (Vulnerable, Critically Endangered and Near Threatened) by IUCN.

13. To Carry Out Detailed Assessment of Biodiversity Status and Preparation of Conservation and Management Plan for Wildlife in Core and Buffer Zone of the GMDC Roha Kotda-Nandra-Jarjok Bauxite Mine, Taluka Abdasa and Nakhatrana, Dist. Kachchh

Funding Agency Gujarat Mineral Development Corporation (GMDC), Ahmedabad

Project Team S. K. Sajan, Nikunj B. Gajera, Kripa M. K, Mukesh H. Koladiya, Viral Vadodariya, Rakesh Poptani, Bhagirath R. Paradva, Vivek Chauhan, Kaksha Soni, Mosin Khatri

Project Duration July 2024 - April 2025

The GMDC Roha Kotda-Nandra-Jarjok Bauxite Mine operated by the Gujarat Mineral Development Corporation (GMDC), are a significant source of both plant-grade and non-plant-grade bauxite. The mining lease covers an area of 169.59 ha across the villages of Naredi- Mota -Nandra. This study provides a detailed assessment of the floral and faunal diversity in the study area. A large variety of floral species belonging to 26 orders, 52 families and 166 genera were recorded and 142 terrestrial vertebrate faunal species including 123 species of birds, 9 species of herpetofauna and 10 species of mammals were documented from the study area. A total of 27 species (both flora and fauna) are of high conservation significance. Of these, 12 species belonged to Threatened categories (Vulnerable, Critically Endangered and Near Threatened) by IUCN. 22 species belonged to Schedule-I under the WPA 1972 (Amendment 2022).

14. To Carry Out Detailed Assessment of Biodiversity Status and Preparation of Conservation and Management Plan for Wildlife in Core and Buffer Zone of the GMDC Naredi, Mota Nandra Bauxite Mine, Taluka Abdasa, Dist. Kachchh

Funding Agency Gujarat Mineral Development Corporation (GMDC), Ahmedabad

Project Team Kripa M. K, Nikunj B. Gajera, S. K. Sajan, Mukesh H. Koladiya, Viral D. Vadodariya, Rakesh Poptani, Bhagirath R. Paradva, Vivek Chauhan, Kaksha Soni, Mosin Khatri

Project Duration July 2024 - April 2025

The GMDC Naredi, Mota Nandra bauxite mines operated by the Gujarat Mineral Development Corporation (GMDC), are a significant source of both plant-grade and non-plant-grade bauxite. The mining lease covers an area of 169.59 ha across the villages of Jarjok, Roha (Kotra), Mota Nandra and Nana Nandra. This study provides a detailed assessment of the floral and faunal diversity in the study area. A large variety of floral species belonging to 26 orders, 52 families and 166 genera were recorded and 142 terrestrial vertebrate faunal species including 123 species of birds, 9 species of herpetofauna and 10 species of mammals were documented from the study area. We found that total 27 species (both flora and fauna) are of high conservation significance. Of these, 12 species belonged to Threatened categories (Vulnerable, Critically Endangered and Near Threatened) by IUCN. 22 species belonged to Schedule-I under the WPA 1972 (Amendment 2022).

15. To Carry Out Detailed Assessment of Biodiversity Status and Preparation of Conservation and Management Plan for Wildlife in Core and Buffer Zone of the GMDC Nana Goniasar Bauxite Mine, Taluka Mandvi, Dist. Kachchh

Funding Agency Gujarat Mineral Development Corporation (GMDC), Ahmedabad

Project Team Kripa M. K, Nikunj B. Gajera, S. K. Sajan, Mukesh H. Koladiya, Viral D. Vadodariya, Rakesh Poptani, Bhagirath R. Paradva, Vivek Chauhan, Kaksha Soni, Mosin Khatri

Project Duration July 2024 - April 2025

The GMDC Nana Goniasar bauxite mines operated by the Gujarat Mineral Development Corporation (GMDC), are a significant source of both plant-grade and non-plant-grade bauxite. The mining lease covers an area of 70.93 ha across the villages of Nana Goniasar. This study provides a detailed assessment of the floral and faunal diversity in the study area. A large variety of floral species belonging to 20 orders, 44 families, 135 genera, and 167 species were recorded and 107 terrestrial vertebrate faunal species including 85 species of birds, 11 species of herpetofauna and 11 species of mammals were documented from the study area. We found that total 23 species (both flora and fauna) are of high conservation significance. Of these, 10 species belonged to Threatened categories (Vulnerable, critically endangered and Near Threatened) by IUCN. 19 species belonged to Schedule-I under the WPA 1972 (Amendment 2022).

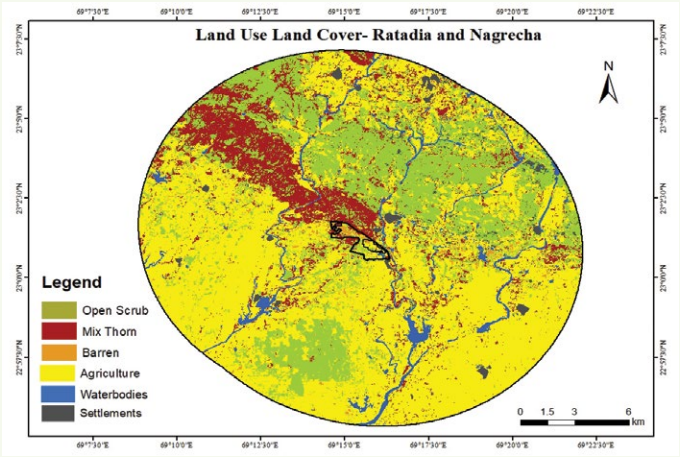
16. To Carry Out Detailed Assessment of Biodiversity Status and Preparation of Conservation and Management Plan for Wildlife in Core and Buffer Zone of the GMDC Ratadia and Nagrecha Bauxite Mine, Taluka Mandvi, Dist. Kachchh

Funding Agency Gujarat Mineral Development Corporation (GMDC), Ahmedabad

Project Team Kripa M. K, Nikunj B. Gajera, S. K. Sajan, Mukesh H. Koladiya, Viral D. Vadodariya, Rakesh Poptani, Bhagirath R. Paradva, Vivek Chauhan, Kaksha Soni, Mosin Khatri

Project Duration July 2024 - April 2025

The GMDC Ratadia and Nagrecha bauxite mines operated by the Gujarat Mineral Development Corporation (GMDC), are a significant source of both plant-grade and non-plant-grade bauxite. The mining lease covers an area of 204.07 ha across the villages of Ratadia and Nagrecha. This study provides a detailed assessment of the floral and faunal diversity in the study area. A large variety of floral species belonging to 21 orders, 39 families, 133 genera, and 163 species were recorded and 120 terrestrial vertebrate faunal species including 99 species of birds, 10 species of herpetofauna and 11 species of mammals were documented from the study area. We found that total 22 species (both flora and fauna) are of high conservation significance. Of these, 10 species belonged to Threatened categories (Vulnerable, Critically Endangered and Near Threatened) by IUCN. 19 species belonged to Schedule-I under the WPA 1972 (Amendment 2022).



17. To Carry Out Detailed Assessment of Biodiversity Status and Preparation of Conservation and Management Plan for Wildlife in Core and Buffer Zone of the GMDC Daban, Wamoti Bauxite Mine, Taluka Abdasa and Nakhatrana, Dist. Kachchh

Funding Agency Gujarat Mineral Development Corporation (GMDC), Ahmedabad

Project Team S. K. Sajan, Nikunj B. Gajera, Kripa M. K, Mukesh H. Koladiya, Viral D. Vadodariya, Rakesh Poptani, Bhagirath R. Paradva, Vivek Chauhan, Kaksha Soni, Mosin Khatri

Project Duration July 2024 - April 2025

The GMDC Daban, Wamoti bauxite mines operated by the Gujarat Mineral Development Corporation (GMDC), are a significant source of both plant-grade and non-plant-grade bauxite. The mining lease covers an area of 642.055 ha across the villages of Daban, Wamoti, Khannai, Balapar, and Rasalai. This study provides a detailed assessment of the floral and faunal diversity in the study area. A large variety of floral species belonging to 28 orders, 56 families, 180 genus and 222 species were recorded and 123 terrestrial vertebrate faunal species including 106 species of birds, 9 species of herpetofauna and 8 species of mammals were documented from the study area. We found that total 18 species (both flora and fauna) are of high conservation significance. Of these, 6 species belonged to Threatened categories (Vulnerable, Critically Endangered and Near Threatened) by IUCN. 14 species belonged to Schedule-I under the WPA 1972 (Amendment 2022).

18. Conservation and Sustainable Livelihood through Appropriate Technological Interventions in villages around Marine National Park Gujarat

Funding Agency Department of Science and Technology, New Delhi

Project Team Jayesh B. Bhatt, Durgaprasad Behera, Bhavati Kannad, Pradeep Bariya

Project Duration February 2022 – March 2025

The Gujarat Institute of Desert Ecology have been allotted a project on "Conservation and Sustainable Livelihood through Appropriate Technological Interventions in villages around Marine National Park Gujarat" by the DST. Four villages around Marine National Park have been selected for the project to implement four objectives of the project. Training and capacity building program have been made on seaweed cultivation and 52 seaweed rafts have been prepared and distributed among 25 beneficiaries of the Arambhada village. A training to the trainers has been conducted for guides of Khijadiya & around villages at Khijadiya Bird Sanctuary. Conservation of Green Sea Turtle programs have been conducted at Hamusar and Poshitra schools. For Pisci culture activity two cages have been designed and prepared and will be installed during the monsoon at Hamusar pond. The project funding agency has instructed to submit the extension period for two years which has been submitted to funding agency.

19. Preparation of People's Biodiversity Register for 20 BMCs of Morbi District

Funding Agency Gujarat Biodiversity Board, Gandhinagar, Gujarat

Project Team Jayesh B. Bhatt, Dayesh Parmar, Mukesh H. Koladiya, Rakesh A. Poptani, Ajay K. Gohel, Bhagirath R. Paradva, Ketankumar Yogi

Project Duration September 2023 – July 2025

The Biological Diversity Act, 2002 mandates to set up a Biodiversity Management Committee (BMC) in every gram panchayat of the country. Committee consists of one Chairperson, six members as 1/3rd of the designated women, SC / ST reservation as per state demography. The Committee primarily works on documentation of local biodiversity in the form of People's Biodiversity Register (PBR).

The Gujarat Institute of Desert Ecology has been empaneled as Technical Support Group (TSG) for PBR preparation of Tankara and Wankaner taluka for Morbi District and allotted 20 BMCs for the preparation of PBR.

The revised draft PBR has been received from Gujarat Biodiversity Board and incorporated with all the suggestions and comments and submitted for final print.

20. Preparation of People's Biodiversity Register for 25 BMCs of Kachchh District

Funding Agency Gujarat Biodiversity Board, Gandhinagar, Gujarat

Project Team Jayesh B. Bhatt, Dayesh Parmar, Mukesh H. Koladiya, Ajay K. Gohel, Bhagirath R. Paradva, Viral D. Vadodariya, Rakesh A. Poptani, Ketankumar Yogi

Project Duration September 2023 – July 2025

The Gujarat Institute of Desert Ecology has been empaneled as Technical Support Group (TSG) for PBR preparation of Bhuj and Mundra Taluka under Kachchh District and allotted 25 BMCs for the preparation of PBR. The training for BMC members for preparing PBR and first phase data collection of such as PRA exercise, training to BMC members and Seasonal data collection of flora/fauna, agriculture, livestock and village profile have been completed in the 25 villages (15 villages of Bhuj and 10 villages of Mundra Taluka). The draft PBR have been submitted to Gujarat Biodiversity Board for the suggestions and comments.

21. Preparation of People's Biodiversity Register for 15 BMCs of Patan District

Funding Agency Gujarat Biodiversity Board, Gandhinagar, Gujarat

Project Team Jayesh B. Bhatt, Dayesh Parmar, Ajay K. Gohel, Rakesh A. Poptani, Bhagirath R. Paradva, Viral D. Vadodariya, Ketankumar Yogi

Project Duration September 2023 – July 2025

The Gujarat Institute of Desert Ecology has been empaneled as Technical Support Group (TSG) for PBR preparation of Sami and Patan Taluka under Patan District and allotted 15 BMCs for the preparation of PBR. The training for BMC members for preparing PBR and first phase data collection of such as PRA exercise, training to BMC members and Seasonal data collection of flora/fauna, agriculture, livestock and village profile have been completed in the 15 villages (10 villages of Sami and 5 villages of Patan Taluka). The Final PBR have been prepared incorporating comments and suggestion from GBB and submitted for approval of final print.

22. Preparation of People's Biodiversity Register for 35 BMCs of Kachchh District

Funding Agency Gujarat Biodiversity Board, Gandhinagar, Gujarat

Project Team Jayesh B. Bhatt, Dayesh Parmar, Ajay K. Gohel, Rakesh A. Poptani, Bhagirath R. Paradva, Viral D. Vadodariya, Mosin Khatri, Kaksha Soni, Ketankumar Yogi

Project Duration September 2023 – July 2025

The Gujarat Institute of Desert Ecology has been empaneled as Technical Support Group (TSG) for PBR preparation of Bhuj, Mundra and Nakhatrana Taluka under Kachchh District and allotted 35 BMCs for the preparation of PBR. The training for BMC members for preparing PBR and first phase data collection of such as PRA exercise, training to BMC members and Seasonal data collection of flora/fauna, agriculture, livestock and village profile have been completed in the 35 villages. The first phase documents have been submitted to Gujarat Biodiversity Board.

23. Preparation of People's Biodiversity Register for 20 BMCs of Patan District

Funding Agency Gujarat Biodiversity Board, Gandhinagar, Gujarat

Project Team Jayesh B. Bhatt, Dayesh Parmar, Ajay K. Gohel, Bhagirath R. Paradva, Viral D. Vadodariya, Ketankumar Yogi

Project Duration September 2023 – July 2025

The Gujarat Institute of Desert Ecology has been empaneled as Technical Support Group (TSG) for PBR preparation of Sami and Santalpur Taluka under Patan District and allotted 20 BMCs for the preparation of PBR. The training for BMC members for preparing PBR and first phase data collection of such as PRA exercise, training to BMC members and Seasonal data collection of flora/fauna, agriculture, livestock and village profile have been completed in the 20 villages. The first phase documents have been submitted to Gujarat Biodiversity Board.

24. Preparation of People's Biodiversity Register for 20 BMCs of Morbi District

Funding Agency Gujarat Biodiversity Board, Gandhinagar, Gujarat

Project Team Jayesh B. Bhatt, Dayesh Parmar, Ajay K. Gohel, Bhagirath R. Paradva, Viral D. Vadodariya, Mukesh Koladiya, Rakesh Popatani, Mosin Khatri, Ketankumar Yogi

Project Duration September 2023 – July 2025

The Gujarat Institute of Desert Ecology has been empaneled as Technical Support Group (TSG) for PBR preparation of Maliya and Wankaner Taluka under Morbi District and allotted 20 BMCs for the preparation of PBR. The training for BMC members for preparing PBR and first phase data collection of such as PRA exercise, training to BMC members and Seasonal data collection of flora/fauna, agriculture, livestock and village profile have been completed in the 20 villages. The first phase documents have been submitted to Gujarat Biodiversity Board.

PROJECT HIGHLIGHTS
COASTAL AND MARINE ECOLOGY DIVISION – ONGOING PROJECTS

1. Regular Monitoring of Marine Ecology in and around the Deendayal Port Authority and Continuous Monitoring Programme

Funding Agency Deendayal Port Authority, Kandla

Project Team Durga Prasad Behera, Kapilkumar Ingle, L. Prabhadevi, Dhara Dixit, Viral D. Vadodariya, Rupak Dey

Project Duration May 2024 – May 2025

Deendayal Port Authorities intend to develop 7 integrated facilities (100 ha) in addition to the development of 3 integrated facilities (Stage-I) within the existing Deendayal Port Authority. After the completion of the regular monitoring project 2021 to 2024, sanction has been accorded further for the period 2024 to 2027. The developmental activities will have their own environmental impacts. The Ministry of Environment, Forest, and Climate Change (MoEF & CC) has directed the port authorities to conduct "Regular Monitoring of Marine Ecology in and around the Deendayal Port Trust and Continuous Monitoring Programme" to record the current status and conserve its fragile environment through an appropriate management plan. The study recorded moderate subtidal and intertidal biodiversity in the port area over three seasons (May 2024 to May 2025) by adopting different standard methodologies. Comprehensive qualitative and quantitative assessments of intertidal fauna were conducted, focusing on their composition, distribution, diversity, density, and other characteristics. This included meticulous data collection on species of benthic fauna and planktons. The mangrove ecosystems were analysed for their density and growth characteristics, providing valuable insights into the health and development of these crucial coastal forests. Furthermore, water and sediment samples, including those from mudflats, were studied to evaluate various physicochemical parameters. The study also documented the occurrence, diversity, and distribution of halophytes, seagrasses, seaweeds, and other coastal flora and fauna, highlighting the rich biodiversity present in these ecosystems. Additionally, the investigation extended to avifaunal diversity, recording the density, composition, and habitat preferences of the birds. Special attention was given to identifying threatened and endangered species, ensuring that conservation efforts could be appropriately directed. These comprehensive assessments offer a holistic view of the ecological health and biodiversity of the marine and coastal environments of the port. A detailed management plan was also prepared for the restoration and sustenance of the species diversity and water and soil characteristics of the port and the coastal ecosystem.

2. Marine Environment Monitoring for the "proposed development of all weather, multi cargo, greenfield, captive jetties at Jatadhari Muhan river

Funding Agency Jindal Steel

Project Team Durga Prasad Behera, S. K Sajan, L. Prabhadevi, Dr. Dhara Dixit, Vivek Chauhan, Mosin Khatri

Project Duration May 2024 – May 2025

The proposed project is for the development of All-weather, Multi cargo, Greenfield Captive Jetty(ies) for handling capacity 52 MTPA at Jatadhari Muhan River, Dist. Jagatsinghpur, Odisha. JSW Utkal Steel Ltd. (JUSL), a wholly owned subsidiary of JSW Steel Ltd., intends to set up 13.2 MTPA Integrated Steel Plant (ISP) near Paradip, in Jagatsinghpur district, Odisha. The 13.2 MTPA crude steel ISP will also comprise captive power plant (CPP) of 900 MW capacity, and cement grinding & mixing unit of 10.0 MTPA. Iron ore for the ISP shall be sourced through slurry pipeline from a 30.0 MTPA Iron Ore Grinding & Desliming Plant proposed in Keonjhar district, Odisha. Captive Jetty(ies) along with Integrated Steel Plant (ISP), captive power plant (CPP) of 900 MW capacity, cement grinding & mixing unit of 10.0 MTPA make an integrated project. The ISP shall be served by a captive jetty of handling capacity of 52 MTPA, to be located adjacent to the steel plant on the bank of Jatadhari River near Paradip. Environment monitoring of marine water quality and sediment quality studied for 3 season Monsoon (June-September), Pre-Monsoon (October-January) and Pre-monsoon (February-May) for the period 2025-2026 which is measuredly focus on marine ecology regularly in terms of sea weeds, sea grasses, mudflats, sand dunes, fisheries, echinoderms, shrimps, turtles, corals, coastal vegetation, mangroves and other marine biodiversity components including all micro, macro and mega floral and faunal components. Based on the results a detailed marine biodiversity management plan based on the impact of project activity has been suggested to JSW.

3. Climate Change Mitigation and Enhancing livelihood options through Seaweed Cultivation and conservation: a model development for Gujarat

Funding Agency Climate Change Department, Government of Gujarat

Project Team Durga Prasad Behera, Dhara Dixit L. Prabhadevi

Project Duration March 2019 – March 2022 (Extension)

The seaweed cultivation along Gujarat coast needs promotion at suitable coastal areas that would create livelihood opportunities for the coastal community. Given the scenario the present study attempts to culture commercially important seaweed species K. alvarezii to improve the livelihood status of the coastal villagers of Gujarat in association with Gujarat Climate change Department, Government of Gujarat with financial support from Gujarat Energy Development Agency. With this perspective, the project was activated at Simar, Una were being attempted to demonstration of seaweed culture models. The major objective such as carbon sequestration, livelihood opportunities and other allied benefits and up-scale and popularize the standardized culture technique for small scale seaweed farming was achieved during the project period. Besides this, for coastal beneficiary the microeconomics and livelihood opportunities have been established through seaweed cultivation. Besides this a proposal of Value addition has been submitted to CCD, GEDA and ask for extension.

PROJECT HIGHLIGHTS
COASTAL AND MARINE ECOLOGY DIVISION – COMPLETED PROJECTS

1. Marine biodiversity impact assessment of DP world terminal

Funding Agency Hindustan Gateway Container Terminal Kandla Private Limited (HGCTKPL-PT)

Project Team Durga Prasad Behera, Kapilkumar Ingle, Dhara Dixit. L. Prabhadevi, Viral D. Vadodariya, Rupak Dey, Samir Moshru, Sibani Singh

Project Duration August 2024 - September 2025

The ongoing developmental activities of DP World has been intended for Development of berth of extendable up to 1375 meters) and width of 54 meters. The berth to be designed for handling vessels of at least up to 6000 TEUs drawing a draft of 14 meters. The berth depth approach and berth pocket shall be of 15.4 meters below CD and 16.1 in turning circle. The project Back up area of 54.2 hectares. The Trestle length of 1650 meters and width of 20 meters. As per the environmental clearance requirements to these developmental initiatives, by MoEF & CC, among other conditions, has specified to conduct the monitoring of the coastal environment on various aspects covering all the seasons. The monitoring shall include physico-chemical parameters coupled with biological indices such as mangroves, seagrasses, macrophytes and plankton on a periodic basis during the construction and operation phase of the project. Besides, the monitoring study also includes an assessment of Mudflats,

Fisheries, and Intertidal fauna including the macrobenthos as components of the management plan. The regular marine ecology monitoring includes Micro, Macro and Mega floral and faunal components of marine biodiversity of the major intertidal ecosystems, the water and sediment characteristics. The study covers all the seasons as specified by specific condition of the Ministry of Environment, Forest and Climate Change (MoEF&CC). Based on the EC conditions all the physico-chemical, biological, Micro, macro habitat such as phytoplankton, zooplankton, benthos, intertidal organism, fisheries have been thoroughly covering post-monsoon, Pre-monsoon and monsoon. Base on the result, impact assessment and management plan was suggested.

2. Mangrove Plantation in an area of 50 Hectares for Deendayal Port Authority, Kandla

Funding Agency Deendayal Port Authority, Kandla

Project Team B. Balaji Prasath, Kapilkumar Ingle, L. Prabhadevi, Dayesh Parmar, Ketankumar Yogi

Project Duration June 2024 to March 2025

This project, "Mangrove Plantation in the Kandla Deendayal Port Authority" undertakes the afforestation of mangrove ecosystems following the Environmental Clearance (EC), and Coastal Regulation Zone (CRZ). Such biodiversity-initiatives are aimed at recovering the influences of anthropogenic activities, in addition to providing ecological functions like coast protection and marine life habitat. The plantation site was selected with regard to water and sediment quality, inter-tidal fauna, tidal movements, and faunal colonization of mainland seas. It was also checked for self-recycling features. Salinity (35-40 ppt) and pH (6.0-8.5) were also targeted to prove the existence of mangrove species like *Avicennia marina* and *Rhizophora mucronata*. Inspections of the site revealed risks like grazing and provided accessibility for post-plantation monitoring. Earth mounts known as rows were built on land to plant seeds in areas with slow current waters. Transplantation of Nursery Raised Saplings: Saplings grown in polythene bags for 3-4 months increases the rate of survivors after transplantation (high survival). With scientifically validated techniques, we undertook the plantation of mangroves over an area of 50 hectares and were successful in it. We preliminarily observe that *Avicennia marina* and *Rhizophora mucronata* in fact does grow, favoured by salinity and the substratum with tidal flushing. Sediment analysis suggests nutrients for the existing mangroves soil are abundant in nature.

3. Monitoring of Mangrove Plantation (1600 Ha) carried out by Deendayal Port Authority, Kandla

Funding Agency Deendayal Port Authority, Kandla

Project Team B. Balaji Prasath, Kapilkumar Ingle, L. Prabhadevi, Dayesh Parmar, Dhara Dixit, Ketankumar Yogi

Project Duration June 2024 to March 2025

This project aims to assess the survival rate, growth, and carbon sequestration potential of the mangrove plantations around Sat Saida Bet, Nakti Creek, and Kantiyajal, which the Deendayal Port Authority developed between 2005 and 2023. It aims to estimate carbon stock, bulk density, composition, and the conservation measures of mangrove ecosystem. From September 2024 to April 2025, mangrove saplings were assessed using 10 x 10 m plots. Sites were geo-referenced and marked on Google Maps. Mangrove formations were evaluated along creeks. Specific organic carbon and density will be evaluated. Carbon Stock and bulk density of the soil was estimated, based on the soil samples collected from different depths. The study aims determining the survival rate and assessing the health of mangrove plantations in relation to different assessment sites alongshore. It also measures soil bulk density, organic carbon content, and carbon stocks belowground. Assess carbon sequestration potential of these mangroves in biomass and CO_2 equivalent and improved conservation and management practices. As a result of its tolerance to arid and saline conditions, Avicennia marina mangroves have notably restored in the Kachchh region of the Gujarat coast. Although earlier attempts through a single species approach raised concerns around ecological diversity, a combination of several agencies and local community involvement has met with some success. However, the anoxic conditions paired with low freshwater availability still constrain the ability to support diverse and resilient ecosystems. The area's mangroves are important carbon sinks and enhance carbon sequestration above most other forest types flushing. Our sediment analysis suggests nutrients for the existing mangroves soil are abundant in nature.

PROJECT HIGHLIGHTS
DIVISION OF NATURAL RESOURCES MANAGEMENT – ONGOING PROJECTS

1. Training of IWMP Projects in Kachchh

Funding Agency Gujarat State Watershed Management Agency (GSWMA), Gandhinagar

Project Team Prakash M. Patel, Geeta Goswami, Amit Ghodasara

Project Duration August 2017 - March 2026

Integrated Watershed Management Programme (IWMP) is a modified programme of erstwhile Drought Prone Areas Programme (DPAP), Desert Development Programme (DDP) and integrated Wastelands Development Programme (IWDP) of the Department of Land Resources, Ministry of Rural Development, Government of India, New Delhi. The main objectives of the IWMP are to restore the ecological balance by harnessing, conserving and developing degraded natural resources such as soil and vegetative cover. Gujarat State Watershed Management Agency (GSWMA) under the Commissionerate of Rural Development has sanctioned watershed Training project to GUIDE in Kutch. This training is mainly given to Farmers, SHG's and VWC's.

2. A Sustainable Future for Kanoj Village, Lakhpat Taluka, Kachchh. A Comprehensive CSR Initiative to Empower Rural Communities

Funding Agency Paschim Gujarat Vij Company Ltd. (PGVCL) – CSR

Project Team Prakash M. Patel and Amit Ghodasara

Project Duration April 2025-March 2026

Kanoj Village is located near to Narayan Sarovar in Lakhpat Taluka (under Narayan Sarovar Gram Panchayat) of Kachchh District, Gujarat with a population of 315 people (Census 2011). The village faces several challenges, including low literacy rates, limited access to healthcare, and inadequate infrastructure facilities. The Corporate Social Responsibility (CSR) fund supported in a significant way to address the above issues through targeted initiatives that align with the community's requirements and corporate goals.

Proposed Activities includes

A. Livelihood Development: Organized training sessions in for Sustainable Agriculture and Animal Husbandry For 50 Participants Along with Training Kits, Refreshments, etc. Ashapura Sakthi Mandal (SHG) was formed to promote microfinance opportunities and entrepreneurship among women and youth. Provide modern fishing equipment to fisherman families to improve their livelihoods. Total 5 kits for fisher, 40 kits for Pastoralists and 10 kits for labourers were distributed in the village. Further, a grass godown was constructed for storage of fodder availability to support animal husbandry.

B. Education and Skill Development: Under this, Installation of R. O. water plant at Primary School, Overhead water tank with taps for better water accessibility to children, enhance fitness facilities and provide new sports equipment were provided. Further, the Anganwadi building was renovated and a small roof shed was made in the school playground.

C. Animal Husbandry and Healthcare Initiatives; Organized health camps and general check-ups and specialist consultations for more than 500 cattle/Buffalo/Goat and Sheep.

D. Water Resource Management: Construction of Rainwater Harvesting Pond for Domestic and Livestock (02 Nos), Repairing and Deepening of the Existing Ponds for Domestic and Livestock (03 Nos) and construction of Agricultural Farm Ponds for Enhanced Irrigation Facilities (03 No). The above 8 water harvesting structures have enhanced the surface water availability from 42,500 CMT to 3,10,000 CMT through the Project, which benefits farmers and livestock.

E. Ecological Conservation: Plantation of Native Tree Species of 150 Native Trees and Trenches Were Made at Suitable Locations in an Area of 1 ha through the Local Village Labours and 200 Kg Seeds of Tree Species and Grasses were Sown in the Area.


• પ્રોજેક્ટ નું નામ: CSR PGVCL
• ફંડિંગ એજન્સી: CSR PGVCL
• અમલીકરણ એજન્સી: ગાયત્રી
• ગામ: કનોજ - તા: લખપત
• કામનો પ્રકાર: Repair and deepen Existing Lakes for livestock
• કામ નો નામ: Pond No. 3 • પૂર્ણ થયા વર્ષ: 2024
• ખર્ચ: ₹ 69,969.00

3. INTEGRATED WATERSHED MANAGEMENT PROGRAMME (IWMP)- 49

Funding Agency Gujarat State Watershed Management Agency (GSWMA), Gandhinagar

Project Team Prakash M. Patel, Geeta Goswami, Amit Ghodasara

Project Duration 2017 – 2026

The watershed project (IWDP-49) was sanctioned by the DWDU during April 2017. The project villages includes Bayath, Changday, Bambhaday and Maper covering an area of 6042.60 Ha in Mandvi taluka of the Kachchh district. These villages are located along the fringes of the Coastal belt of Kachchh. Major problems of the project area includes degraded lands, climatic constraints, poor soil fertility, soil erosion, poor vegetative cover, water crises, salinization of soil and water resulting into land degradation and poor productivity. The integrated project aims at improving the land status through various soils, water and other site-specific amendments, thereby improving the socio-economic status of the villagers. The following developmental activities had been under taken in the project villages till date.

- PRA of the project area
- Baseline survey and preparation of Detailed Project Report
- Formation and registration of village committees
- Entry Point Activities (Survey, Planning and Execution
- Training and exposure
- Work Phase Activities (110 ponds, 432 farm bunding for farmers and kit distribution to 900 people)
- Livelihood activities
- Micro-enterprise activities

PROJECT HIGHLIGHTS
ENVIRONMENTAL MONITORING AND ASSESSMENT DIVISION - COMPLETED PROJECTS

1. Environmental Audit of Deendayal Port Authority, Kandla, Gujarat

Funding Agency Deendayal Port Authority (DPA), Kandla, Gujarat

Project Team K. Karthikeyan, Ratansi M. Chaudhary, Ruturajsinh Sarvaiya, Hirji K. Dangar

Project Duration August 2023 – July 2024

Gujarat Pollution Control Board (GPCB) as directed by Hon'ble High Court of Gujarat in their verdict in 1996 directed for implementation of Environmental Audit Scheme for the industries in the State of Gujarat. Hon'ble High Court directed to have qualified technical professionals who can become a link between the individual industries on one hand and the GPCB and other public authorities as well as association of industries on the other hand, with the added vital elements of accountability and transparency. This scheme is to be supervised by the GPCB and implemented effectively. The Court also directed GPCB to prepare a format of audit report to be submitted by the auditors.

Gujarat Institute of Desert Ecology is recognized as Schedule-1 Environmental Auditor by Gujarat Pollution Control Board (GPCB), Gandhinagar since January 2015 to conduct Environmental Audit of Industries in Gujarat. Environmental Audit is basically a management tool which comprises of an organized evaluation procedure for performing the Environmental Management protocols in an industrial setup to ensure waste prevention, waste reduction and to maintain other regulatory compliances. The major task of the Environmental Auditors is to monitor and evaluate the Environmental Management System (EMS), suggest, and recommend necessary improvement of EMS in the industries and informing all these activities in the public domain.

In this regard, Deendayal Port Authority has entrusted GUIDE to undertake Environmental Audit on a seasonal basis, i.e., Monitoring of Ambient Air, Water, Marine water, Noise monitoring etc. The audit work intends to gather information on the industrial processes adopted by the system. During the financial year 2023-24, a full-fledged Environmental Audit was conducted.

2. Marine Environmental Monitoring Studies at Single Buoy Mooring (SBM), Jetty and Inter-Tidal Locations of Nayara Energy Limited, Vadinar, Gujarat

Funding Agency Nayara Energy Ltd. (Formerly ESSAR Oil Ltd), Jamnagar

Project Team G. Jayanthi, K. Karthikeyan, Krushnakant D. Baxi, Hirji K. Dangar, Monika R. Sharma, Dipti L. Parmar

Project Duration Feb 2022 – Jan 2028

In order to facilitate the supply of crude oil to the refinery, Essar Oil Refinery had established a marine terminal termed as Vadinar Oil Terminal Limited (VOTL) comprising SBM, product berths, pipelines etc. The Marine Terminal's entire marine operations are executed via VOTL located at Vadinar. To monitor Vadinar's Marine environment, VOTL has given GUIDE the task of monitoring and evaluating the marine ecological status of the environment at critical locations in and around the terminal and its offshore facilities. In this regard, GUIDE was entrusted with tenth consecutive year of monthly monitoring of selected area in Vadinar coastal belt.

3. Studies on Dredged Materials for the Presence of Contaminants and Suggesting Suitable Disposal Options (as per EC & CRZ Clearance Accorded by the MOEF & CC, GOI Dated 19/12/2016- Specific Condition No. VII)

Funding Agency Deendayal Port Authority, Gandhidham, Gujarat

Project Team K. Karthikeyan, G. Jayanthi, Krushnakant D. Baxi, Hirji K. Dangar, Monika R. Sharma, Dipti L. Parmar

Project Duration November 2021 – October 2024

Deendayal Port Trust intends to develop seven integrated facilities to meet the increasing cargo handling demands of the port. The Ministry of Environment, Forests and Climate Change (MoEF & CC), New Delhi, while according environmental clearance to these developmental initiatives, among other conditions, stipulated to carry out "Studies on dredged materials for the presence of contaminants" as per the EC & CRZ Clearance accorded by the MoEF & CC, GoI dated 19/12/2016, Specific Condition No. vii and the task of carrying out the study was given to Gujarat Institute of Desert Ecology (GUIDE), Bhuj during September 2017 and the study encompasses a detailed study of various physical, chemical and biological characteristics of the sediment. This report covers the study conducted for the period from November 2018 – October 2021. This study contemplates the evaluation of the physico-chemical characteristics of dredged materials in dumped locations as outlined by "The Central Water and Power Research Station (CWPRS), Pune".

Based on the results observed during the present study, long-term Maintenance Dredging Management Plan (LMDMP) has been suggested to understand the status of responsibilities for managing natural sediment accumulation at the Port, in a way that ensures the safe and efficient operation of the Port and the protection of environmental values.

4. Environmental Audit and Management System Adequacy for Schedule-I Industries

Funding Agency Industries (As per GPCB guidelines)

Project Team K. Karthikeyan, Ratansi M. Chaudhary, Hirji K. Dangar, Ruturajsinh Sarvaiya

Project Duration January 2015 – December 2024

In 1996, the Hon'ble High Court of Gujarat in their verdict directed the Gujarat Pollution Control Board (GPCB) for implementation of an Environmental Audit Scheme for the industries in the State of Gujarat. Hon'ble High Court directed to have qualified technical professionals who can become a link between the individual industries on one hand and the GPCB and other public authorities as well as association of industries on the other hand, with the added vital elements of accountability and transparency. This scheme is to be supervised by the GPCB and implemented effectively. The Court also directed GPCB to prepare a format of audit report to be submitted by the auditors.

Gujarat Institute of Desert Ecology is recognized as Schedule-1 Environmental Auditor by Gujarat Pollution Control Board (GPCB), Gandhinagar since January 2015 to conduct Environmental Audit of Industries in Gujarat. Environmental Audit is basically a management tool which comprises of an organized evaluation procedure for performing the Environmental Management protocols in an industrial setup in order to ensure waste prevention, waste reduction and to maintain other regulatory compliances. The major task of the Environmental Auditors is to monitor and evaluate the Environmental Management System (EMS), suggest, and recommend necessary improvement of EMS in the industries and informing all these activities in the public domain. With the above-mentioned objectives, this scheme is being functional since last 10 years being implemented by GPCB through various Recognized Environmental auditors (Schedule – I and II).

GUIDE is one among the 42 Schedule - I Auditors in the state. Environmental audits are undertaken on seasonal basis, i.e., monitoring, Water, Wastewater, STP and trade effluent analysis, Hazardous waste characterization and Noise monitoring. The audit work intends to gather information on the industrial processes adopted by the system. During the financial year 2021-22, a total of 14 industries has been allotted to GUIDE based on XGN random allotment by GPCB.

5. Assessment of Water Quality in Gulf of Kachchh and Gulf of Khambhat

Funding Agency Ministry of Earth Sciences (through National Centre for Coastal Research, Chennai)

Project Team K. Karthikeyan, G. Jayanthi, L. Prabhadevi, Krushnakant D. Baxi, Nirav P. Sadhu and Bulbul Kushvah

Project Duration August 2022 – July 2026

In India, Gujarat has the longest coastline of around 1,600 km. It is broadly classified into five regions Rann of Kachchh, Saurashtra coast, Gulf of Kutch, Gulf of Khambhat and South Gujarat coast. Seawater resources constitutes one of the major natural water resources that are under the threat of over exploitation and pollution caused by anthropogenic activities. Seawater quality changes with time and space because of its effect on human and aquatic ecosystem particularly marine life. Thus, it is very necessary to have seawater quality monitoring and assessment for effective water quality management. Physiochemical monitoring is done for better understanding of the changes happening in coastal areas. Water quality parameters such as pH, salinity, micro and macro nutrients, dissolved oxygen and temperature significantly affect the water environment. The distributions of flora and fauna in marine system are mainly controlled by the physical and chemical characteristics of the water body. Coastal regions between Okha to Bhavnagar and Surat is hub for mega industries like textile, cement, chemicals, soda power plant, fertilizer and supportive industries. This coastline is also known for its rich biodiversity. Therefore, it is important to monitor the various physio-chemical parameters as a preliminary step for the assessment of pollutants and their impact on the seawater quality. The Seawater Quality Monitoring Program (SWQM) was established as the Coastal Monitoring and Prediction of Seawater (COMAPS) by the MoES in 1990. The main objective of the program was to periodically assess the coastal water quality. The SWQM program monitors and assesses the coastal water quality through collection of physical, chemical, and biological samples. In this context, the present study was carried out to monitor and compare physiochemical, biological and microbiological parameters of the coastal regions such as Kandla of Gulf of Kutch and Hazira of Gulf of Khambhat, Gujarat, India.

6. Assessment of Ambient Air Quality for DP World

Funding Agency DP World, Kandla, Kachchh, Gujarat

Project Team K. Karthikeyan, G. Jayanthi, Ratansi Chaudhary, Hirji Dangar, Ruturajsinh Sarvaiya

Project Duration September 2024 – August 2025

DP World is a multinational logistics company headquartered in Dubai, United Arab Emirates. It specializes in cargo logistics, port terminal operations, maritime services and free trade zones. Formed in 2005 by the merger of Dubai Ports Authority and Dubai Ports International, DP World handles 70 million containers that are brought in by around 70,000 vessels annually. This equates to roughly 10% of global container traffic accounted for by their 82 marine and inland terminals present in over 40 countries. Until 2016, DP World was primarily a global port operator, but since then, it has acquired other companies up and down the value chain. Our UAE heritage. From our beginnings in 1972 as a local port operator in Dubai to a global logistics provider with operations in over 69 countries and across every continent. Currently, the DP World is expanding its port network. Under this, the company has decided to construct a new jetty at the Tuna port location near Tuna Village. For the construction of a new jetty at the location the EC & CRZ clearance is obtained by the company. (MoEF & CC file no. 10-9/2017-1A- .). For compliance with the conditions given by MoEF & CC, EC and CRZ clearance. The ambient monitoring of the site is necessary. Hence the project for ambient air quality monitoring at the premises of DP World is entrusted to GUIDE. The project objectives includes Assessment of Ambient air quality for DP World and to carry out seasonal monitoring of ambient air at four locations during the construction process and to perform the analysis of ambient air quality parameters.

7. Ecological Biodiversity Studies within 10 km radius for development of captive salt jetty and associated infrastructure in Lakhpat, Dist: Kachchh, Gujarat

Funding Agency Archean Chemical Industries Ltd

Project Team G. Jayanthi, K. Karthikeyan, Nikunj B. Gajera, L. Prabhadevi, Kapilkumar N. Ingle, Krushnakant D. Baxi, Durga Prasad Behera, M. K. Kripa, Monika R. Sharma, Hirji K. Dangar, Bulbul Kushvah, Rakesh Poptani and Kaksha Soni

Project Duration September 2024 – December 2024

A comprehensive ecological assessment conducted by the Gujarat Institute of Desert Ecology (GUIDE) for the proposed captive salt jetty of Archean Chemical Industries Limited (ACIL) at Kaiyari village in Lakhpat Taluka, Kachchh. Covering a 10 km radius around the project site, the study integrates marine and terrestrial ecological evaluations to meet the Environmental Clearance conditions stipulated by the MoEF&CC. The marine component includes analyses of physico-chemical water parameters, sediment characteristics, plankton diversity, benthic communities, mangrove structure, and fishery resources, offering insights into ecosystem health and productivity. Terrestrial assessments document flora, fauna, avifauna, herpetofauna, and mammalian diversity using systematic grid-based sampling, line transects, and quadrat methods. Land Use and Land Cover (LULC) mapping highlights the dominance of creeks, agriculture, mudflats, and sparse vegetation, with mangroves occupying a smaller proportion of the landscape. The study identifies key ecological attributes, species richness, abundance, and habitat conditions, emphasizing the region's sensitivity due to proximity to the Narayan Sarovar Wildlife Sanctuary and its eco-sensitive zone covering a conservation and management plan to ensure sustainable development while safeguarding the area's ecological integrity.

8. Ecological study, Environmental Impact Assessment and coastal Regulatory Zone Clearance for 05 Creek Border out Post and Helipad in Creek Area Gujarat Sector

Funding Agency Central Public Works Department- Border Security Force, Bhuj

Project Team K. Karthikeyan, V. Vijay Kumar, Durgaprasad Behera, B. Balaji Prasath, L. Prabhadevi, M. K. Kripa, Kapilkumar N. Ingle, Dayesh M. Parmar, Muskan Karamchandani, Ketankumar Yogi, Arjan Rabari

Project Duration May 2024 – August 2024

Coastal seas are among the most crucial regions as half of the global population reside within 60 km of the coastline, leading to substantial environmental and ecological challenges, due to several anthropogenic activities. Therefore, it is essential to monitor ecological status and assessment of spatial and temporal changes in coastal and marine environment for managing the ecosystems sustainably. A border outpost/border observation post / BOP is an outpost maintained by a sovereign country on its border, usually one of a series placed at regular intervals, to watch over and safeguard its border with a neighbouring country with which it may or may not have responsive relations. Such posts are staffed by Border Security Force (BSF) and are at all times connected by radio communication with ongoing border patrols in their region and the force headquarters in the interior of the country for their day-to-day functioning, passing on intelligence and for requesting supplies and any needed reinforcements in emergencies. Depending on the length and breadth of a country's borders and geography, they could be located in a wide variety of terrain, including the inhospitable areas that often marked as the political boundaries. As per the CRZ norms, it is mandated for the Border Security Force to carry out a thorough Ecological and Biodiversity study of the proposed BOP development sites in order to get the clearance from the MoEF & CC, Government of India. Thus, the CPWD, Bhuj has approached Gujarat Institute of Desert Ecology (GUIDE), Bhuj-Kachchh to carry out the "Ecological Feasibility Study and Impact Assessment" for the construction of 5 Creeks Border Out Posts and Helipad with approach road in creek area, Bhuj sector.

9. Technical study for rectification in CRZ classification under the draft CZMP sheet for the GMB ports, port limits, and proposed locations for development of greenfield ports and port cities.

Funding Agency Gujarat Maritime Board

Project Team V. Vijay Kumar, K. Karthikeyan, B. Balaji Prasath, Nikunj B. Gajera, G. Jayanthi, Durgaprasad Behera, L. Prabhadevi, Kapilkumar N. Ingle, Dhara Dixit, Dayesh M. Parmar, Monika R. Sharma, Bulbul Kushvah, Muskan Karamchandani, Ketankumar Yogi, Arjan Rabari

Project Duration April 2024 –March 2026

India is one of the major coastal nations in the world having 5422.6 km stretch along the mainland and 2094 km of island territories which supports very high biological productivity. However, the coastal areas are vulnerable due to environmental degradation, geomorphological settings, climatic and socioeconomic changes which alter the coastal system at spatial and temporal scale resulting in degradation of ecosystem services. This scenario necessitates Coastal Governance which in due course formulated CRZ rules that were notified by the MoEF&CC in February, 1991 under the ambit of the Environment (Protection) Act, 1986. The CRZ rules plays a vital role in managing coastal development and preventing environmental degradation. The National Institute of Oceanography in 2007 has prepared a report which details the physical demarcation of HTL, LTL and CRZ boundary across the stretch of land. The Government of India revised the CRZ Notifications time to time (2011, 2014 and 2019) under the Environment (Protection) Act, 1986. The NCZMA is responsible for identifying the ecologically sensitive areas in the Coastal Regulation Zone and formulate area-specific management plans for such identified areas. Accordingly, the coastal regulations are classified as CRZ-IA, CRZ-IB, CRZ-II, CRZ-IIIA, CRZ-IIIB, CRZ-IVA and CRZ IVB. In this regard, GMB has approached GCZMA for rectification of CRZ classification in 52 sheets covering GMB Ports and Port limits as well as proposed sites for Port development. In this matter, a meeting was held in February 2024 under the Chairmanship of Hon. CM, GoG to rectify the CRZ classification in the Draft CZMP sheets of 2019. Further, in the above matter, a letter was received from Member Secretary, GCZMA asking to share evidence/technical justification for rectification of CRZ classification in the concerned sheets.

In this regard, GMB has entrusted the Work on "Technical Study for Rectification in CRZ classification under the Draft CZMP-2019 sheets for GMB ports, Port Limits and Proposed Locations for Development of Green Field Ports and Port Cities" to GUIDE.

10. Training on Edible Oyster mushroom and Medicinal Cordyceps militaris mushroom

Funding Agency Registration fees from the participants

Project Team G. Jayanthi, K. Karthikeyan, Monika R. Sharma and V. Vijay Kumar

Project Duration April 2023-March 2024

In line with the expansion of Cordyceps militaris research and training initiatives, we have successfully implemented five specialized training programs, reaching 11 participants from diverse backgrounds. The impact of these programs has been particularly noteworthy, with ten participants successfully establishing medicinal mushroom cultivation operations across multiple states, including Tamil Nadu, Maharashtra, Gujarat, and Karnataka. This demonstrates the widespread adoption and practical application of our training initiatives. Concurrent with the training efforts, the research team at GUIDE continues to conduct detailed analyses of *Cordyceps militaris* extracts, investigating their various biological activities. These ongoing studies aim to further our understanding of this valuable medicinal mushroom's properties and potential applications. The synergy between research activities and training programs has created a robust framework for both scientific advancement and practical implementation in the field of medicinal mushroom cultivation.

During the same period, an extensive series of training initiatives focused on oyster mushroom cultivation was conducted. A comprehensive training program was implemented, by which both theoretical knowledge and hands-on practical sessions were delivered, and thorough expertise in commercial cultivation techniques was ensured to be gained by participants. Four structured training sessions were successfully delivered, by which a total of 7 participants from various backgrounds were benefited. This program's effectiveness in promoting entrepreneurship was demonstrated. Essential aspects including substrate preparation, spawning techniques, pest control, and post-harvest handling were covered in the training curriculum. Specialized instruction in value-addition techniques and marketing strategies was also received by participants, whereby sustainable business models could be developed.

PROJECT HIGHLIGHTS
REMOTE SENSING AND GIS CELL – COMPLETED PROJECTS

1. To Demarcate Ecologically Sensitive Area (ESA) as per CRZ notification

Funding Agency Deendayal Port Authority

Project Team Dayesh Parmar, Ketankumar Yogi, Nikunj B. Gajera, Kapilkumar Ingle

Project Duration June 2024 - August 2024

The present study focuses on the assessment of mudflats within the DPA-designated area at Kandla to identify their sediment characteristics and biological productivity. The study also aims to evaluate the use of these mudflats as foraging grounds by marine and migratory birds, thereby establishing their ecological importance. In addition, the study documents other ecologically sensitive features within the DPA-designated areas in accordance with the CRZ Notification.

Considering the scale of development, it is essential for the Deendayal Port Authority (DPA) to ensure the integrity and planned development of the entire 10,425.42 ha area, as approximately 1,485.77 ha may be affected due to proposed port development activities. In view of the anticipated impacts on CRZ–I(A) areas, the Gujarat Coastal Zone Management Authority (GCZMA) may consider appropriate measures, including a compensatory mangrove plantation programme, to mitigate ecological impacts and ensure compliance with CRZ regulations.

2. Assessment of the High Tide Line Map by using High Tide Line Calendar for Five Years given by Gujarat Maritime Board and Satellite Imageries of Highest High Tide of that Calendar in Suvali & Hazira Villages, Surat District, Gujarat

Funding Agency Arcelor Mittal Nippon Steel India Ltd

Project Team Dayesh Parmar, Ketankumar Yogi

Project Duration September 2024 - November 2024

The present study involves a comprehensive physical assessment of the coastal environment through field surveys, DGPS measurements, drone surveys, and ground truthing to capture the existing ground conditions. Changes in the High Tide Line (HTL) were assessed by superimposing DGPS-derived HTL data on the latest LISS-IV satellite imagery (2024) and compared with the NCSCM CRZ map (2019).

The analysis indicates that between 2020 and 2024, the HTL along certain coastal stretches has shifted significantly, ranging from no observable change to landward movement of up to 1.7 km. Shoreline change is a common and dynamic process along the coastal districts of South Gujarat, driven by natural coastal processes. Except for the mouth of the Tapi estuary, most coastal stretches experience erosion during extreme events such as cyclones and high wave conditions.

3. Mangrove Mapping through Satellite Imagery

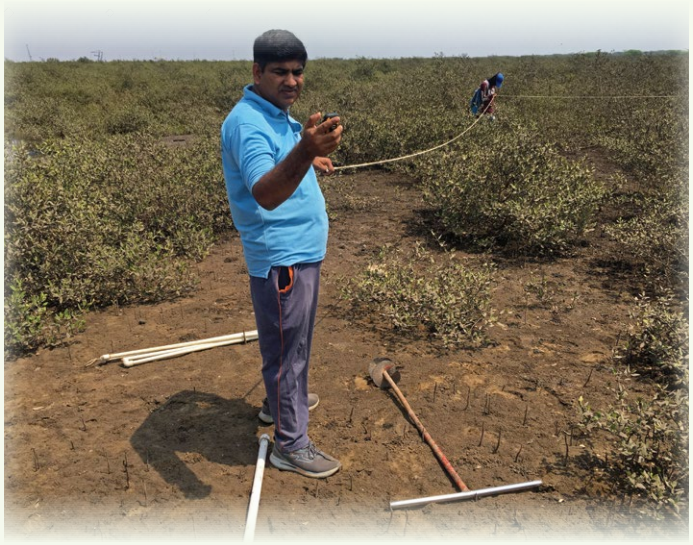
Funding Agency AMNS Ports Hazira Limited

Project Team Dayesh Parmar, Kapilkumar Ingle, Deep Dudiya, Arjan Rabari

Project Duration February 2024 - July 2024

Annual mangrove monitoring using satellite imagery and to prepare a mangrove conservation and management plan. Accordingly, AMNS Ports Hazira Limited Engaged M/s Gujarat Institute of Desert Ecology (GUIDE) to assess long-term temporal changes in mangrove cover in the vicinity of APHL using LISS-IV satellite imagery (yearly monitoring).

The present study focuses on the status, temporal changes, and ecological significance of mangrove cover in the study area. The analysis revealed a substantial increase in mangrove extent from 13.89 ha in 2014 to 78.06 ha in 2023. This significant expansion is largely attributed to regular tidal water flushing, which provides favourable soil conditions, nutrient availability, and prolonged moisture and submergence, thereby enhancing mangrove survival, recruitment, and overall ecosystem health.



4. Shoreline Change Assessment Studies Using Satellite Imageries for the Proposed Hindustan Gateway Container Terminal Kandla Private Limited (HGCTKPL) Project by DP World, Tuna, Gujarat, India

Funding Agency Hindustan Gateway Container Terminal Kandla Private Limited (HGCTKPL)

Project Team Dayesh Parmar, Ketankumar Yogi

Project Duration November 2024 and February 2025

Shoreline Change Assessment Studies Using Satellite Imageries for the Proposed (HGCTKPL) by DP world: The shoreline change analysis carried out for the period 2014–2024 along the Tuna coast reveals pronounced patterns of accretion and erosion. The 24 km coastal stretch has experienced significant shoreline dynamics, with accretion rates reaching up to 28.63 m/year, while erosion rates of up to 102.48 m/year were observed at certain locations. Areas exhibiting high erosion are primarily associated with salt pan activities, which have altered the natural coastal morphology and sediment dynamics, thereby intensifying shoreline instability.

PROJECT HIGHLIGHTS
REMOTE SENSING AND GIS CELL – COMPLETED PROJECTS

1. To Demarcate Ecologically Sensitive Area (ESA) as per CRZ notification

Funding Agency AMNS Ports Hazira Limited

Project Team Dayesh Parmar, Kapilkumar Ingle, Ketankumar Yogi

Project Duration July 2025

AMNS Ports Hazira Limited (24-25): Annual mangrove monitoring using satellite imagery and to prepare a mangrove conservation and management plan. Accordingly, AMNS Ports Hazira Limited Engaged M/s Gujarat Institute of Desert Ecology (GUIDE) to assess long-term temporal changes in mangrove cover in the vicinity of APHL using LISS-IV satellite imagery (yearly monitoring).

The present study focuses on the status, temporal changes, and ecological significance of mangrove cover in the study area. There is slight reduction in the total mangrove cover of about 2.25 ha area in 2024, when compared with the previous year 2023. A road traversing the study area has been observed, which appears to be a critical factor contributing to the decline of mangroves in both zones, primarily due to disruption of the natural hydrological regime. It is clarified that AMNS Ports Hazira Limited is not involved in any construction activity in the said area, and other facilities exist between the observed location and the boundary of AMNS Ports Hazira Limited. The present assessment is based on field observations.

GUIDE'S COLLABORATIONS
(Past and Present)

MoU / International Collaborations

- Blaustein Institute for Desert Research (BIDR), Israel
- Institute of Development Studies, University of Sussex, Brighton, UK
- Massey University, North Palmerston, New Zealand
- Norwegian University of Life Sciences, Norway
- The University of Greenwich, London, UK
- Le Centre National De La Recherche Scientifique (CNRS) and Centre d'Ecologie Fonctionnelle et Evolutive (CEFE), Montpellier

MoU / National Collaborations

- Institute of Trans-Disciplinary Health Sciences and Technology (ITDHST), Trans Disciplinary University (TDU), Bengaluru
- S.P. University, Anand, Gujarat
- Indomer Coastal Hydraulics Private Limited., Chennai
- ICAR-Central Institute for Brackish Water Aquaculture (CIBA), Chennai
- The Centre of Advanced Study in Marine Biology, Annamalai University, Chidambaram, Tamil Nadu
- C.C. Shroff Research Institute, Mandvi – Kachchh, Gujarat
- Central Arid Zone Research Institute (CAZRI), Jodhpur, Rajasthan
- Central University of Rajasthan (CURAJ), Ajmer, Rajasthan
- Centre for Advanced Study in India (CASII), Bhuj, Gujarat
- CSIR - National Environmental Engineering Research Institute (NEERI), Nagpur, Maharashtra
- CSIR - National Geophysical Research Institute (NGRI), Hyderabad
- Gujarat Environmental Management Institute (GEMI), Gandhinagar, Gujarat
- Gujarat National Law University, Gandhinagar, Gujarat
- Institute of Science and Technology for Advanced Study and Research (ISTAR), S.P. University, Vallabh Vidyanagar, Gujarat
- K.S.K.V. Kachchh University, Bhuj-Kachchh, Gujarat
- Knowledge Consortium of Gujarat (KCG), Gandhinagar, Gujarat
- Pandit Deendayal Energy University -PDEU (Formerly PDPU), Gandhinagar, Gujarat
- SANDHAN, Gandhinagar, Gujarat
- Network for Certification and Conservation of Forests (NCCF)
- GSFC University, Vadodara.
- Nirma University, Ahmedabad.
- Gujarat Industries Power Company Ltd., Vadodara.

INTERNATIONAL, NATIONAL MEMBERSHIPS AND RECOGNITIONS (Past and Present)

GUIDE is an active member in several national and international programmes in the area of Climate change, Biodiversity conservation, Combating desertification, etc. Additionally, GUIDE has recognitions at various levels by various authorities in many fields.

Memberships

- Global Network of Dryland Research Institutes (GNDRI), Israel
- International Society of Zoological Sciences (ISZS), China
- International Union for Conservation of Nature (IUCN), Switzerland
- Ocean Expert, Intergovernmental Oceanographic Commission of UNESCO
- International Hydrological Programme (IHP)
- Eco sensitive International Hydrological Programme (IHP)

Committees

- District Environment Impact Assessment Authority (DEIAA), Kachchh
- Eco-sensitive zone committee of Girnar Wildlife Sanctuary, Junagadh
- Eco-sensitive zone committee of Marine National Park and Sanctuary, Jamnagar
- Eco-sensitive zone committee of Kutch Bustard Sanctuary
- Eco-sensitive zone committee of Narayan Sarovar Sanctuary
- District Expert Appraisal Committee (DEAC), Kachchh.
- Chhari-Dhand Conservation Reserve Management Committee, Kachchh

Recognitions

- GUIDE is an Expert Organization on 'Combating Desertification' recognized by the ENVIS Centre on Combating Desertification, hosted by CAZRI and sponsored by MoEF & CC, Govt. of India, New Delhi.
- GUIDE is recognized as Environmental Auditors for Schedule - I Industries of Gujarat by the Gujarat Pollution Control Board (GPCB), Gandhinagar.
- GUIDE is recognized as Scientific and Industrial Research Organization (SIRO) by the Department of Science and Technology (DST), Govt. of India, New Delhi.
- GUIDE laboratory was recognized as State Air & State Water Laboratory by the Gujarat Pollution Control Board (GPCB), Government of Gujarat, Gandhinagar.
- Education and Research Institute by the K.S.K.V. Kachchh University, Bhuj.

Accreditations

- National Accreditation Board for Education and Training (NABET), Quality council of India (2014-2019).
- National Accreditation Board for Testing and Calibration Laboratories (NABL), Quality council of India in the field of chemical testing as per ISO/IEC 17025:2005 (February 2019- February 2022).

Awards

- Kutch Ratna Award for Environment by K.S.K.V. Kachchh University, Bhuj, Gujarat
- National Education Leadership Award by Dainik Bhaskar, Mumbai.

CONSULTANCY SERVICES OFFERED BY ENVIRONMENTAL MONITORING AND ASSESSMENT DIVISION FOR VARIOUS ANALYSIS

1. Pure Water Suppliers, Bhuj-Kachchh, Gujarat
2. ARAC International LLP, Bhuj, Kachchh, Gujarat
3. ASHAPURA PERFOCLAY LTD., Kachchh, Gujarat
4. Border Security Force, Bhuj-Kachchh, Gujarat
5. Chief Conservator of Forests (Kutch Circle), Bhuj, Kachchh, Gujarat
6. Clear Bleach LLP, Bhuj, Kachchh, Gujarat
7. Cube Contraction Engineering Limited, Vadodara, Gujarat
8. Davda Shikhand & Sweets, Bhuj-Kachchh, Gujarat
9. Dayapar Forest Department
10. Department of Chemistry, KSKV Kachchh University, Bhuj, Kachchh, Gujarat
11. Department of Life Science, M.K. Bhavnagar University, Bhavnagar, Gujarat
12. Department of Pharmaceutical Science, Saurashtra University
13. Dept. of Earth and Env. Science, KSKV Kachchh University, Bhuj-Kachchh, Gujarat.
14. District Rural Development Agency, Bhuj-Kachchh, Gujarat
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34. Taluka Development Office, Anjar, Gujarat
35. Taluka Development Office, Nakhatrana, Gujarat
36. Taluka Development Office, Bhuj, Gujarat
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44. Neelkanth Salt Chem India Pvt. Ltd, Kachchh, Gujarat
45. Davda Shikhand & Sweets, Kachchh, Gujarat
46. Mihir And Company, Kachchh, Gujarat
47. Gujarat Industries Power Company Ltd., Kachchh, Gujarat
48. LCC Projects Ltd, Kachchh, Gujarat
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50. Bhojay Sarvoday Trust, Kachchh, Gujarat
51. Eden Horticulture Services, Haryana, India.
52. Heartyculture Natural products LLP, Andhrapradesh
53. P. P. Sanghvi Hospital LLP, Kachchh, Gujarat
54. Ashapura Minechem Limited, Kachchh, Gujarat
55. 100 Hands Foundation for Building Artisans, Kachchh
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58. OMG Goli Soda, Bhuj, Kachchh, Gujarat
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60. ARAC International LLP, Kachchh, Gujarat

PUBLICATIONS

Research Papers

Nair, M. N. B., Bhatt, J. B., Paradva, B. R., Fursule, A., Raturi, P. P. and Verma, R. 2024. Sustainable Tapping of Commiphora wightii (Arnott) Bhandari. *European Journal of Applied Sciences*, 12(5): 327-338.

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Gajera N.B., Bhatt, J.B., Koladiya, M.H., Poptani, R.A. and Chauhan, V.U. 2025. Roots and Wings: Celebrating the Biodiversity of Welspun World, Anjar, Jointly Published by Gujarat Institute of Desert Ecology and Welspun World, Anjar. 92 Pages

Vijaya Chitra, A., S. Selvajeyanthi, K. Karthikeyan, K. Nanthakumar, P M Ayyasamy, 2024. Fecal Microbiota Transplantation as a Perspective of Microbiome Engineering. In Microbiome Engineering. 1st Edn. Published by CRC Press. E- Book ISBN: 9781003394662

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SCIENTIFIC STAFF		
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6.	Dr. Jayesh B. Bhatt	Scientist
7.	Dr. G. Jayanthi	Scientist
8.	Dr. Durga Prasad Behera	Scientist
9.	Dr. Sk. Sajan	Scientist (Joined on 05/04/2024)
10.	Dr. M. K. Kripa	Scientist (Joined on 01/0 7/2024)
11.	Dr. Soumya Dasgupta	Scientist (Till 31/08/2023)
12.	Dr. V. Kannan	Scientist (Till)
13.	Dr. L. Prabhadevi	Scientific Advisor
14.	Dr. Dhara Dixit	Project Scientist
15.	Dr. Kapilkumar. N. Ingle	Project Scientist
16.	Dr. Krushnakant. D. Baxi	Scientific Officer
17.	Dr. Rupak Dey	Project Scientist
PROJECT STAFF		
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21.	Mr. Bhagirath R. Paradva	Project Fellow
22.	Mr. Rakesh A. Poptani	Project Fellow
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29.	Mr. Ketankumar Yogi	Project Assistant (Till 11/04/2026)
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37.	Mr. Nirav Sadhu	Junior Scientific Assistant
38.	Mr. Ruturajsinh P. Sarvaiya	Environmental Engineer
39.	Ms. Bulbul S. Kushvah	Jr. Scientific Assistant (Joined on 06/04/2024)
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41.	Mr. Jayanti Barot	Laboratory Cum Field Assistant (Till 30/11/2024)
42.	Mr. Jeet Vaghela	Laboratory Cum Field Assistant (Till 17/09/2024)
43.	Mr. Arjan Rabari	Laboratory Cum Field Assistant (Till 30/06/2025)
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45.	Sh. Nischal Joshi	Sr. Manager (Projects & Admin.) (Till 25th Sep 2024)
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48.	Ms. Geeta Goswami	Accounts Officer
49.	Mr. Arvind. K. Lakum	Driver-Cum-Peon

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51.	Mr. Hameed. H. Maniyar	Peon-Cum-Chowkidar
52.	Mr. Dansing Bist	Cook-Cum-Care Taker
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53.	Mr. Amit Ghodasara	Data Entry Operator (WS)

S. No	Name	Designation
54.	Mr. Gani R. Node	Peon
SUPPORTIVE STAFF		
55.	Mrs. Ushaben Bhangi	Sweeper
56.	Mr. Bhura Bhai Bharwad	Watchman cum Gardner
57.	Mrs. Ramilaben	Assistant Cook

DOCTORAL STUDENTS

Name of the Supervisor	Student Details	Title
Dr. K. Karthikeyan (Co-GUIDE)	Mr. Rajendra Prasad, Ph. D. (Marine Biology), Annamalai University, Chidambaram, Tamil Nadu	Conservation of Creeks and associated Ecosystems of Deendayal Port, Kachchh, Gujarat
	Mr. L. Govind Sanjeev Kumar, Ph.D. (Manufacturing Engineering), Annamalai University, Chidambaram, Tamil Nadu	Investigating the corrosion and wear protection and control of degradation rate of magnesium alloys by pulse electro plating process
	Ms. Fakhra Sarwat, (Zoology), Gujarat University, Ahmedabad, Gujarat	Benthic Diversity in the Mangrove Ecosystem of Gulf of Kachchh with special reference to bioaccumulation of selected Organic and Inorganic Constituents
	Ms. Gayatri Thacker, (Microbiology), Saurashtra University, Rajkot, Gujarat	Isolation, Purification, Characterization and multifaceted applications of Bacteriocins
Dr. G. Jayanthi (Co-GUIDE)	Mr. Nirav A. Sadhu, Ph.D. (Chemistry), Saurashtra University	Investigation of Phytochemistry, Pharmacognosy and eco-friendly properties of selected plants from Semi-arid region of Western India: Ascertaining their role in medicinal and environmental applications

POST-GRADUATE STUDENTS (Dissertation/Project)

Student Details	Title of the Project
Under the Guidance of Dr. K. Karthikeyan	
A.S. Patel, M. Sc (Chemistry), Dept. of Chemistry, K.S.K.V. Kachchh University, Bhuj, Gujarat	Comprehensive Assessment of Environmental Parameters (Ambient Air, Waste Water and Noise) Near the Industrial Vicinity: An Integrated Approach
D. D. Parmar, M. Sc (Chemistry), Dept. of Chemistry, K.S.K.V. Kachchh University, Bhuj, Gujarat	Partial purification AND antimicrobial activity OF bacterial derived Biocompound
M. L. Chudasama, M. Sc (Chemistry), Dept. of Chemistry, K.S.K.V. Kachchh University, Bhuj, Gujarat	Assessment of Marine Water and Sediment Quality Characteristic of Selected Location of Gulf of Kachchh, Gujarat, Western India
A. Harish, M. Sc (Life Sciences), Central University of Gujarat, Gandhinagar, Gujarat	Diversity and Distribution of Plankton at Sikka and Kandla, Gulf of Kachchh with reference to select Water quality parameters
Under the Guidance of Dr. G. Jayanthi	
D. V. Chaudhary, M. Sc (Chemistry), Dept. of Chemistry, K.S.K.V. Kachchh University, Bhuj, Gujarat	Phytochemical analysis and antimicrobial activity of *Commiphora wightii* and *Commiphora stocksiana*

Ms. Rishma, M. Sc (Chemistry), Dept. of Chemistry, K.S.K.V. Kachchh University, Bhuj, Gujarat	A Study on Adsorption of Alizarin Red S Dye onto Activated Carbon of *Ziziphus mauritiana* Leaf Powder.

POST-GRADUATE STUDENTS (Internship/Training)

Name of the Student	Degree	University/College/Institution	Area of Training
Under the Guidance of Dr. K. Karthikeyan			
Ms. Greeshma. R. G	M. Sc Biochemistry	St. Berchman's College (Autonomous), Kottayam, Kerala	Isolation of total heterotrophic bacteria from coastal and marine sediment samples
Mr. Rishi Vegad	International Baccalaureate	Rishi Valley School, Andhra Pradesh	Assessment of Fluoride in drinking water samples
Ms. Tejashwi Pindolia	Ph.D Evolutionary Ecology	Indian Institute of Science Education Research, Trivandrum, Kerala.	Plant specimen preservation

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