Newsletter

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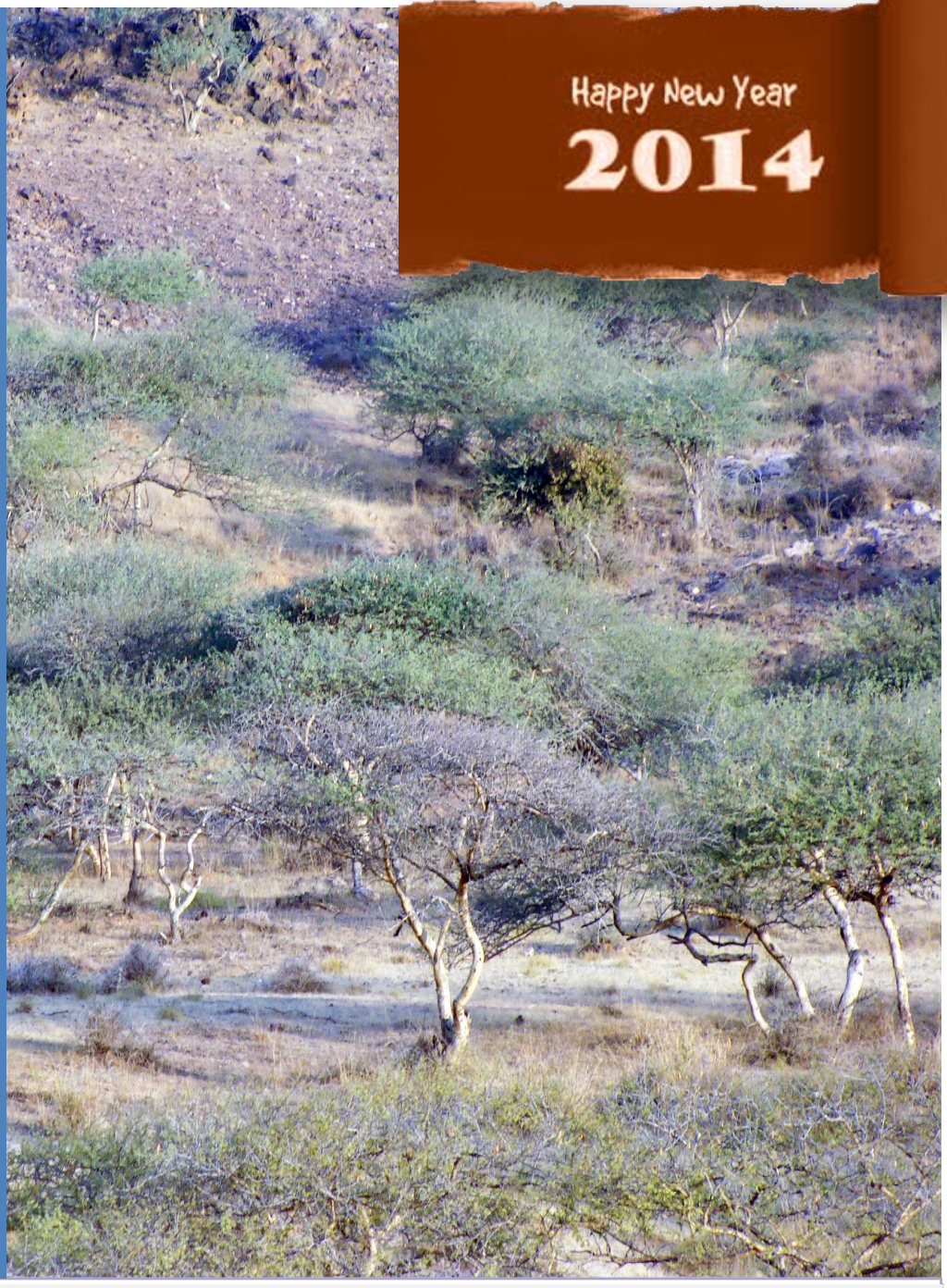

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Gujarat Institute of Desert Ecology
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Cover Stories

Dainik Bhaskar award to GUIDE for Meritorious Research and Academic Activities

In This Issue

CoHaB Programme Secondment for ESR at GUIDE

NABET TEAM VISIT

Essar's contribution in Environmental Conservation and Green Belt Development

Wetlands in Dryland

***Thuja occidentalis*- An effective radio protector for radiation induced mammalian cells.**

Acropora Coral - is the same fate for other corals?

The Real Wealth

Editor: Dr G. A. Thivakaran

Graphic & Design: Raushan Kumar Raman

Editor's Note

Greetings 2014!

The New Year 2014 has begun with new hopes and promises and ***guide.net*** has entered in its second successful year. This newsletter was created with a goal to apprise desert/arid zone ecologists of what is happening in desert science in general and Kachchh in particular. It is hoped that our goals are being met as we see from the feedbacks of our readers. Our earnest request to our readers is to share *guide.net* with researchers and scholars of similar interest in arid zone ecology in order to stimulate more thoughts and discussions on research needs, management and conservation requirements on desert ecology. As always, we are open to new ideas and thoughts which may be communicated to us in the form of articles.

Let us always remind ourselves that our collective actions, albeit unknowingly, should not destroy the living potential of earth and its environment. Actions at local and regional level to stop this will surely snowball into global level. This newsletter is an effort in this direction.

Let us all re-pledge and redeem ourselves for the betterment of desert environment in this New Year.

G.A. Thivakaran

Editor, **guide.net**

Contents

Dainik Bhaskar award to GUIDE for Meritorious Research and Academic Activities

Dainik Bhaskar, a leading newspaper group in India has instituted a National Education Leadership award in collaboration with the US based Stars of the Industry Group. Recipients' of this prestigious award include institutes and teaching faculties who have done meritorious and innovative service for the betterment of higher education and research in India representing diverse fields like marketing, advertising, communication, Technology, engineering and science. Institutes like IIMs', IITs', NITs', renowned Indian universities and organizations.

Gujarat Institute of Desert Ecology (GUIDE), Bhuj has been chosen to receive this award in view of its contribution to arid ecosystem and its function. The award was presented to GUIDE in a function organised by Dainik Bhaskar group at Taj Lands End Hotel, Bandra, and Mumbai on 23.10.2013. Mr. R.L. Bhatia Project Director, B-School affaire, Dainik Bhaskar group and Mr. Jonathan Peters, Founder, Stars of the Industry group organised the function. Prominent industrialists, academicians and senior citizens of Mumbai graced the occasion along with the award recipients. Dr.G.A. Thivakaran, Senior Principal Scientist, GUIDE participated in the award ceremony and received this prestigious award.

Essar's contribution in Environmental Conservation and Green Belt Development

ESSAR Oil Limited (EOL) has set-up an integrated petroleum refinery at Vadinar near Jamnagar to process crude oil (405000bbl/d, 20MMTPA) and condensate to produce quality product-fuels. Apart from these EOL has also established their marine facilities such as SPM, Jetty, approach road and bund to facilitate refinery. Considering the presence of 11 SPMs in the Gulf of Kutch (Reliance 5, IOCL 2, Essar 1, BORL 1, Mundra 2), a well established Oil Spill Disaster Contingency Plan (OSDCP) is in place by Essar wetted by Indian Coast Guard.

Essar Oil Limited (EOL) has cargo transfer facilities at Vadinar consists of 2 berths in the Pathfinder Creek capable to handle vessels of 10,000 to 100,000 DWT (Dead Weight Tonnage).

Apart from well defined OSDCP, many more Oil spill mitigating devices are in place at SBM as well as Jetty for No Leak strategy. Over 90% personnel on Terminal are trained for IMO (International Maritime Organization) Level-I, Spill Response by ICG & OEM. At Regional level, Essar (VOTL) has initiated and supported a need for mutual aid for Marine specific emergencies including Oil Spill. The Mutual Aid Agreement is in place between RIL, IOCL, BORL and ESSAR.

It is also ensured minimum oil spill at the SBM while transferring the crude oil from the ship to tank farm by providing Marine Breakaway Coupling (MBC) in the floating hoses. This prevent the transfer of oil during extra pressure generated due to drifting of the ships from the SBM due to any eventuality and closes valves automatically preventing any further oil spillage in an aquatic environment.

The calm and deep water of Gulf of Kutch makes it an ideal commercial cargo transit channel. However, the Gulf is also rich in marine wealth due to presence of mangroves and coral habitats. The entire region was notified as a Marine National Park and Sanctuary (MNPS) in 1982. Since 1991, coral reefs and mangroves in the region have additionally been accorded the highest degree of protection under the 1991 Coastal Regulation Zone (CRZ) Notification. Many varieties of corals and other unique marine life exist in close vicinity of the Jetty and SPM area. All coral species are categorized under schedule 1 and are threatened species.

Considering the importance of protection and conservation of corals in the MNP / MS areas, Essar as an environmental friendly organization has engaged National Institute of Oceanography (NIO) to carry out the translocation of subtidal as well as intertidal corals to conserve and protect the existing marine environment under the their supervision and in close consultation with MNP authority. NIO has carried out the translocation of these corals in association with MNP/MS authority during April 2004.

Translocation of Corals

The translocation of corals has been done elsewhere, with very moderate success rate; this was planned for the first time in the India, initiated by ESSAR for more than 15 species. In the first phase, experienced scientists will assess the extent of corals to be removed and to identify the new site for translocation. In the second phase, the logistic needed to be quantified and designed plan of action to be followed. The corals in the area were mostly solitary in nature. These corals were removed from the substratum without damaging the live corals and were transported to the new sites for translocation. Each coral were tagged with an acrylic number label.

Total 319 live corals from Intertidal area with a size range of 5-30 cm length were carefully transplanted. They mainly belong to the genera *Montipora*, *Favia, Porites, Favites, Cyphastrea, Siderastrea, Leptastrea* and *Turbinaria* at pipeline corridor, whereas 160 live corals were carefully translocated to the designated site after tagging. On subsequent monitoring these transplanted corals are found to be healthy and in good condition. The recovery of tagged corals suggests survival of 70 – 90% of translocated corals after translocation. The mortality was mainly attributed to drifting/rolling, turning upside down and subsequent burial especially of small coral boulders by the tidal currents.

In total, 1879 live corals were translocated from the subtidal corridor during October-November 2004. Among these, 147 corals were selected and tagged for regular monitoring for their survival and growth. All of these corals were identified for their taxonomical status. These were represented by 23 species of hard corals and one species of soft coral. The most dominant species were *Goniastrea pectinata, Coscinaraea monile, Favia speciosa, Platygyra sinensis, Porites compressa, Goniopora nigra, Cyphastrea seralia, Symphyllia radians, Leptastrea purpurea, Porites lutea, Porites lichens, Porites sp., Montipora sp., Turbinaria peltata* and *Hydnopora exesa*.

Subsequent study revealed that corals with tags and without tags were in healthy condition. Big coral boulders were observed to be in proper position with corals in live condition.

Essar has spent 1.52 crore for the entire project including post project monitoring for three years. The monitoring of the same translocated corals is still continuously being done by NIO. The sole objective of the project was to conserve and protect the sensitive schedule 1 organisms in a most environmentally friendly manner. The methodology used for the same was indigenously developed and emphasis was given on survivability, growth and health of the corals.

The corals present in the small pipeline corridor and jetty corridors were saved which otherwise would have been wiped out. The extent of the success of the research based programme initiated by ESSAR has opened the door for more positive approach for the conservation and preservation of endangered species. It has set an example for coexistence of development and conservation of sensitive ecology. It has also proved beyond reasonable

doubt the safe existence of industrial development in close association with fragile environmental condition, without adverse impacts, if proper planning and execution is applied.

Mangrove Afforestation

The mangrove habitats of the Gulf of Kachchh have been degraded due to various anthropogenic pressures. Hence, it was thought appropriate by the Government to increase mangrove areas in the Gulf through plantation on suitable mudflats of the Gulf.

During 2009 to 2011, ESSAR has initiated voluntary plantation of mangrove in 150 ha of the land identified by the Forest Department. Total 60000 raised beds were made and each bed was planted with 60 to 80 *Avicennia marina* seeds. The raised bed method was suggested by the Forest Department after the successful results under their own plantation programme.

Essar has spent more than 50 lakhs for the entire mangrove afforestation project including post project monitoring over the last three years. The monitoring of the same afforested mangrove for its health, status and survival rate is still continued and is being done on regular basis by Essar.

Marine Environmental Monitoring

The coastal environment of Vadinar forms an integral part of the Gulf. Hence, the knowledge of the general hydrography and ecology of the Gulf is necessary for comparing the site-specific environmental conditions with that of the parent body. Large number of industrial establishments has been set – up on the coast of the Gulf of Kachchh such as Reliance, Essar, power plants of GEB, existing and upcoming power plants of Essar, Fertilizer unit GSFC, Cement plant Digvijay cement at Sikka, Tata chemicals at Mithapur, various salt pans and commercial port such as Bedi port at Jamnagar.

NIO and Gujarat Institute of Desert Ecology (GUIDE) have been engaged to carry out yearly as well as monthly monitoring, respectively. The main components of marine environment such as water quality, sediment quality and biological parameters are being monitored and reported. Overall the operations of marine facilities of Essar have not resulted in the enhancement of levels of phenols in marine waters off Vadinar.

The sediment quality revealed that the sediment texture and sediment burden of trace metals, PHc, Organic Carbon and phosphorus in the subtidal and intertidal sediments off Vadinar showed no evidence for their increase due to operations of marine facilities in the region.

The Biological assessment revealed no gross changes in marine ecology off Vadinar due to operations of EOL/VOTL.

Green Belt

Green plants play a key role in maintaining ecological balance. They play a vital role in shaping our environment such as improvement of air quality, microclimate, water availability and soil fertility. It functions as sink for air pollutants too, particularly in industrial and urban areas. Essar has undertaken tree plantation on a large scale for Refinery and Power Plant. Surrounding areas of Refinery and Power Plant have been converted into green belt to the extent of 1028 acres. Keeping in

view the nature of pollutants expected from Refinery and pollution attenuation coefficient of plants, the plant species short-listed by NEERI are being planted at Refinery Greenbelt which include: neem (*Azadirachta indica),* karang (*Pongamia pinnata),* sissoo (*Dalbergia sissoo),* desi babul (*Acacia nilotica),* australian babul (*Acacia auriculi formis) and* cassid (*Cassia siemea).* Normally 2000 trees are planted per hectare which takes care of 5 M^2 per Tree with 10 Metre height.

The layout of greenbelt of existing Refinery project and photographs of greening the Refinery Projects and surrounding areas are given below:

Optimization of water in Green Belt:

The Watering to orchard is done by Drip Irrigation network with following objectives:

- Uniform water distribution through drippers & easy to operate
- Minimize the water consumption by plants
- Minimize the irrigation cost
- Minimize the water evaporation rate
- In-organic fertilizers can be supplied to plants without any extra cost

Self sustainability from Green Belt

In order to maintain the large part of the refinery greener, plantation of some orchard tree species have been planted under greenbelt and the revenue generated from the orchard and commercial timber plantation would be spent for the continuous development and maintenance of greenery. The orchard species such as mango, sapota, pomegranate, ber, fig, lemon, guava, mosambi, etc. are covered under the orchard plantation scheme. The photographs showing the large scale Mango plantations carried out in the year 2005-06:

Essar's Initiative in Nature Conservation (ECO-PARK & NATURE TRAIL):

The Nature Conservation Center is being set up in Greenbelt of Refinery area with following prime objectives:

1. Center dedicated to protect and conserve the local flora & fauna of the Saurashtra region which are getting extinct.
2. Center activities dedicated towards development of innovative techniques to protect natural areas of particular ecological and cultural importance.
3. Center will provide training of conservation for surrounding local villagers in environmental education and communications.
4. Involve local communities in all aspects of management and Conservation of Nature
5. Center will provide the opportunity to experience ,inspire and passion for nature and promote environmentally responsible choices through experience and education

Biodiversity

Although green belts are largely planning designations, they can directly or indirectly support biodiversity objectives by providing and maintaining connected open spaces in a highly industrial areas.

We Essarites are eco-friendly towards nature conservation, preservation and MAINTENACE OF ECOLOGICAL BALANCE……

We love nature and strongly believe that we are part of nature. We plant at least one tree per barrel of crude Oil Processed at our refinery. Our aim is to make the Refinery as a GREEN REFINERY without compromising environment wellbeing.

Dr. Jayaraman Gopal
Head-HSE-Energy Business,
Essar Oil Ltd, Vadinar
Dr Pratik Mehta,
Marine Ecologist,
Essar Power Gujarat Limited

CoHaB Programme Secondment for ESR at GUIDE

'Diasporic Constructions of Home and Belonging' (CoHaB) is an International Trans-disciplinary Research Project, Financed by the European Union's Marie Curie ITN. Professor Nilufer E. Bharucha from Mumbai University is the Coordinator and Scientist-in-Charge of the project.

The CoHaB Network institutions include University of Muenster-Germany, the University of Mumbai-India, the Universities of Oxford and Northampton and the School for Oriental and African Studies (SOAS) in U.K. and the University of Stockholm in Sweden. The Centre for Advanced Studies in India (CASII), India is the partner of the CoHaB project and Gujarat Institute of Desert Ecology (GUIDE), Bhuj-Kachchh is a partner of CASSI.

As part of the programme on secondment, three early stage researchers (ESR) from Mumbai University (Ms. Iulia Nicoleta Rascanu, Ms. Ruby Rana and Mrs. Melanie Robin Wattenbarger) and one ESR from Munster University (Ms. Holly Jennifer Morgan) have visited GUIDE during the period between 3rd and 30th November, 2013.

The students have undergone field explorations in connection with Diaspora and its linkages with the environment. They have investigated the Diaspora and migration aspects of communities in Kachchh that includes Banni Maldharis, Pachchham Communities, Rabari Communities of Rapar and Bhachau, Maritime and Fishermen Community of Mandvi. Apart from these, they have visited many ecological and environmentally important places linked with Diaspora like Dholavira, Dinodhar, Lakhpat, Madhapar, Baladia, White Desert and Kaladungar.

Expert from different discipline like Dr. Heena K. Gangar, Dr. Vimmi Sardarngani, Dr. Lalitha Narayan, Ms. Judy Frater, Dr. V. Vijay Kumar, Dr. G. A. Thivakaran, Dr. A.K.R. Mahato and Mr. M. Laxman have delivered lectures on Refugee Diaspora, Sindhi Diaspora, African/US/UK Diaspora, Frugal Techno-innovative of Diaspora and Peoples and Environment of Kachchh.

NABET TEAM VISIT

A high level technical team consisting Dr. Bhaskar Murthy and Dr. Narendra Bachshi from NABET visited GUIDE on 19th and 20th of December 2013. The purpose of the visit was to award NABET accreditation to GUIDE and its scientists and scholars. The team visited GUIDE laboratory and interacted with all scientists and scholars.

Wetlands in Dryland

Formation and function of wetlands, as an ecosystem is characterized by water. In dry regions like Kachchh, wetland is an important source for biodiversity and human livelihood. In Kachchh totally 340 inland wetlands (>10 ha) were identified. Coverage of wetlands (2, 17, 7200 ha) is more than total forest cover in the district. Some of the important and well-known inland wetlands of Kachchh are Pragsar lake, Bhimasar and Shinay lakes, Devisar tank, Munjasar talav, Tapar dam, Rudarmata dam, Nirona dam, Ningal dam and Kukma village tank. Other than these major ones, some minor but ecologically important wetlands are Ler dam, Don reservoir, Topansar tank, Godhatad and Sanadhro dam, Karaghoga and Vijay Sagar dam and Changadasar talav. The Little Rann of Kachchh (LRK) and the Great Rann of Kachchh (GRK) are unique seasonal freshwater- cum-saline wetland ecosystems; the kind of which could be found nowhere else. Apart from them there are numerous Jheels in Banni, talavs, dams, seasonal water bodies, streams, marshlands, mangroves and large stretches of mudflats that contribute significantly to make Kachchh a dry land with numerous wetlands.

Despite their significant ecological, hydrological and socio-economic roles, the wetlands have undergone major change and face major pressures now and in the near-future in the district. Their biota has been facing threats from several man-induced factors. Some of these threats include: Changes in wetland extent due to ecological causes such as drought, siltation and sedimentation, non-

ecological causes such as washing, encroachment, dredging and filling, over-extraction of water for irrigation, pollution, disturbance to the birds by tourists, burning of dry emergent hydrophytes, fishing, etc. Local communities extensively use wetlands, and their livelihood depends on the health of these wetlands. Even the wetlands protected by law are not completely free from degradation due to these anthropogenic activities.

In the light of freshwater shortage and frequent drought, conservation of wetlands assumes significance.

In Kachchh, there is a need to improve general health of wetlands.

Improving the water quality by stopping discharge of effluents rich in detergents, pesticides and garbage, banning encroachment in the wetland catchment areas are some drastic measures immediately needed.

In view of the urgency for their conservation, remedial measures like awareness programme needs to be arranged on priority basis. Institutions and NGOs should be encouraged to organize, educate and improve the capability of local communities to manage them as community biodiversity reserves. These areas should be used by local communities for their livelihood on a sustained basis. This is a also a need to develop Wetland Conservation Authority in Gujarat to improve human resources and management capability to conserve the wetlands of the state.

Dr. Jagruti Sangvi

DST-Woman Scientist
Gujarat Institute of Desert Ecology
Bhuj-Kachchh

Thuja occidentalis- An effective radio protector for radiation induced mammalian cells.

Thuja occidentalis is a well known medicinal plant belonging to family Cupressacae. *Thuja occidentalis* is commonly known as American arbor vitae or White Cedar. It is indigenous to eastern America and is grown in Europe as an ornamental tree. The plant was first identified by native Indians in Canada during expedition in 16th century and was found effective against Scurvy. In folk medicine *T. occidentalis* has been used to treat Bronchial Catarrh, Enuresis, Cystitis, Psoriasis, Uterine carcinomas, Rheumatism and is also used as an anti-cancer agent.

The development of radio protective agents has been a subject of intense research in view of their potential for use within a radiation environment such as space explorations, radiotherapy and even nuclear war. In traditional Indian system of medicine several plants have been used to treat radiation mediated ailments. Radiotherapy is required by almost 80% of cancer patients for curative or palliative purposes. The use of radiation to treat cancer inevitably involves exposure of normal tissues whose cells are destroyed by damaging the genetic material.

T. occidentalis can be used as a radio protector that can facilitate the healing of radiation injury. It contains Polyphenols like Anthocyanins, Flavenoids, Tannins and Lignins. Thuja's extracts eliciting radio protective properties contain a Plethora of compounds including antioxidants, immune-stimulants, cell proliferation stimulators and anti microbial agents.

Tannins possess radio protective ability by scavenging free radicals, thereby sparing enogenous antioxidant enzyme system. This confers protection against ROS (Radiation induced reactive Oxygen species) and RNS (Radiation induced reactive Nitrogen species). Cells and tissues are equipped with endogenous enzymes eg: Super oxide dismutase (SOD), Glutathione peroxidase (GPx), catalase, reduced glutathione Glutathione S transferase capable of neutralizing free radical induced cellular damage. GSH performs multifunctional activities to attenuate radio toxicity by scavenging free radicals, synthesis of DNA precursors and maintaining ATP levels. However, once the reactive oxygen species increases above tolerable limits the

endogenous system fails to protect the cells from hazardous effects of radiations.

The effect of *Thuja occidentalis* against damage induced by gamma radiation was studied where whole body of Swiss Albino mice was exposed to radiation. This radiation reduced total WBC count to 1900 cells/mm^3 , on third day count of WBC was elevated to 2050 cells/mm^3 by the administration of alcoholic extract of *Thuja occidentalis* (5mg/dose/animal). Six animals from each group were killed after 2, 7 and 11 days of irradiation to detect the bone marrow cellularity and radiation induced toxicity. The number of bone marrow cells and alpha esterase positive cells in control animals (those not treated with the alcoholic extracts of *T. occidentalis*) after 11 days was reduced to 12.2×10^6 cells/femur and 693.5/4000 cells, respectively. But in the treated animals, bone marrow cellularity was increased to 16.9×10^6 cells/femur and alpha esterase positive cells were 940/ 4000 cells which are near normal level. Alcoholic extracts of *T. occidentalis* reduced the elevated levels of GPT (glutamate pyruvate tranaminase) and alkaline phosphatase in liver and serum after irradiation. The lipid peroxidation levels were also lowered in the irradiated animals treated with *T. occidentalis*. This experiment proved the ability of *T. occidentalis* to repair the damage caused by radiation. It has also been reported that Thuja also increases the proliferation of spleen cells as well as increases TNF-α (Tumor necrosis factor) activity in serum which proves its protective effect against radiation induced toxicity.

Thuja is also used as a medicinal herb and its essential oil is THUJONE. Thujone rich fraction of *T. occidentalis* demonstrated major anticancer potential evidences from *in vitro* studies on A375 cells of human tissues. Its crude ethanolic extract is also used as homeopathic mother tincture (ΤΟΦ) to treat various ailments, particularly moles and tumors.

Thus, *Thuja occidentalis* has proven as one of the herb possessing radio protective properties and can be used as an anti-cancer agent in this cancerous age.

Ms. Shweta Vaidya
MSc (Final)-Environmental Sciences
KSKV Kachchh University
Bhuj-Kachchh

Acropora Coral - is the same fate for other corals?

Coral reefs, the most diverse marine ecosystems, are the biodiversity hotspots of marine regimes. High species diversity and very high rate of biological productivity make coral reefs very important and unique marine ecosystem. It has a significant role as carbon sink besides providing habitat and food for fishes, crabs, prawns and other marine life. (http://www.geciczmp.com) Worldwide, Corals are dying in an alarming rate.

One such example is the extinction of *Acropora* coral in Jamnagar Coast of Gulf of Kachchh. *Acropora* is a genus of small polyp stony coral under the Phylum Cnidaria. Some of its species are known as table coral and staghorn coral. Despite being a declared Marine National Park and Sanctuary (MNP & S), Jamnagar coast continue to witness setting up of industries, ports and promotion of eco-tourism. Other factors that degrade marine ecosystem in this coast are increased anthropogenic pressure, unsustainable coastal development, over-fishing, rise in sea temperature and ocean acidity, caused by global warming, pollution from human activities such as sewage, and agricultural run-off. This continuous onslaught renders the corals degrading and several species of corals are either on the brink of local extinction or becoming rare and threatened. One such species is *Acropora*. This species has disappeared totally at Jamnagar coast in the last one decade while many more species face similar fate in the near future. The loss of corals will have profound implications for people who depend on coral reefs for their livelihoods like fishing. As the corals die, so do the other plants and animals that depend on coral reefs for food and shelter, and this can lead to the collapse of entire ecosystems. The threat to the corals is probably unprecedented in modern times.

In order to bring back the extinct coral, a joint effort was made by the Gujarat Forest Department and Wildlife Trust of India (WTI), under the aegis of Tata Chemicals Limited (TLC) at Mithapar, Jamnagar. Corals were transported from Agatti Islands of Lakshswadeep. This coral restoration and re-plantation largely aims at ecosystem restoration besides other fringe benefits like

boosting ecotourism and enhancing fishery production.

Now the question is how we are going to conserve the corals that were brought back and what will be the fate of other corals that already exist. Nonetheless, some questions remain unanswered. Will the industrialists and government bodies give up the unsustainable development in this fragile ecosystem? It's time to adopt the middle path of development and learn from each other's experience. Still a break through path should be needed to preserve the extinction of corals.

Ms. Devi
Gujarat Institute of Desert Ecology
Bhuj, Kachchh, Gujarat

The Real Wealth

Everyone hopes to achieve something in life. Life one can say, "Learn incredible functionality to earn"; whatever the dignity, status in modern scenario. The race begins when you come to the Earth. Freedom of thoughts changes with the rhythm of time. Which, we call a fully developed society now-a-days. Science teaches us to assemble the entire thoughts in efficient manner for a better tomorrow. Let us imagine a world where everything is unsystematic or unplanned; then it is really difficult to manage things on time. We often say that we are living in a civilized society but where the change comes from. We are responsible for every bit of the present scenario. In one hand, we are protecting nature and on the other hand we are destroying the beautiful nature.

We are in 21st century, achieved number of good things from the ground to space. But have not developed the standards of thought still. Human brain is the best among all species in the world.

When human brain gives an idea that change tomorrow, it will result into fruitful outcomes or sometimes in severe damages. Comparing the results will often depends on situation but

Is it our real wealth?

India stands for unity in diversity. The area is significant due to its vast culture. Today we are a developing nation but we are missing our great ideology and essence of life inherited from our past. Now, our behavior and attitude is so uncivilized that we realize the feelings of other only after hurting them. The revolution for bringing of Jan Lokpal Bill in the country focuses how we are fighting against corruption.

!! Let us change our thoughts for a better tomorrow!!

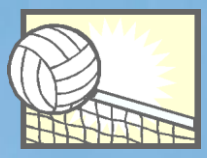
!! Don't be in a hurry to practice bad activities!!

!!Don't Jealous with others; it's you to change the environment!!

!!Real Wealth is what we kept with ourselves from our great heritage;

!!Let us join together for a better India!!

Let us give freedom to mind, body and Soul……



Never judge the face with one side. Give Space to everyone progress

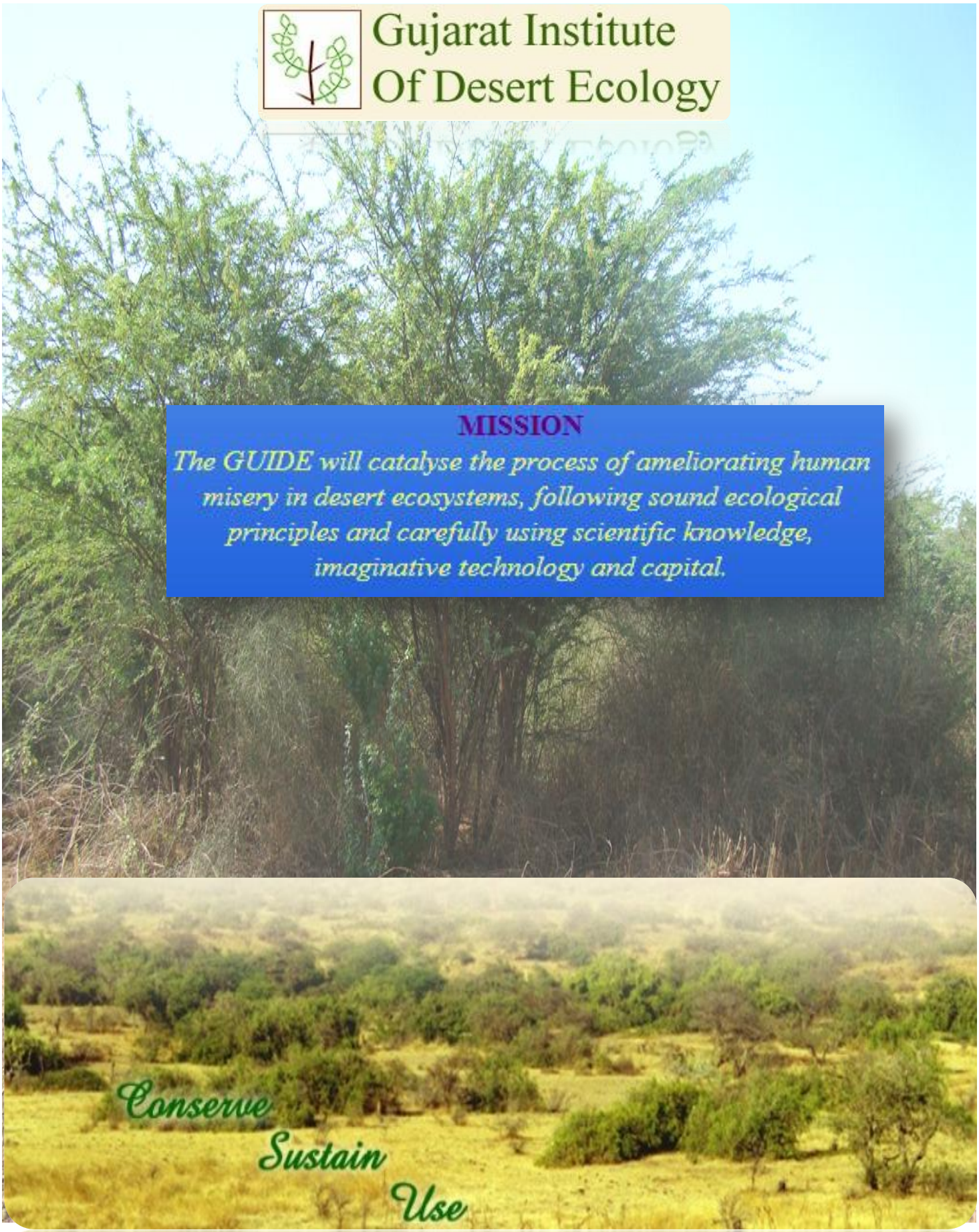
!! This is the Real Worth!!

Be always live in high spirits…..

Raushan Kumar Raman
JRF-(GIS & RS), GUIDE

Events

- 9th International Conference on Air Quality 2014 (Website: http://www.airqualityconference.org), 24 -28 March 2014, Garmisch-Partenkirchen, German.
- 5th International Congress on Arsenic in the Environment 2014, (Website: www.as2014.com.ar) 11–16 May 2014, Ciudad Autónoma de Buenos Aires, Argentina.
- 4th iLEAPS Science Conference "Terrestrial ecosystems, atmosphere, and people in the Earth system"2014, (Website: http://www.ileaps-sc2014.org) 12–16 May 2014, Nanjing, China.
- The 3rd World Congress on Agro forestry 2014 (Website: http://www.wca2014.org/) 10 – 14 February 2014, Delhi, India,
- National Conference on Biodiversity: Challenges & Issues (Website: http://ncbci.servenature.in) 10 –11 Feb 2014, Shillong, Meghalaya, India
- 4th International conference on Climate change and sustainable management of Natural Resource (Website: http://www.itmuniversity.ac.in) 12 –14 Feb 2014, MP, India.
- Workshops on Research Methods and Application of statistics for Biological Science Students (Website: http://www.nioh.org/noihworkshop2014), 24 –26 Feb 2014, Ahmadabad, India.
- Environment, Technology and Sustainable Development: Promises and Challenges in 21st Century, (Website: http://www.etsd2014.org) 2-4 March 2014, MP, India.
- International Conference on Climate Change (Website: http://wwwyadavacollege.org) 28-31 March 2014, Madurai, Tamilnadu, India.
- International Research conference (Website: http://conf14.jbims.edu.) 06-07 March 2014, Mumbai, Maharashtra, India.


Gujarat Institute
Of Desert Ecology
MISSION
The GUIDE will catalyse the process of ameliorating human misery in desert ecosystems, following sound ecological principles and carefully using scientific knowledge, imaginative technology and capital.
Conserve
Sustain
Use