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Quarterly Newsletter



Gujarat Institute of Desert Ecology

Bhuj-Kachchh, Gujarat, India

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Editor :

Dr. G. A. Thivakaran

Editorial board:

Dr. Nimisha Tripathi

Dr. Arun Kumar Roy Mahato

Dr. Pranav Pandya

Mr. Nainesh Patel

Ms. Devi Valuswami

Graphic Design

Mr. Dayesh M. Parmar and Mr. Raushan Kumar

Editor's Note

Welcome to the second edition of guide.net. This issue features articles as diverse as alien species in Kachchh and Baya Weaver's nest. This issue captures some priority topics vis-à-vis Kachchh environment and its arid zone ecology and it depicts an array of activities GUIDE is involved in presently. The least explored ecosystems of Kachchh offer enormous scope for innovations and new approaches as it pose multifarious ecological questions. Traditional and modern lifestyle of Kachchh populace is inextricably linked with its environment. A pastoral and nomadic community supported by its grasslands, considerable chunk of fishing population depending on rich fishery resources of fertile offshore fishery grounds, white expanse of least explored Rann, astonishingly diverse avifaunal communities, lush green mangrove formations supporting rich fishery ground and coastal livestock and numerous coastal and near coastal habitats are a unique composition of ecosystems which enriches aesthetic and ecological diversity of Kachchh. Fast developing industries both in the coastal and inland realms adds complexity to the existing ecological issues demanding again a careful understanding of how ecosystems will respond to this man-made interventions and how best they could be maintained pristine.

In Kachchh environment, still there is a yawning gap between what we know and what we do not. Pressing issues of Kachchh like more effective water conservation, innovative approaches to improve arid agriculture, rational utilization of ground water and harnessing natural energy like solar and wind needs enhanced attention from research communities. Vast expanse of Rann could be put to multifarious, but environmentally conscious usage especially for non-conventional energy development.

Likewise, in spite of its aridity, Kachchh' aquatic realm is scientifically so fascinating that it calls for sustained attention akin to its terrestrial environment. For instance, aquatic extremophiles of Rann possess unique characteristics whose further investigations will unravel many new facts about physiology of arid zone organisms. So is the occurrence of marine alien species. Growing maritime activities and increased vessel movement in Gulf of Kachchh waters makes it imperative to pay intense attention to this hitherto ignored aspect of marine ecology, which one day may pose severe livelihood issues due to its implication to fishery resources. It gains all the more importance in the light of our Prosopis experience. Overlapping socio-economic, ecological and developmental issues again calls for a holistic and multi-disciplinary effort by scientists of different walk.

It is apparent that the magnitude of scientific issues confronting us in Kachchh is truly enormous and needs a well-orchestrated multi-pronged and sustained effort to address them. Similar to the previous issue, this issue of guide.net discusses some issues directly relevant to Kachchh.

*Editor
Guide.net*

From the Director's Desk

As we step into 2013, I wish you and your family a very happy and prosperous New Year.

Gujarat Institute of Desert Ecology (GUIDE) in its 17th year of existence. Introspection of its path since 1995 clearly shows that we have made our presence felt through our multifarious scientific activities, addressing many socio-economic and environmental questions in the process. Whether it is our contribution to understand and address the process of Rann Desertification, ecological and socio-economic linkages at Banni grassland, unraveling the ecological intricacies of Kachchh mangroves or the larger coastal and terrestrial biodiversity questions, GUIDE has eked out a place for itself. In recognition of its contribution to Kachchh environment, GUIDE has been recently honored with the title, 'Kachchh Ratna' by Kachchhi Chair of KSKV Kachchh University. As a part of our continuing process of manpower and infrastructure up gradation, our core scientific team has been further strengthened by additional manpower.

We in GUIDE are aware that to make a difference, our activities should be in tune with the environmental necessities of Kachchh. Accordingly, a three pronged approach, namely research, academic and assistance to industries is followed. In the research sphere, many new research projects funded by central and state funding agencies have either been initiated or are in pipeline. Recognition of GUIDE laboratory by Gujarat Pollution control Board (GPCB) is a pointer in this direction. As a mark of its broadened vision and expertise, GUIDE's assistance has been sought by Desert Research, Monitoring, Control Centre (DRMCC) of Yobe University of Nigeria to study its arid zones.

Likewise, our contribution to the advancement of arid zone ecology has been widely lauded in the recently held International Conference on Drylands, Deserts and Desertification at Sede Boquer, Israel attended by the Joint Director of GUIDE, Dr. V. Vijaykumar. Simultaneously, knowledge sharing and gaining through organized annual scientific events like conferences, workshops and seminars is a regular feature since 2007. As a follow-up, an environment-industry linkage conference is being envisaged during the earlier part of next year.

GUIDE's contribution in the academic sphere includes its active involvement in teaching MSc environmental Science and BSc Marine Sciences students of Kachchh University. Through this process it is strongly hoped to create a well-trained scientific manpower pool in the Kachchh region which will further promote and advance our endeavor to understand and sustain arid Kachchh environment. Similarly, it has been GUIDE's earnest attempt ever since its inception to assist industries to negate their repercussion in order to create a sustained environment and many corporate houses in Kachchh and elsewhere have been rendered valuable assistance in this regard.

We are aware that only a sustained and unflinching attempt will help us achieve our goal of creating a better environment for posterity and, as always we are determined to work towards to this goal.

*R.V. Asari
Director
GUIDE*

Invasion of Alien Species- Some Comments

Introduction

*With increased globalization, biological invasion of exotic species into native biodiversity of any country is a threat ecologists and natural resource managers have to cope with. In agriculture sector alone billions of US dollars are being spent to check or neutralize the detrimental impact of some of the biological invaders. While in agriculture systems their invasion is detected earlier, in forest ecosystems, freshwater and coastal wetlands and common lands such invasion becomes visible only at a later stage when it is too late. There is complete lack of studies on marine alien species in Gujarat though it is a major maritime state with largest number of ports. On terrestrial side, the best case in point is *Prosopis juliflora* which was introduced deliberately during later part of 1800 in Kachchh as it was thought to control desertification and would provide green cover in an area that is otherwise sparse in vegetation. While this species is known to provide many livelihood option in an arid settings like Kachchh, its impact in negating the local floral biodiversity is apparent. While this controversy on its pros and cons are raging and inconclusive, it is imperative to gain some insight into some salient points of biological invaders and ways and means to cope with it. This article highlight some of such points which will further our understanding of the science of biological invasion.*

Alien Plant Invasion

*It appears almost all introductions of non indigenous species in some way are facilitated by human activities. The best example in marine ecosystems is introduction of alien species by ballast waters. In terrestrial ecosystems, besides the best known example of *P. juliflora*, *Parthenium hysterophorus* has been introduced through commercial food grains*

*during this century and declared as weed of national significance in India. Increasing trade and commerce through land and sea routes provide perfect means of spread for these invasive plants. Their ability to remain dormant for prolonged period of time and resilience and plasticity to new environmental conditions enable them to get established and spread quickly. There have been few attempts in India to identify and quantify the origin, number and possible impact of biological invaders that inadvertently arrive at our ports and borders while in countries like US preliminary screening is in place to track such biological invaders albeit with limitations. However, it is to be noted that among the introduced species, only a few become invasive and again there is no much effort to monitor their arrival and establishment. This is one area of research priority to safeguard biological integrity of the country. This is further eased by the fact that many of the plant species introductions in the country are intentional (best example being the *bt.cotton* in agriculture; new species in aquaculture; plants for landscaping and gardening). Countries of Africa and south America and Middle East are possible sources of invasive/non indigenous species with which there has been a spurt in trade and commercial activity recently.*

Establishment of Invasive Plants

Introduction of invasive plant species in small numbers are not likely to survive due to many environmental, biological and genetic factors. However, multiple and sequential introduction of species which have got the plasticity and elasticity to survive and establish in new environment could easily become invasive in nature in due course of time. Most of the invasive

Invasion of Alien Species- Some Comments

*species are hardy and capable of withstanding harsh environmental condition such as those of Kachchh, which render this region more susceptible to biological invasions of plant as well as animal species. Here again abiotic and biotic factors governing an exotic species survival and establishment is so varied and little understood that each species will have to be studied to arrive at conclusions regarding their life history. Some basic traits like long flowering and fruiting period, short time between seed germination and flowering, prolific seed production, prolonged period of dormancy enable them to establish successfully. All these traits are shown by **P. juliflora**.*

Invasive Species- Some General Characteristics

Almost no data exist to show that how invasive an introduced plant species could be in a new environment. Tracking seed and propagules movement could provide some clues as to how invasive the plant could be. It is known some dispersal mechanisms like wind and cattle transport could be potential source of spread in arid treeless ecosystems like Kachchh. Some traits of the non indigenous plant species that render them invasive include a deep and dense root system to capture water in arid zones, abundant nectar that attract pollinators, high nitrogen fixing capacity that alters soil chemistry and high fire resisting and heat yielding capacity; traits none of the native species possess disabling them less competitive and rendering them to become extinct in the run. Strong genetic makeup is another trait to the advantage of invasive plant species.

Impact Evaluation of Invasive Plants

*Assessing the impact of invasive plant species is challenging indeed; a task further complicated by the seeming benefits they provide in terms of livelihood options by way of fuel and other benefits especially in arid zones like Kachchh. Present management dilemma vis-a-vis **P. juliflora** largely stems from these so called advantages they provide. By and large, investigators largely disagree on the measurement of its ecological consequences. Effects at genetic, population, community, ecosystem and economic levels further complicate the impact assessment.*

Lack of data on the structure and function of previous ecosystem before invasion makes it further difficult for comparison. An invasion is recognised only after it has occurred and the ecosystem has changed unrecognisably.

*Invasion of **P. juliflora** in Kachchh has enabled us to gain some insight into the general nature of invasion of woody plant species. Based on that some conclusions could be drawn.*

*Though numerous economic benefits are being attributed to the all pervasive **P. juliflora**, its impact on native plant species in particular and arid biodiversity in general should be re-evaluated in the light of already carried out studies and new studies with the sole objective of assessing its impact on biodiversity. Similarly, efforts to reconstruct Kachchh ecosystem in its pre-invasive period could be done to the maximum possible extent through the available literature for better comparison with the present conditions.*

*Invasion of **Alien Species**- Some Comments*

*A common accepted procedure to measure the impact of invasive plant species with special reference to **P. juliflora** should be formulated by the scientific community.*

*Scientific studies based on this procedure would address many of the outstanding questions on its perceived benefits and negative impacts on the social, economic and ecological spheres. The formulated procedure will have far reaching utility in solving many of the issues pertaining biological invasions of other species as well. This common procedure would also help the widely accepted management solution of site specific control/promotion vis-a-vis **P. juliflora** by giving a concrete indication.*

*Despite a widespread outcry on invasive plant species like **P. juliflora**, studies on the various facets of its ecology and biology are either inadequate or irrelevant to frame a solid management approach on this species. Priority areas for research should be identified to fill this gap.*

Multi disciplinary studies involving researchers of population ecology, soil chemistry, simulation modelling, etc. should be undertaken to fill this gap.

G.A. Thivakaran
Wetland Division
Gujarat Institute of Desert Ecology
Mundra Road, Bhuj-370 001
athivakaran028@gmial.com

SOPHISTICATED ARCHITECTURE OF BAYA WEAVER'S NEST



The Baya Weaver's nest is an architectural feat. The nest architecture is complicated. Each nest is constructed from grass leaves, plaited in a very complex way. A completed nest looks like an upside down flask with a downward pointing entrance tube. Within the swollen portion is the nesting area. The general features are a central nesting area with a long tube that leads to a side entrance. This tube makes it difficult even for snakes to enter the nest. Although they look precarious, most nests are very well attached and are impossible to remove without almost destroying the nest. The nests last well through the 3-month breeding season, sometimes even up to a year. After the breeding season, other small birds may roost in the abandoned nests. The nests are made entirely out of strips of grass which the birds collect by cutting a notch in a tall grass, then stripping off a 30-60 cm length. No stalks or entire grass blades are used. The birds then use their strong beaks to weave and knot the strips of grass. A newly-made nest is green with fresh grass and turns light yellow/brown as the grass dries. The males are promiscuous and try to attract females by building several nests halfway. These half-built "male" nests look like motorcycle helmets complete with chin strap! Lumps of dry clay may be inserted around the rim to stabilize the nest in strong winds. The male performs displays and songs on these half-built nests to attract a

mate. This type of nest is also called a "cock-swing"!

A female bird first inspects the male's handiwork of a nest before signaling her approval to him. If the female does not approve of the construction, he will abandon it. Obviously a strong and properly constructed nest is crucial to successful breeding as otherwise the nest may fall off before the chicks fledge. Once he has her approval, he will continue with the construction, completing it with a tube-like structure below the entrance. If the nest construction seems to be incomplete; probably the male Baya Weaver is having a rest or cannot find enough nest materials? Or probably the male does not want to continue building his pretty house for the female, because she is not pleased with the house he built and has to be abandoned by the architect.

It is not only humans that have special courtship behavior. Baya birds, in order to attract a female, need to pay a "bride price" or a guarantee of a home to raise the young. The male has to build a "castle" for the female before the copulation is allowed. The many male birds can be seen competing with one another to collect materials and construct the nest. They are all busy arranging the grass leaves piece by piece, plaiting them carefully to slowly construct the nest before presenting to the female for approval. The bird that builds the most

SOPHISTICATED ARCHITECTURE OF BAYA WEAVER'S NEST

“beautiful and comfortable” nest will win a female for the current breeding season. Once a female chooses to mate with him, he might finish the nest. But often, the female completes the nest. Weaved nest needs regular repairs, as with use and the extra weight of the chicks, the neck gets overly stretched. Repairs consist of weaving in new grass materials to tighten the nest and to secure its attachment. The presence of green strands in a mostly brown nest shows evidence of such repairs, rather than recycling of the nest. Lumps of clay have also been found plastered on the inner wall of the nest, probably to stabilize the nest. When the female lays and is preoccupied with incubating the eggs, the male abandons her and immediately uses his other half-finished nests to woo a new female. Most males mate with two females, but sometimes three. The males defend his nests from other males. Meanwhile, the female is left to incubate and raise the brood on her own. 3-4 white eggs are laid and the nestlings are fed insects.

*Nikunj B. Gajera
Project Scientist
Gujarat Institute of Desert Ecology*



Health benefits and Medicinal Uses of Seaweeds

Introduction

Seaweeds or marine algae are the primitive type of plants growing abundantly in the shallow waters of sea, estuaries and backwaters. They flourish wherever rocky, coral or suitable hard substrata are available for their attachment. They are categorized in to three groups namely green, brown and red algae based on the pigmentation, morphological and anatomical characters.

Seaweeds are one among the commercially important marine living and renewable resources of India. They contain more than 60 trace elements, minerals, protein, iodine, bromine, vitamins and several bioactive substances.

Hence they are of great economic value and also serve as both feeding and breeding grounds for invertebrates and fishes. Twenty thousand species of seaweeds are recorded globally; in India, 833 species are recorded. Seaweeds were considered to be of medicinal value in the orient as early as 3000 B.C. The Chinese and Japanese used them in the treatment of goiter and other glandular diseases. The Romans used the seaweeds for healing the wounds, burns and rashes.

The British used the seaweed *Porphyra* to prevent scurvy (vitamin deficiency disease) during long voyages. Various red algae particularly *Coralline officinalis* and *Alsidium helminthocorton* were employed as vermifuges. Some other red algae such as *Chondrus*, *Gracilaria*, *Gelidium* and *Pterocladia* have been used to treat various stomach and intestinal disorders and also helped to relieve from constipation and other discomforts. *Laminaria* was used as a pain-killer and also used to distend the uterus.

A number of species of marine algae have been found to have anticoagulant and antibiotic properties. Carrageenan may be useful in ulcer therapy and the alginates are found to prolong the rate of activity in certain drugs. Species of *Sargassum* were used for cooling and blood cleaning effect. *Hypnea musciformis* was used as a vermifuge or worm expelling agent.

The iodine rich seaweed, *Sarconema* can be used for controlling the goiter disease caused by the enlargement of thyroid gland.

Though the importance of different seaweed products in pharmacology is known, the development of antibacterial, antifungal and antiviral substances from seaweeds is still at a growing stage of research and development. *Gelidium cartilagineum* have been found to be active against influenza B and mumps virus. Among the seaweeds, red algae have been the major producer of bioactive secondary metabolites. Isolation of polysaccharides and other compounds with antiviral activity against enveloped viruses increased interest in algae as a source of antiviral compounds. Polysaccharides from extracts of red algae were found to inhibit Herpes Simplex Virus (HSV) and other viruses. Extracts from the California red algae *Schizymenia pacifica* contained a sulfated polysaccharide in the g-carrageenan family, which selectively inhibited HIV reverse transcriptase.

Health benefits and Medicinal Uses of Seaweeds

Some of the most important seaweeds used for isolating bioactive substances and their usage are indicated below.

| Groups | Species | Medical Use |
|--------------------|----------------------------------|-----------------------------------|
| Red algae | | |
| | <i>Asidium helminthochorton</i> | Vermifuge |
| | <i>Digenia simplex</i> | Vermifuge |
| | <i>Corallina officinalis</i> | Vermifuge |
| | <i>Chondrus crispus</i> | Coughs, chest, stomach ailments |
| | <i>Gigartina stellata</i> | Coughs, chest, stomach ailments |
| | <i>Porphyra species</i> | Antiscorbutic |
| | <i>Palmaria palmata</i> | Antiscorbutic |
| Brown algae | | |
| | <i>Fucus vesiculosus</i> | Scrofula |
| | <i>Fucus evanescens</i> | Stomach ailments |
| | <i>Laminaria and other kelps</i> | Iodine source (cures goiter) |
| Green algae | | |
| | <i>Ulva species</i> | Burn treatment |
| | <i>Acetabularia major</i> | Bladder and kidney ailments |
| | <i>Brown seaweeds</i> | Treat the goiter disease in China |

Health Benefits

- ❖ Seaweed is rich in iodine
- ❖ Relieves painful symptoms of Arthritis, Rheumatoid and Lupus
- ❖ Relieves muscular aches, pains and stiff joints
- ❖ Ideal for labour intensive work - soothing to sore, over worked muscles
- ❖ A natural anti-inflammatory
- ❖ Seaweed is high in magnesium, melting muscular spasms, cramps and muscular tension
- ❖ Rich in minerals and vitamins
- ❖ A powerful antioxidant
- ❖ Anti-fungal, Antiseptic, Anti-viral, Anti-bacterial and Antioxidant
- ❖ Seaweed help eliminate toxic waste, safely carrying lead and chemical waste out of the body
- ❖ Seaweed helps stop free radical damage upon the body
- ❖ Anti-aging properties
- ❖ Tones skin tissue - ideal for amazing facial results
- ❖ Helps reduce cellulite
- ❖ Reduces stress levels - contains B vitamins
- ❖ Improves blood circulation
- ❖ Helps with weight loss
- ❖ Aids the immunity
- ❖ A natural skin tissue healer, improving sore irritated skins and spots
- ❖ Helps clear Eczema and calms psoriasis, improving skin appearance
- ❖ Rehydrates your skin
- ❖ A natural moisturizer leaving skin like silk
- ❖ Rich in calcium and protein
- ❖ Seaweed is said to have anti-cancer properties

G. Thirumaran
Wetland Division (GUIDE),
gtmarancas@gmail.com

Utilization of *Halophytes*



Avicennia marina



Suaeda fruticosa

Halophytes are salt-tolerant plants (micro and macro) that can prosper in seawater or brackish waters. Two types, broadly classed as coastal and inland (desert), can be found in marshes, coastal plains, inland lakes, and deserts.

Large areas of Rajasthan and Gujarat comprise of saline unproductive land in the form of saline lakes, salt depressions, saline swampy lands and saline waste land like desert near the coastal regions. . These lands are either devoid of any vegetation or support very meager cover. The flora of halophytes of Gujarat especially Kachchh includes indigenous, highly valuable genetic diversity, only little known or unknown, which naturally grows well on saline wetlands and marginal desert and semi desert areas without any support by scientifically proven agricultural technologies.

In the light of freshwater shortage and most of the areas are saline in Kachchh region it seems necessary to see if some of the halophytes can be converted into crops and /or used for other purposes.

There are many native and exotic halophytes with various uses such as human food (vegetables, salads, and pickles), fodder for livestock, wildlife and fish, wood for building material, bio-fuel, chemicals, medicine, landscaping and rehabilitation of degraded rangelands with high potential for exploitation.

Among the halophytic flora of Kachchh, the inland trees are dominated by *Prosopis juliflora* (Gando baval), *Salvadora persica* (Piludi), *Acacia senegal* (Gorad), *Acacia nilotica* (Deshi Baval) and *Phoenix dactylifera* (Khajur). In the coastal habitat, *Avicennia marina* (Cheriya) and *Commiphora wightii* (Gugal) are dominant. Halophytic herbs are mostly dominated by *Cressa cretica* (Lano); shrub communities are mostly represented by *Suaeda fruticosa* (Morad) stands and also some salt tolerant grasses like *Chloris virgata*, *Eleocharis dulcis* and *Aeluropus lagopoides* (Del).

Utilization of *Halophytes*

Halophytes are being utilized in many ways: timber (mangrove), Fuel (*Atriplex*, *Tamarix*, *Prosopis*, *Cappris*), Food (*Beta vulgaris* (Beets), *Phoenix dactylifera* (Khajur), *Suaeda fruticosa* (Morad), *Salvadora persica* (pilu), Cooking oil and protein (*Salicornia*), Forages (*Atriplex*, *Sporobolus*, *Aeluropus*, *Suaeda*, etc.), Landscaping (*Prosopis*, *Acacia*, *Casuarina*), Chemicals (mangroves), Medicine (*Phyla nodiflora*, *Withania somnifera*).

The primary objective of this article is to generate awareness in society on salt affected soils and poor quality waters plant can be used for many different purposes. Salinity always affected the society but the adverse effects could be better realized when food and nutritional security with the increasing population in arid region like Kachchh.

Dr. Jagruti P. Shah
GUIDE





Training Program in *Hyperspectral Remote Sensing- My Experience*

Department of Science and Technology (DST) sponsored training program on hyper-spectral remote sensing conducted at MS University, Vadodara is attended by me recently. The overall objective of this training program is to enhance the capabilities of scholars using GIS and RS programs for various studies. Trainees from different organizations all over India have been intensively trained in hyper spectral remote sensing and GIS work. Eminent faculties from Premier Institutes like Indian institute of Technology, Mumbai, Indian institute of Remote Sensing, Indian institute of Space technology, Space Application Centre, Ahmedabad, Maharaja Sayajirao University, and Vadodara imparted latest techniques in the field.

The word, 'hyper spectral' implies the usage of many bands which are sometimes 200 or more in the Visible-NIR-Thermal infrared range. In general, hyper-spectral remote sensing is nothing but the digital imagery of earth materials in many narrow contiguous spectral bands.

Why Hyperspectral Remote Sensing?

Most of the earth's surface materials have different absorption features in the 400nm to 2500nm range of the electromagnetic spectrum using signature of materials which can be identified using high spectral resolution.

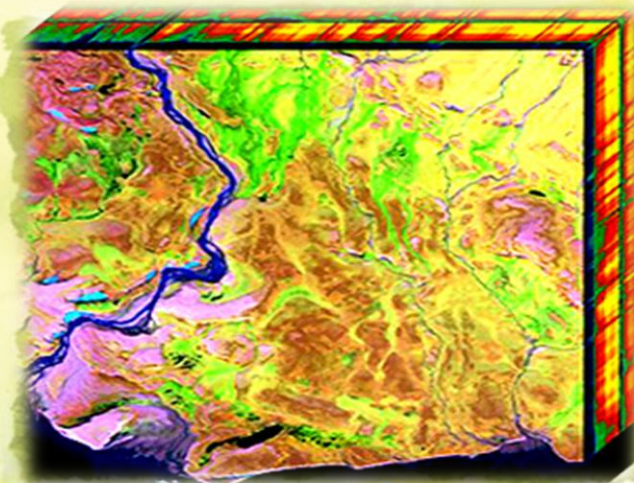
Data cube is another commonly used terminology in GIS. It is nothing but hyper-spectral imagery in the front of data cube which gives an idea of special information; side view gives an idea of spectral resolution of imagery

For example; in a data such as 256 X 3140 X 242, 256 is width of image, 3140 is length of image and 242 are the bands of the image.

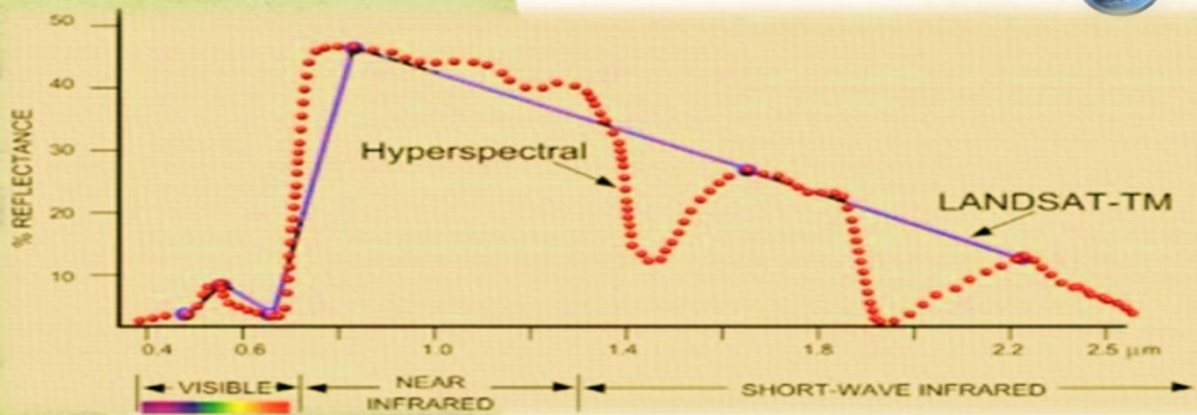
Hyper- spectral vs. Multispectral

Hyper-spectral image is having very narrow band ranges of $10\mu\text{m}$ and it continues over the spectrum without any gap. Whereas, multispectral image has wide band ranges of $100\mu\text{m}$.

For example, to identify vegetation it is easy to use multi spectral remote sensing but for vegetation like mangroves, horticultural fields like mango, teakwood and Bamboo, we need to have hyper-spectral images. Using different spectral signature biological materials can be easily identified in hyper-spectral images. Hyperion space satellite provides hyper-spectral data whereas Landsat TM provides multi spectral data.



Training Program in *Hyperspectral Remote Sensing- My Experience*



Disadvantages:

1. Large amount of memory space is required to process hyper-spectral data.
2. Data is combined with noise.
3. It is very difficult to distinguish different spectra in mixed pixel.
4. Availability of data is restricted.

Applications of Hyper-spectral data

1. Vegetation or crop type (eg. Soyabean vs. corn)
2. Biophysical Properties (e.g. LAI, biomass, yield, density)
3. Biochemical properties (e.g. Anthrocyanins, Carotenoids, Chlorophyll)
4. Disease and stress (e.g., insect infestation, drought),
5. Nutrients (e.g., Nitrogen),
6. Moisture (e.g., leaf moisture),
7. Net primary productivity

Interaction with GIS & Remote sensing experts from different fields during this program was quite informative. Scholars and experts from different areas of GIS shared their expertise and problems they encountered and solved. As a part of this training program, Junbudhoda Sanctuary was visited where participants were trained in handling field spectrometer to collect spectra for different tree species. Every participant was motivated at the end of the training program to work on hyper-spectral data in their study areas. An impetus to apply hyper-spectral images to study habitats and ecosystems in their vicinity and to address questions of natural resource management and spatial distribution was achieved through this program. Botany department of Maharaja Sayajirao University who organized this program and the sponsoring agency DST deserve to be appreciated for this excellent and skill enhancing training program.

Dayesh Parmar
GIS & RS Division
GUIDE

Can *forest* certification scheme draw *India* towards Sustainable *Forest Management*?

Forest certification is a system for monitoring, tracing and labeling timber, wood and pulp products and non-timber forest products in which the standards of environmental, social and economic perspectives are reviewed against a series of established standards. It is a process that leads to the issuing of a certificate by an autonomous body which validate that an area of forest is managed to a defined standards.

Approximately 17 million hectares of tropical forests were cleared in 1990, at a rate of more than an acre per second (FAO, 1990). In 1992, a global effort to wrestle with environmental and sustainable development issues resulted in the United Nations Conference on Environment and Development, also known as the Earth Summit, held in Rio de Janeiro. Although no legally binding commitments were made, the Agenda 21 Forestry Principles set out an action plan to delve into sustainable forestry issues. While these formal processes of developing criteria for sustainable forest management were in progress, forest certification started to take shape through a non-governmental organization (NGO) channel. This innovative idea was developed during the parallel Rio meetings. The concept was to develop a system for certifying and labeling forests and forest products. As a result, a voluntary non-profit organization called the Forest Stewardship Council (FSC) was launched in 1993 with the coalition of Worldwide Fund for Nature (WWF) and other leading environmental organizations.

Forest certification refers to two separate processes viz., Forest Management Unit (FMU) certification and Chain of Custody certification (CoC). CoC certification is a process of tracking forest products from the certified forest to the point of sale to ensure that product originated from a certified forest. There are several certification schemes in operation of which Forest Stewardship Council (FSC) certification is one of the most popular and credible certification schemes globally.

India is likely to face severe shortage of supply of timber to meet its requirement from both domestic and international front. It is estimated that the demand for timber is likely to grow from 58 million cubic meters in 2005 to 153 million cubic meters in 2020. As a result, the nation has to heavily depend on imports for meeting its growing demand which could result in loss of high conservation value forests or loss of biodiversity elsewhere.

The Union government of India is likely to come out with a forest certification policy very soon which would be applicable to all states and Union Territories. Forest certification in India is still at its infancy. No forests in India are certified except 644 hectares of a private rubber plantation in Tamil Nadu which secured 'FSC' Forest Management Unit Certificate. To promote forest certification, WWF has advocated a "step wise approach" and developed suitable methods and tool kits which can be used by forest or plantation managers and traders.

Can forest certification scheme draw India towards Sustainable Forest Management?

The Quality Council of India (QCI) and the Forest Stewardship Council (FSC) signed an historic agreement on 30th March, 2012 at FSC's Bonn, Germany headquarters. The Memorandum of Understanding (MoU) between QCI, India's national quality facilitation and accreditation organization, and FSC, the world's global standard for responsible forest management, is aimed at promoting responsible forest management in India and facilitating international trade in forest products. The agreement aims to support the development of FSC programs in India by strengthening the credibility of independent third party auditing, providing technical support and training, and fostering the exchange of information between the two organizations. The rapid growth of FSC certification in India confirms the fact that certification brings substantial market advantages. In 2007, only four Chain of Custody FSC certificates were issued in India which today has increased to nearly three hundred. So far, India has secured one FSC Forest Management Unit and a few CoCs mainly by small and medium companies to meet export demand. But the situation is expected to change due to the increased demand for forest certification in the global market and the high growth of the Indian economy. It will be interesting to see how the forest certification standards will shape up to suit Indian scenario and take India towards the Sustainable Forest Management.

*Nainesh Patel
GUIDE*

Environmental awareness in our routine life

Twenty first century is a century for knowledge explosion and material comfort. Education and development has changed and changing our lifestyle and living standards in numerous ways. Increasing economic boom and access to modern gadgets and facilities have enabled us to adapt a high living standard wherein consumerism has pervaded all strata of society. No one can live with limited resources as all wants to have more and more comfort in life. But have we thought about our natural environment?

About our “mother”- **earth**? About our posterity?

It is almost forgotten that natural environment is the fiber of our life and we are an inseparable part of the environment. Achieving development and wellbeing is unquestionably a part of human existence but due attention not to degrade by taking care of our original environment is also an undeniable responsibility of every human being on this earth. Right from Rio De Janeiro Earth Summit of 1992, innumerable conferences and workshops have been held in the past for environmental conservation. But it is to be understood that every human by changing his behavior can bring about a change that world governments can't do. A shift in our day to day activities to set right the present environmental rot can go a long way for improving our environment. Ultimately, we are the consumers as well as destroyers of our environment. We can minimize the environmental problems just by changing some of our routine habits.

Few simple, practicable things in our day to day life are indicated below which will take us a long way to stem the environmental degradation.

1. Try to minimize our energy consumption

Access to adequate and uninterrupted energy resource is the major issue in the whole world today. Increasing population and modernization has compounded the issue. Energy consumption by people is 26000 kcal/day/person.

But after industrialization, up to 1975 it increased drastically to the level of 2, 30,000 kcal/day/person. This shows that how our demands have increased with the passing time.

The ultimate source of energy is fossil fuel which is non-renewable and causes environmental pollution. Our efforts may be directed towards the following points.

- We can reduce consumption of electricity to an optimum level.
- Whenever possible we can walk or use public transport. For every gallon of gasoline, we can avoid 22 pounds of CO2 emissions. If your car gets 25 miles per gallon, for example, and you reduce your annual driving from 12,000 to 10,000 miles, you'll save 1800 pounds of CO2.
- Switch to renewable energy resources in the possible ways like solar panels, wind mills, etc.

Environmental awareness in our routine life

| <i>Appliance</i> | <i>kWh Usage</i> |
|---|-----------------------|
| <i>Fan</i> | <i>0.2 kWh / hr.</i> |
| <i>Light bulb (100-watt incandescent)</i> | <i>0.1 kWh / hr.</i> |
| <i>Refrigerator (2002 or newer)</i> | <i>82 kWh / month</i> |
| <i>Television (21-inch color)</i> | <i>0.3 kWh / hr.</i> |
| <i>Computer with monitor (average)</i> | <i>0.09 kWh / hr.</i> |

The above table shows approximate usage of energy by our appliance. From this we can estimate that how much energy we can save in our routine life.

Minimize wastage of water

Water is one of the most precious resources of our life. So it is required that water should be used in optimum level. Continuing population explosion and dwindling freshwater resources renders this resource a most sought after one by humans. As time passes we require huge amount of water for living. So water conservation has become a very important issue nowadays.

Water conservation and its frugal use in our day to day life has become an utmost necessity. Only if every person strives for water conservation, we can mitigate the water crises in the world. Here are some points we can keep in our mind to conserve water.

- Take care of leakages from tap which can save around 5500 lit of water/ yr.*
- Turn on tap only when it is required during household activities like cleaning, washing, etc.*
- Use optimum amount of water in all activities.*
- Rain water harvesting and improving ground water levels is a most effective means for water conservation*

Environmental awareness in our routine life

Reduce amount of solid waste

Consumerism is economically manifested in the continuous purchasing of new goods and services, with little attention to their true needs, durability, product origin or the environmental

Reducing use of plastic bags as well as plastic materials which cannot degrade is a simple but very fruitful environmental service. If we think about environment before purchasing new goods or wasting materials, we can handle many of environmental problems. Ultimately 3 'R's are key to solve many environmental problems, which are:

- REDUCE**
- REUSE**
- RECYCLE**

It is to be remembered always that if we care for nature, nature will care us. As repeated pointed out we borrowed this earth from our forefathers in a pristine condition and it is our responsibility to pass it on in the same pristine state to our posterity. As the cry to save environment gets louder, it is time to remind ourselves again that **“Policy begins from home”**.



consequences of manufacture and disposal. We can conserve our natural resources and can minimize the solid waste production by adapting right consumer culture.

Dipa Lalwani
GUIDE.

Upcoming Events in dry land Science

- 1. Eleventh International Conference on Dryland Development: “Global Climate Change and its Impact on Food & Energy Security in the Dry lands” 18-23rd March, 2013- Beijing, China. Organized by International Dryland Development Commission (IDDC); hosted by the CAS and CAREERI (China), APAARI.**
- 2. Water Resources and Sustainable Development. 24-25th, February 2013, Ecole Nationale Superieured 'Hydraulique, Algiers, Algeria.**
- 3. INTECOL & British Ecological Society Congress 8th- 23rd August, 2013. International Convention Centre at ExCeL, London, United Kingdom.**
- 4. Utilization and protection of halophytes and salt-affected landscapes. 4th-6th September, 2013, Kecskemet, Hungary.**
- 5. First International Conference on “bio-resource and stress management”16th February, 2013-Kolkata, India.**
- 6. Fourth International Conference on “Environmental Science and Technology” (ICEST 2013) 17-18th March, 2013. Macau, China.**
- 7. Second International Conference on Climate Change and Humanity (ICCCH)- 24th February 2013, Rome, Italy.**
- 8. Eighth International Conference on “Climate Change, Territorial Classification & Socio-economic Crisis”, 23rd April 2013, Tiruchirappalli, India.**
- 9. Conference on “European Algae Biomass” 24-25th April, 2013 Vienna, Austria.**
- 10. First Inter-Regional Conference on Land and Water Challenges” Water Environment and**



Upcoming Events in dry land Science

- 11. Conference on “Coasts, Marine Structures and Breakwaters”. 17-20th September, 2013, Edinburgh, United Kingdom.**
- 12. Third Conference on," Range, Watershed and Desert". 28 - 29th March, 2013, Karaj, Iran.**
- 13. Second International Conference on Biodiversity & Sustainable Energy Development, 12-14th August, 2013. Raleigh, United States.**
- 14. Conference on Bio-Meets. Hydrology: “Water for life”, 21-24th May 2013. Landau in der Pfalz, Germany.**
- 15. National Seminar on Climate Change and Sustainable Development: Issues and Challenges, 23-24th January, 2013. Vadodara, Gujarat, India.**
- 16. Reed as a Renewable Resource. International Conference on the Utilization of Wetland Plants, 14-16th February, 2013. Greifswald, Mecklenburg-Vorpommern, Germany.**
- 17. National Conference on Strategies to Climate Change Mitigation and Adaptation towards Sustainable Development. 24 - 25 January, 2013. Hyderabad, India.**
- 18. Conference on Sustainable water use for securing food production in the Mediterranean region under changing Climate, 10-15th March, 2013. Agadir, Morocco.**
- 19. Fourth International Conference on Aceh and Indian Ocean Studies (ICAIOS) 9-10th June, 2013, Banda Aceh, Aceh, Indonesia.**



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Gujarat Institute of Desert Ecology

P.O. Box No. 83, Mundra Road,
Bhuj, Kachchh-370001,
Gujarat, India

Tel: 02832-329408, 235025 Fax: 02832-235027
Website: <http://www.gujaratdesertecology.com>