



Speeches / Lectures

Address at the National Symposium on PURA: Challenges and Opportunities

[Loyola College, Chennai, Dec 06 2012]

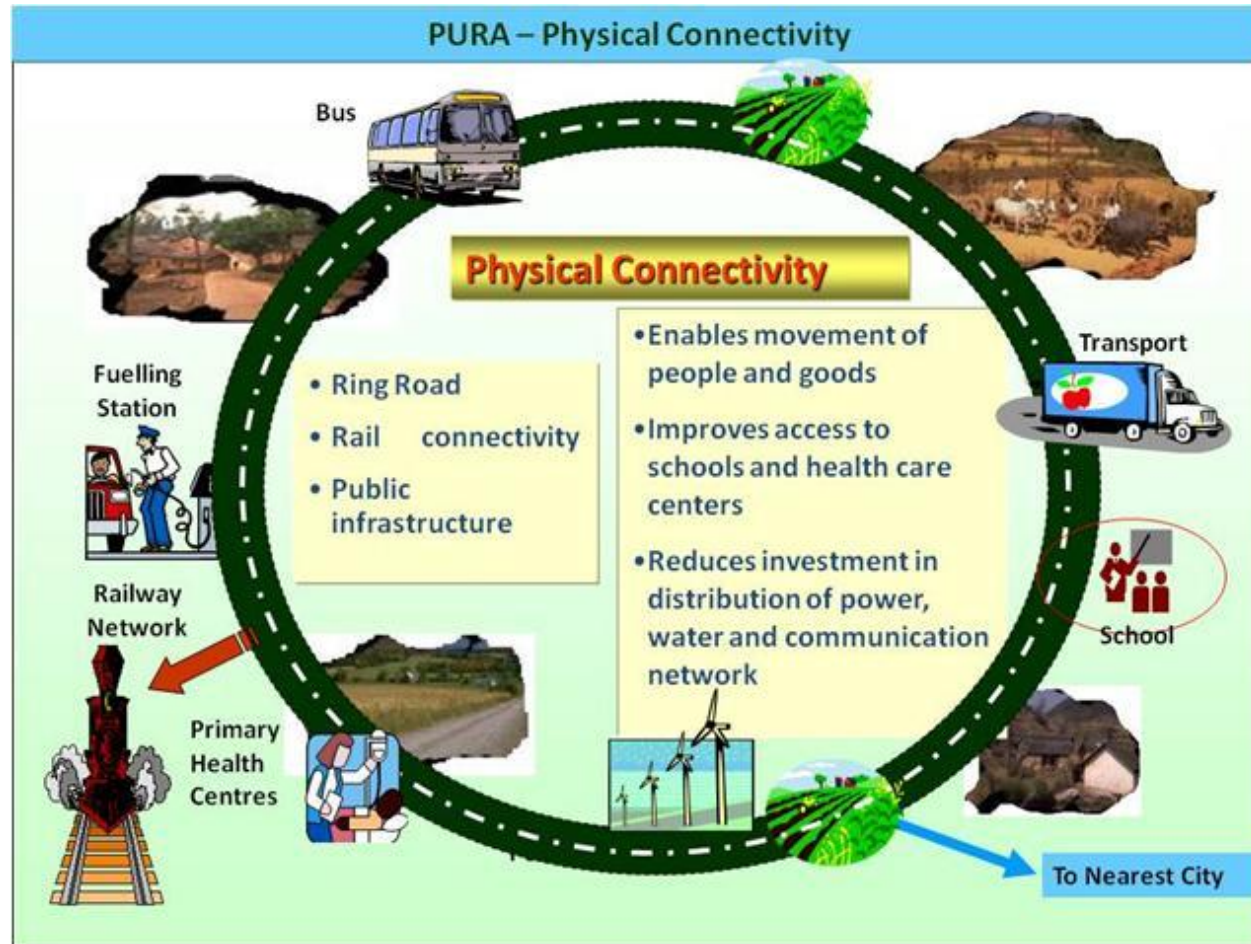
A world of nations where the divide between rural and urban, rich and the poor, developed and developing has narrowed down.

I am indeed delighted to participate the National Symposium on PURA: Challenges and Opportunities organized by LEAD (Loyola Economics Association for Development), Loyola College, Chennai. My greetings to the organizers, students and distinguished guests. When I am here with all of you, I would like to share my thoughts on the topic, "**Sustainable Development System for Rural Areas.**" Let me first discuss the challenges and opportunities.

The need of the hour is the evolution of sustainable systems which act as "enablers" and bring inclusive growth and integrated development to the nations of the world. One such sustainable development system is the mission of Provision of Urban Amenities in Rural Areas (PURA) through creation of three connectivities namely physical, electronic, knowledge leading to economic connectivity. Today it has graduated into a unique system for sustainable development across the world. There are number of PURA established by many institutions and also Govt. of India has accepted PURA as a national mission. A book - TARGET 3 BILLION has been evolved based on the above theme of PURA - a Sustainable Development system. You may refer the book for detailed action plan for the implementation of PURA.

Today I am going to discuss the following subjects:

1. PURA Profile
2. PURA Activated - features and method of execution.
3. The unique model for reaching the benefits of PURA to the unreached called "User Community Pyramid"
4. A mechanism of monitoring and tracking the social developmental indicators in the form of Societal Development radar.

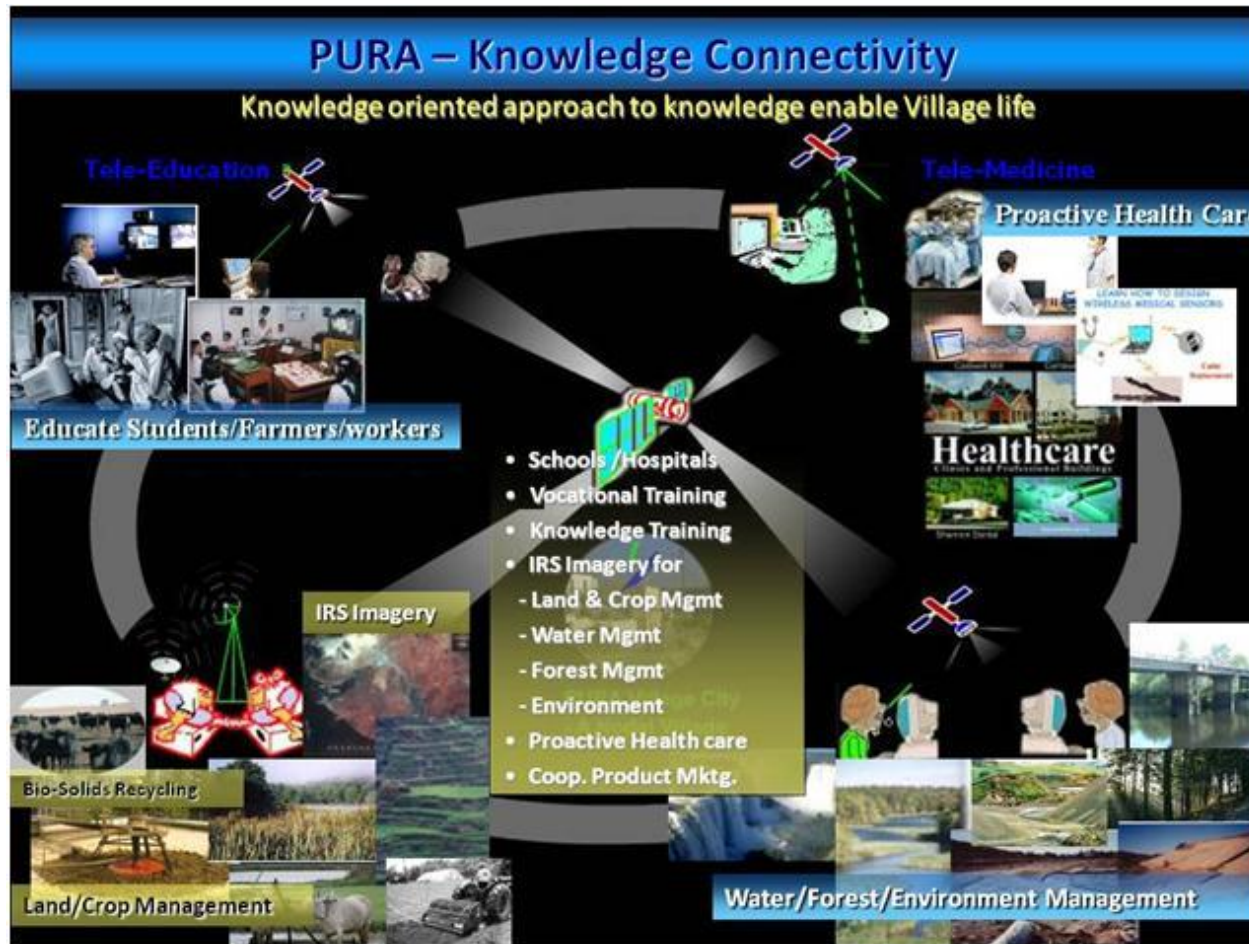


The development of six hundred thousand villages is vital for transforming India into an economically developed nation. It means that:

1. The villages must be connected with in themselves and with main towns and metros through by good roads and wherever needed by railway lines. They must have other infrastructure like schools, colleges, hospitals and amenities for the local population and the visitors. Let us call this **physical connectivity**.

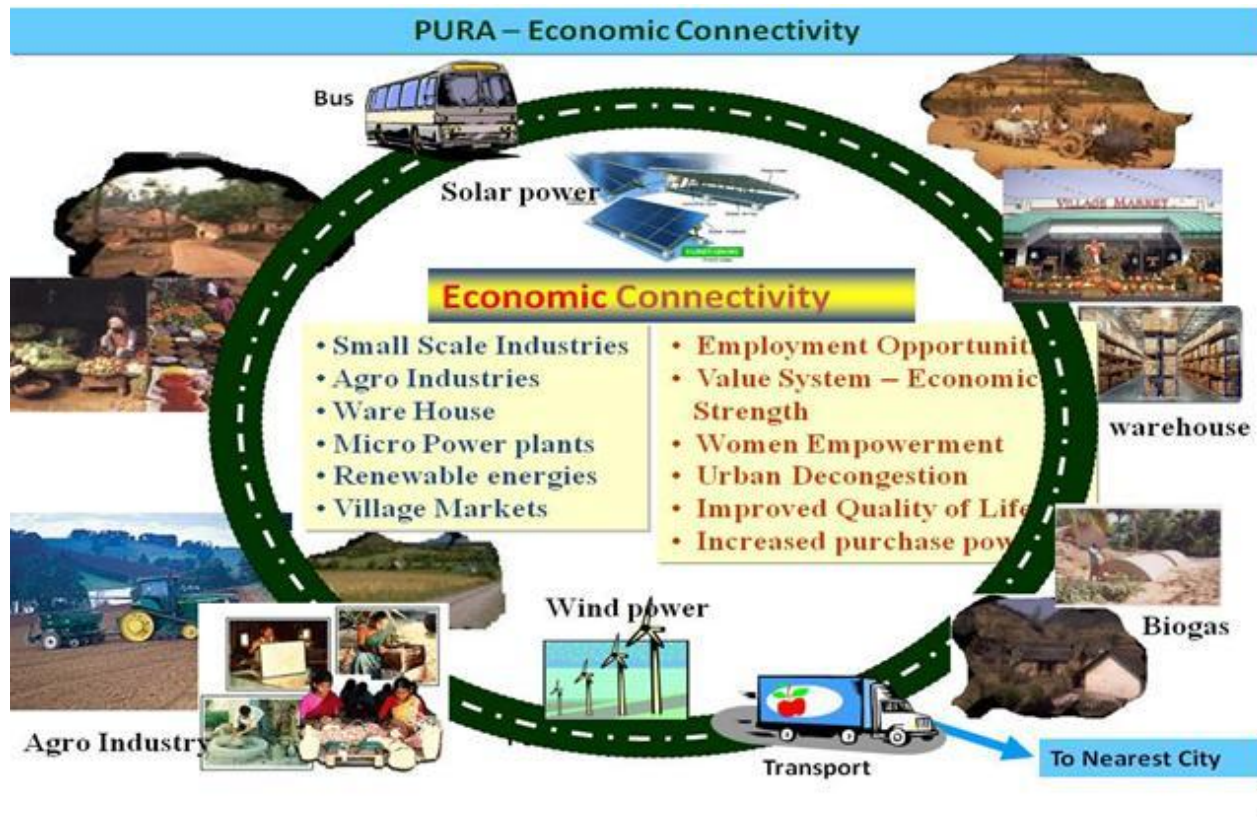


2. In the emerging knowledge era, the native knowledge has to be preserved and enhanced with latest tools of technology, training and research. The villages have to have access to good education from best teachers wherever they are, must have the benefit of good medical treatment, and must have latest information on their pursuits like agriculture, fishery, horticulture and food processing. That means they have to have **electronic connectivity**.



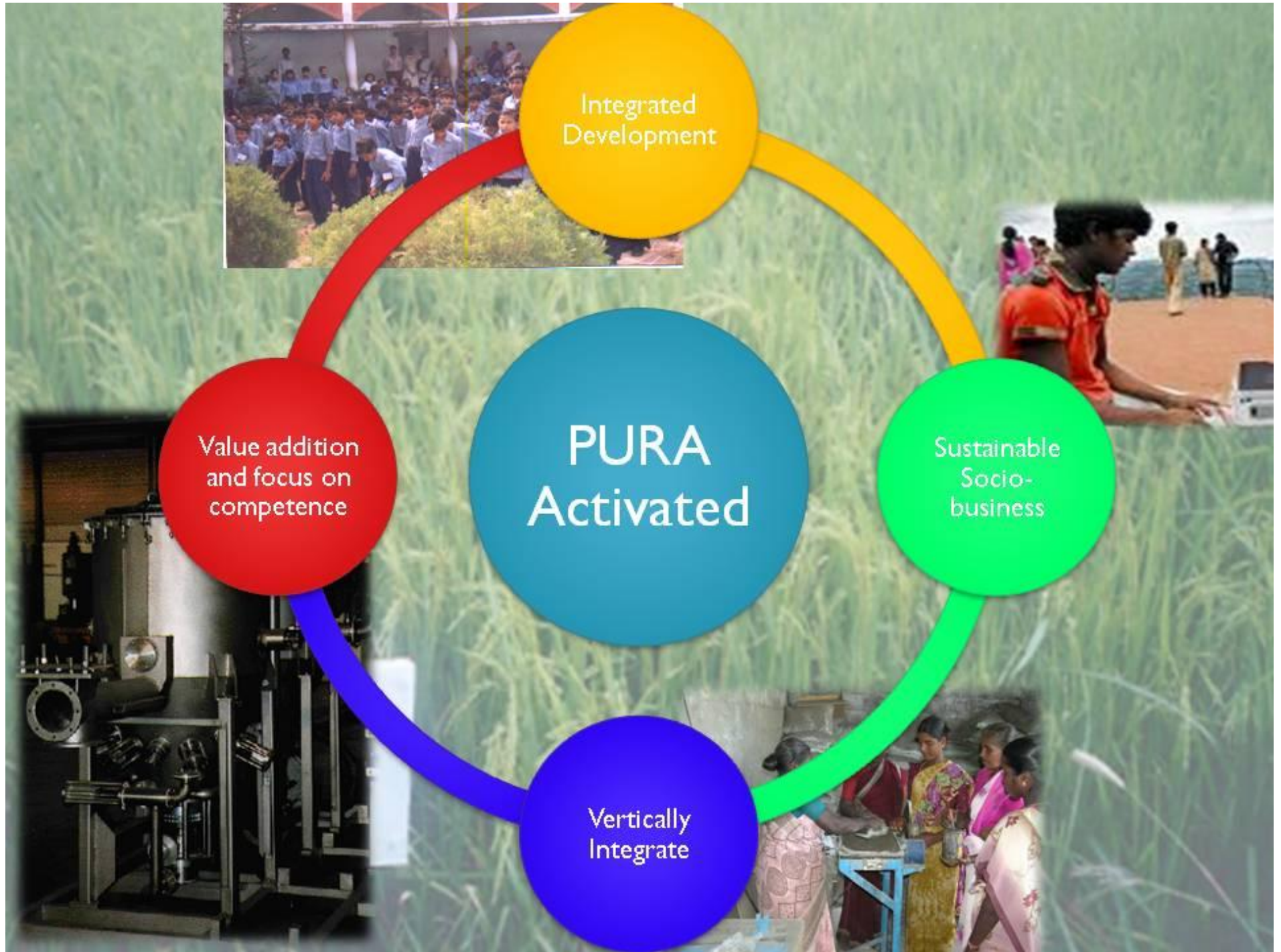
3. Once the Physical and Electronic connectivity are enabled, the knowledge connectivity is enabled. That can facilitate the ability increase the productivity, the utilization of spare time, awareness of health welfare, ensuring a market for products, increasing quality conscience, interacting with partners, getting the best equipment, increasing transparency and so in general **knowledge connectivity**

4. Once the three connectivities viz Physical, Electronic and knowledge connectivity are ensured, they facilitate earning capacity. How can we summaries this? When we Provide Urban Amenities to Rural Areas (PURA), we can lead to upliftment of rural areas, we can attract investors, we can introduce effectively useful systems like Rural BPOs, Micro Finance.



Thus if we take up PURA as a mission, we can make villages as prosperous knowledge accumulation centers and villagers as entrepreneurs. Is this possible? Can we make PURA as an enterprise? This is what I am asking you budding

management experts. The missions for prosperity can be achieved only through the spreading of the missions on the basis of core competence to the village clusters.



The number of PURA for the whole of India is estimated to be 7000 covering 600,000 villages where 750 million people live. Similarly, about 30,000 PURA Complexes would be required to convert the 3 billion rural population of the world into a vibrant economic zone and bringing Sustainable Development to rural areas. **There are operational PURAs in India initiated by many educational, healthcare institutions, industry and other institutions such as Periyar PURA, Loni Warana Valley PURA from Maharashtra, Chirakoot PURA from Madhyapradesh.** Government of India is already moving ahead with the implementation of PURA on the national scale across several districts of India with an outlay of Rs. 1500 Crores in a Public Private Partnership model. Now all these examples of rural development through PURA along with international experience have taken the form of a book, titled Target 3 Billion.

Now let me present a platform which is a unique enterprise driven model of sustainable welfare model through the idea of a PURA Activated. The essence of **PURA Activated** is the belief that PURA enterprises of next generation, need to think of its relationship workforce as beyond being the provider of mere livelihood.

The PURA Activated envisages in the overall, integrated development of the rural population in the PURA Complex. Moreover, it has the vision of sustainable socio-business models which are as a vertically integrated network of multiple entrepreneurs, who share synergies and provide for value addition to each other, leading to overall benefit of all the stakeholders.

The PURA Activated has two kinds of entrepreneurs ?

1) **Resource Entrepreneurs:** They will focus on the economic realization of the natural, traditional and human resources with the help of customized technology and modern management for enhancing the income level for every household. They would be achieving the critical role of moving resources up the value chain, by application of best practices and matching product to market. Their performance will be reflected in the overall growth of the GDP of the rural complex.

2) **Social Entrepreneurs:** The next category of entrepreneurs, will work closely with the resource entrepreneurs. They would focus on improving the human development index, in terms of education, healthcare and improvement of standards of living by provision of amenities and equity across various diversities. These entrepreneurs will hence promote the realization purchasing power into better life and hence more skilled workforce in the area. Their performance will be objectively reflected in the enhanced literacy levels, reduced IMR/MMR/sickness, enhanced nutrition, access to good habitation, sanitation, clean drinking water and quality energy. It will also lead to environmental consciousness and reduction and in societal conflicts.

PURA entrepreneurs

Types and Synergies



The entrepreneurs of PURA Activated would work in close synchronization and integration with the help of local PURA champions - who may be institutions or organizations of repute. They will be partners with the government, local

administration and Panchayati Raj (village governance institutions). The enterprise network of PURA Activated has to be evolved with the technical collaboration from a multi-dimensional array of technological and managerial institutions. Similarly, enterprises from different parts of the world can be partners to the PURA Activated by acting as equity investors, exploring and facilitating market linkages and providing a technological platform the best practices and innovative solutions to production challenges can strengthen the socio-economic rural complexes. In this way, enterprises, academic institutions and business units from across the world can share their core-competencies to harness the resources of untapped rural and sub-urban regions and also lead to human development.

Such collaborative platforms for 600,000 villages covering 750 million citizens in India alone have over \$200 billion market in India, which can harness an agrarian economy leading to mutual benefits. With about the 3 billion people living in rural areas this global development system can be expanded in all the countries. I am putting forward this model to this community of students who share a global concern and endowed with the proven world class knowledge, so that you all can evolve this idea and be a partner to empower people, realize the Developed India Vision 2020 and bring prosperity, happiness and peace in India.

User Community Pyramid for Sustainable Development for PURA Complex

User community pyramid is an integrated solutions needed from technologies and the applications for sustainable development and possible users for the bottom of the pyramid. *The second aspect is the 'Developmental Radar' to review and monitor how the user community has benefited from the user community pyramid. Now let me discuss user community pyramid for achieving sustainable development.*

Sustainable development refers to a mode of human development in which resource use aims to meet human needs while preserving the environment so that these needs can be met not only in the present, but also for the generations to come. Friends, world has so far seen the development, rapid development and social development, economic development and political development. But due to the dwindling of natural resources and burgeoning population leading to more than 7 billion in the world, today it is essential to think of sustainable development in every aspect of human life in every sector of the economy.

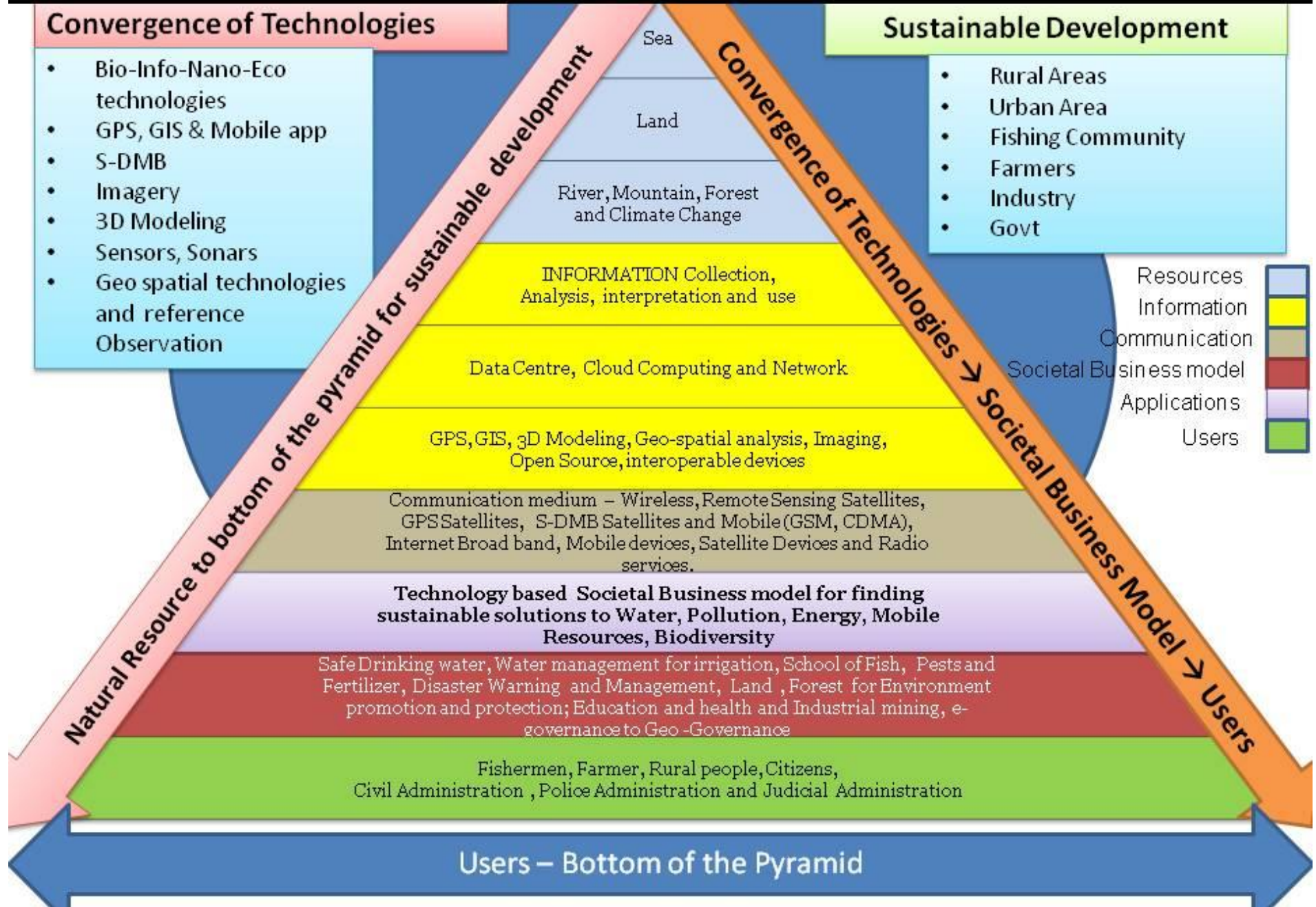
So far, much of the data being generated by the nations using the technologies developed and knowledge acquired through various means of data collection over terrestrial as well as space communication periodically. I was asking myself, what we learn from so many terrestrial and mobile networks, satellites for remote sensing and communication, so many ground sensors, so many flight systems and so much of data received from various data capturing system. When we analyze the data what is the resultant that can be given to the rural population of 3 billion people to empower them with information, knowledge and wisdom to improve their own quality of life. I was thinking what will be the unique approach that will help to achieve sustainable development. I would like to propose an integrated solution for sustainable development through a unique model designed by me called "User Community Pyramid" which uses the convergence of technologies for bringing development to the people using natural resources optimally for the generations to come.

Friends, let me now give my visualization of the sustainable development model using the convergence of technologies for remote areas development including rural areas covering 3 billion population.

I would like to present my visualization of User Community Pyramid structure linking the following:

1. Natural Resources
2. Information and Communication
3. Convergence of Technologies
4. Societal Business model
5. Applications
6. Users

User Community Pyramid



Now let me discuss in detail on how to achieve sustainable development in a given User Community Pyramid (UCP).

What is the Objective of UCP?: There are many

national initiatives at the ground level with the help of technologies to protect the environment and bring sustainable development. . Sustainability for safe drinking water and water for irrigation; reducing the pollution using technology and best practices; adopting more renewable energy resources to reduce the dependency on the fossil fuel; managing the mobile resources so that it does not affect the environment and lead to further deterioration of health and environment; and enrich the bio-diversity thereby bring peace and economic prosperity to the nation.

How to do that? Look at the bottom of the slide

Bottom of the pyramid: The users are called the bottom of the pyramid in the User Community Pyramid and they are the vital link for all economic activities and the beneficiaries of sustainable development.

Resources: Natural resources are the basis for sustainable development. We have natural resources such as Sea, Land, Water, Rivers, mountain, forest and climate change. The Sustainable development in every aspect of the above is essential in promoting and protecting the environment. We have been using the natural resources for the human development using the science and technology and its applications. But at the same time, polluting the environment in the form of CO2 emission; deforestation; polluting the land, sea and river in the form of industrial, municipal waste; fertilizer. Today, natural resources are dwindling and the environment is polluted leading to global warming.

Convergence of Technologies: Today, due to the Convergence of technologies such as Bio-Info-Nano and Eco technologies, resulting into clean and green technologies leads to multiple products and systems in water, energy, environment, pollution, waste and biodiversity and healthcare.

For example, solar technologies have given the first 700 MW Solar park in Gujarat; nano filter technology has given the safe drinking water solutions; nano packaging and eco technologies has given the bio-degradable packaging solutions. Research and development is certainly progressing using the convergence of technologies which will give the clean and green products to the humanity. Now how to ensure that these technologies reaches the out reached using Information and communication technologies and evolving societal business model.

Information and Communication: Information collection, generation and dissemination through Communication network and its technologies over terrestrial and satellite networking has attained new dimension due to the convergence of Geo-Spatial technologies. This helps to monitor and track the natural resources, helps to plan for improving the environment and enriching the biodiversity. The information mining and its analysis will transform into knowledge. Information and Communications systems will collect data from the land and space through the terrestrial network and wireless technologies. The GIS, GPS and, Geo-spatial technologies using Satellite network may acquire and analyze the data from remote sensing, resource mapping on land, water and sea, movement and path of the river dimensions through the satellites such as Cartosat and Oceansat. Modern geo-spatial analytical tools may analyze the data from data mining of the wealth of data generated which may enrich the knowledge on how to bring sustainable development in multiple areas such as Waste, Pollution, Energy, Mobility and Biodiversity. Using the information and communication technologies, we need to evolve innovative societal business model so that the research results of convergence of technologies are used for human development in a sustainable way.

Societal business model: At one side, technology based systems development resulted out of scientific research; and at other side, evolving an innovative business model which will take the technologies to the users for creating sustainable development systems. Socio economic applications from the unique societal business model which will empower and enrich the users such as farmers, fishermen, skilled workers, people living in the rural areas. When the sustainable development societal business model is applied, that will result into the use of available natural resources optimally, recycle it without polluting the environment and at the same time make it available for the generations to come so that global peace and prosperity is assured.

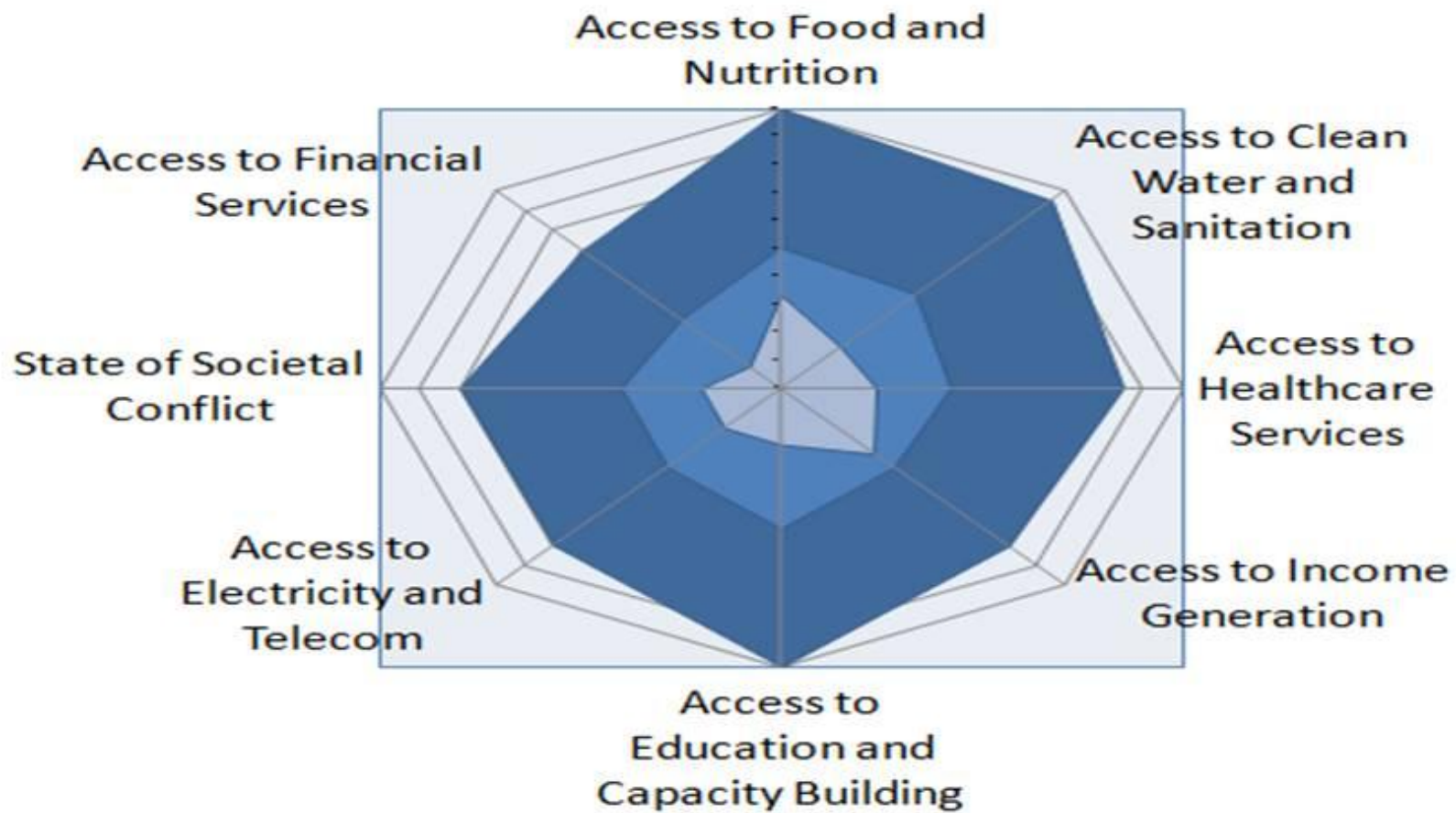
Enriching the Bottom of the Pyramid: Ultimately, the research results will have to benefit the people with pollution free environment, green environment, safe drinking water and also water resource management. Zero waste discharge systems will not pollute the environment, using technologies which will reduce the carbon foot print. Use of renewable energy resources for achieving energy independence, use of navigational and resource mapping to maximize the use of mobile resources such as river flow for the optimal utilization of water and ultimately improve the biodiversity by enriching the environment which is congenial for its growth to manage the life cycle balance. The sustainable technologies have to help to improve the quality living conditions of the people using the existing natural resources sustainably for the generations to come without any depletion of its resources using clean and green technologies. Then it is possible the sustainable development has reached the bottom of the Pyramid which is the ultimate benefit of the defined User Community pyramid.

Societal development Radar

The purpose of establishing the Developmental Radar is to review and monitor how the user community pyramid has benefited the users. This would be the basis of our approach on development radar based on eight essential empowerment attributes which are critical to the realization of our goal a happy, prosperous and peaceful society beginning at the base of the pyramid. These traits are:

Development Radar – Essential empowerment attributes

- Long term Target
- Medium Term Target
- Current State



- 1) Food and nutrition
- 2) Access to water, both potable and irrigation
- 3) Access to Healthcare
- 4) Access to Income Generation Capacity
- 5) Access to Education and Capacity Building
- 6) Access to Quality Power and Communication Applications
- 7) State of Societal Conflict
- 8) Access to Financial Services

In the societal development radar, we have given three

targets, as shown in the radar. One is the current status of the eight social attributes. The second target is, the medium term target. The third target is, long term target with specific schedule. Teams of Goethe green movement and societal transformers in multiple nations can deploy when they are developing technologies, what are the applications which will empower the User Community Pyramid and the outcome may be tracked and monitored through the Societal Development Radar.

Now, the Science and Technological Community had to refocus on how we are using technology of the 21st century to solve the problems which are reminiscent of perhaps the 19th and 20th century. We need to re-think on how the convergence of technologies at our disposal can solve some of the problems of the 3 Billion rural population of the world and help them unleash their potential thereby leading to better human life, without damaging the environment around us.

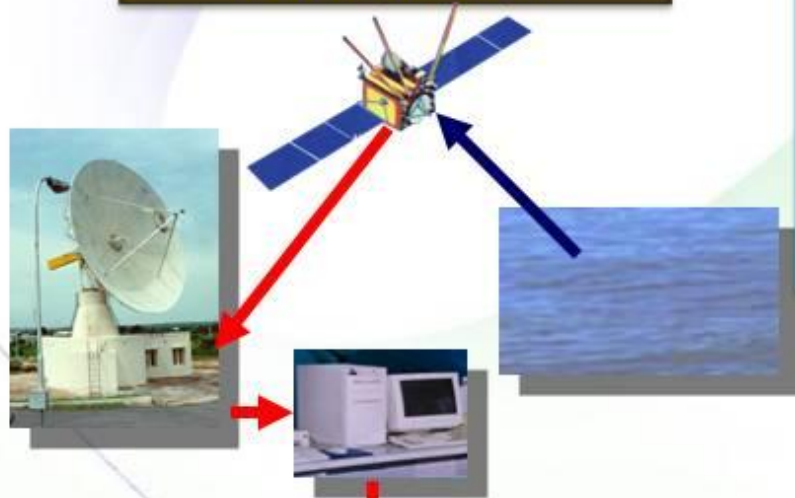
Geospatial Applications in Fisheries for Societal Benefit

Potential Fishing Zone

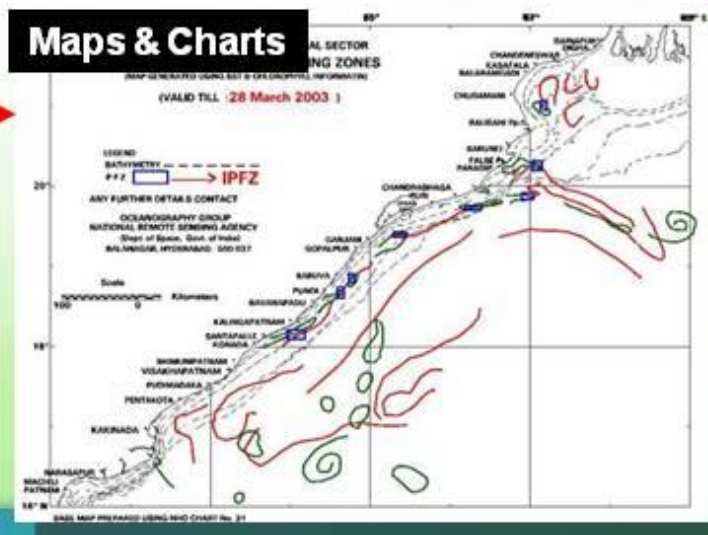
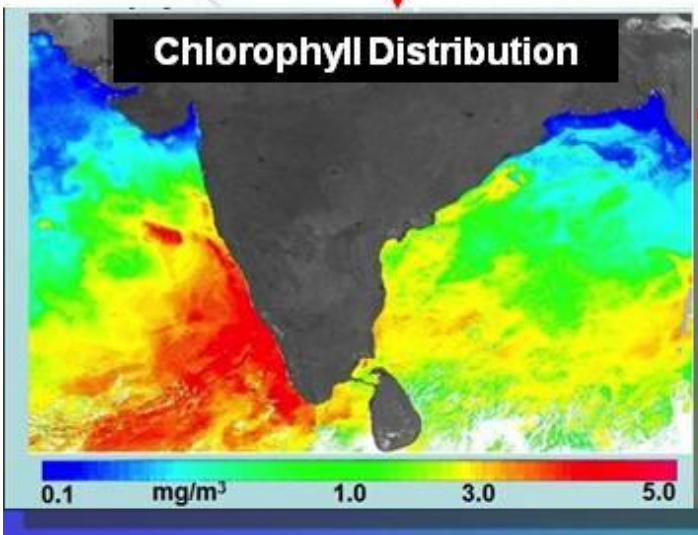
Estimated Users: > 50000

No. of Nodes : > 400

- Potential Fishing Zone based on Chlorophyll & Sea Surface Temperature (SST)
- PFZ advisories in local languages & local measurement units are disseminated on every Tuesday, Thursday and Saturday.
 - ✓ Search time reduction: 60-70%,
 - ✓ Average catch per unit effort improved 2-4 times.
 - ✓ Average increase in net profit is about 2-4 %.



Mode of Information Dissemination
SMS, Radio, TV, Web, Kiosks, Telephone, Fax, Email



Let me share with you about two events in India, how the convergence of multiple technologies and geo-spatial data is used for societal applications.

(i) Empowering the fisherman with Geospatial technologies

In southern coastal area, near one landing site, I spoke to a number of fishermen, particularly I had a tele-conversation with one fisherman Rajendran. I asked Rajendran whether the information about potential fishing zone provided by Indian

National Centre for Ocean Information services is satisfactory. He said, he and other fishermen found the information to be beneficial leading to large catch on that predication. The Indian National Centre for Ocean Information Services, is using the satellite data of the ocean temperature and colour (chlorophyll), twice a week. Based on this colour and temperature data, they are able to establish the potential fishing zone in different parts of the Indian coast line. This information is sent to each landing station in the coast which details about where the potential fishing zone, its distance from the coast, the directional coordinates in which one has to go and the depth of the zone is displayed for the information of the fishermen. The data collected at the landing station may be communicated back to the fishermen inside the sea through SMS or other means of communication in the mode of radio waves or FM or through satellite communication. The fishermen said that this information has become a vital tool for some of the fishermen in the region.

Dear friends, now let me narrate my experience with school children mapping the resources using the GPS/GIS combination to develop the neighbourhood.

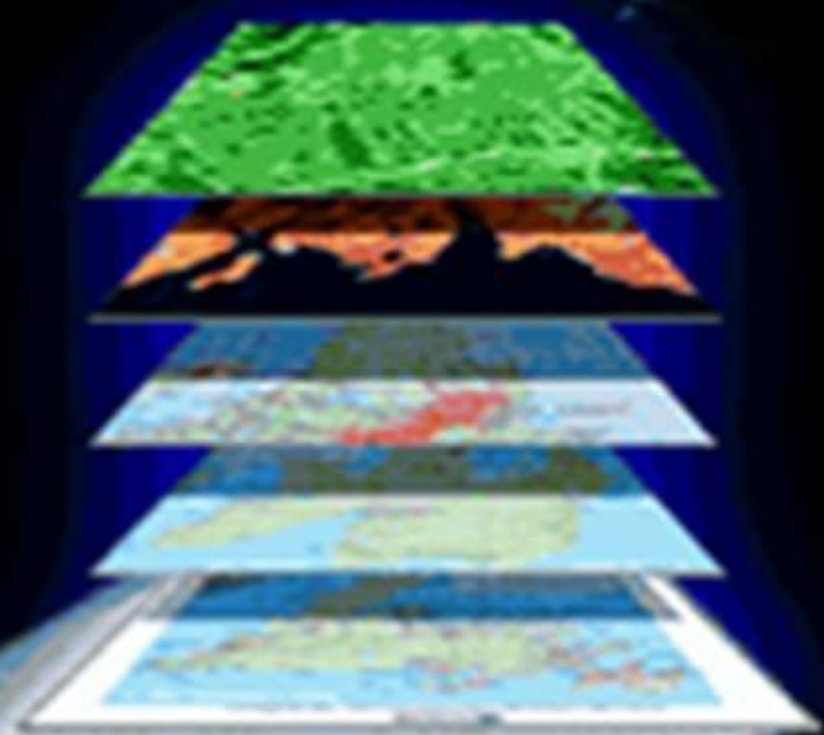
Mapping the Neighbourhood



Students mapping water sources - naula, gadhera, tank and tubewell with PDA coupled with GPS



Almora



(ii) **Mapping the Neighborhood**

Department of Science and Technology has taken up a programme called "Mapping the Neighbourhood". In Almora district in Uttaranchal children from 20 schools have been motivated to use mapping techniques to investigate and map basic socio-economic, environmental and ecological issues being faced by the neighbourhood community. Armed with the scientific and technological tools such as Global Positioning System (GPS), Geographic Information System (GIS), Space Imagery incorporated in the hand held computers; the students are creating maps with the neighbourhood details to improve their understanding of the immediate environment. These maps will enable further the technological community to find solutions for the regeneration of fast disappearing natural sources of water, improving road connectivity, finding better

locations for electricity sub-stations with transformer and water distribution points, reducing traffic congestion, improved systems of garbage collection and overall improvement of environment. The students have extended their understanding to issues of agriculture and irrigation, health and nutrition.

The mapping carried out by the students enables prevention of indiscriminate dumping and better location of garbage collection points and recycling by the municipal authorities for facilitating a clean environment. Since the students are involved, even the elders abide by the laws of the land and contribute to the upliftment of the neighbourhood. I have suggested the Students to undertake the Mapping of the Neighbourhood in their locality for finding out water resources, renovation of old water tanks and water bodies with proper inlet and outlet by clearing unauthorized encroachment and transport management free from accidents and bottlenecks. By this mission, students have contributed in a big way for societal cause. In this way students can be empowered and participate productively in taking up cleanliness mission and keep their homes and neighbourhood clean. This mission will enable us to realize clean villages or cities. Clean villages or cities will lead to clean district. Clean district will lead to clean state. Clean state will lead to a clean nation.

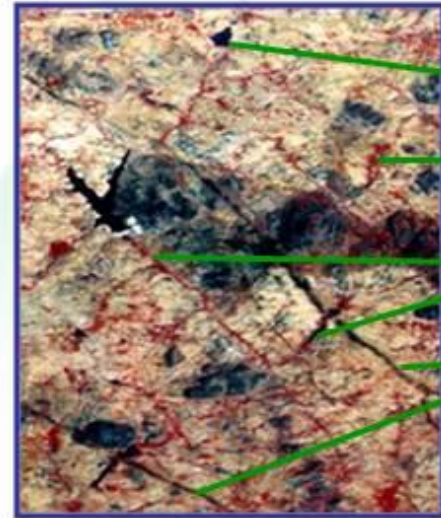
Providing Amenities at the Bottom of the Pyramid

Another challenge we face today is to take urban quality amenities to the 3 billion rural population of the world. This is an urgent challenge which will bridge the divide between the rich and poor and urban and rural. In the book, Target 3 Billion we have researched many fields, which actually point out that the poorest of the world are actually paying the high per unit cost for basic amenities of clean water, nutritious food and healthcare. How can we overcome this ironic reality of the 21st century? There are three possible methods of actions. The Goethe Greening Movement and Indian societal transformers can and study and work for:

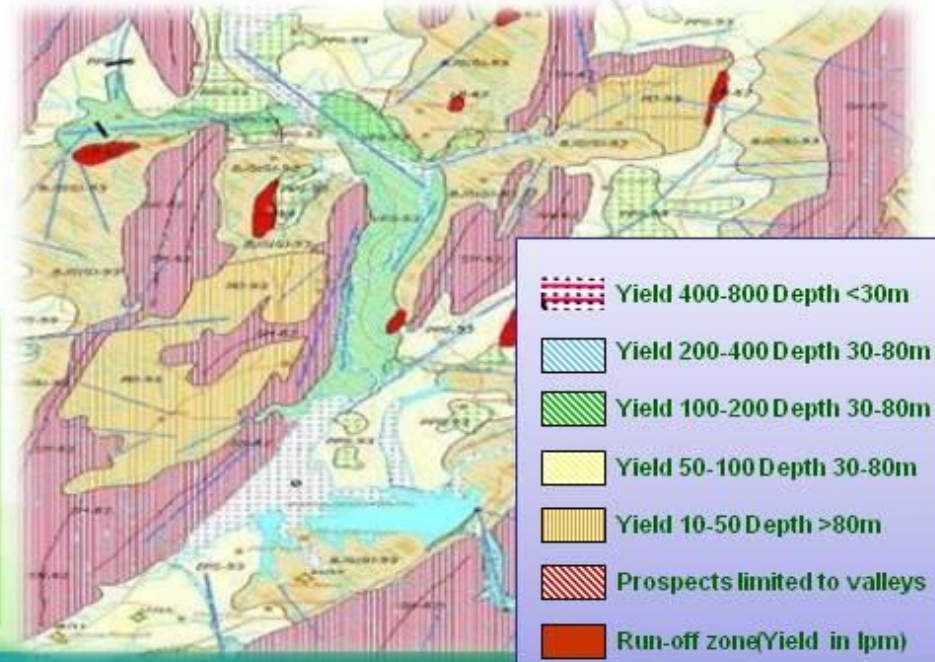
State of potable water availability in the regions



- 20 States completed; work is in progress in 15 states and UTs.
- 2,80,000+ Bore wells drilled with 93% success rate
- 9,050 + Recharge structures constructed



- Hydrologic information (Surface water bodies)
- G.W. exploitation (Ground water irrigated area)
- Conduits for G. W. movement (Fracture /Lineament)
- Barriers for G. W. movement (Dolerite dyke)

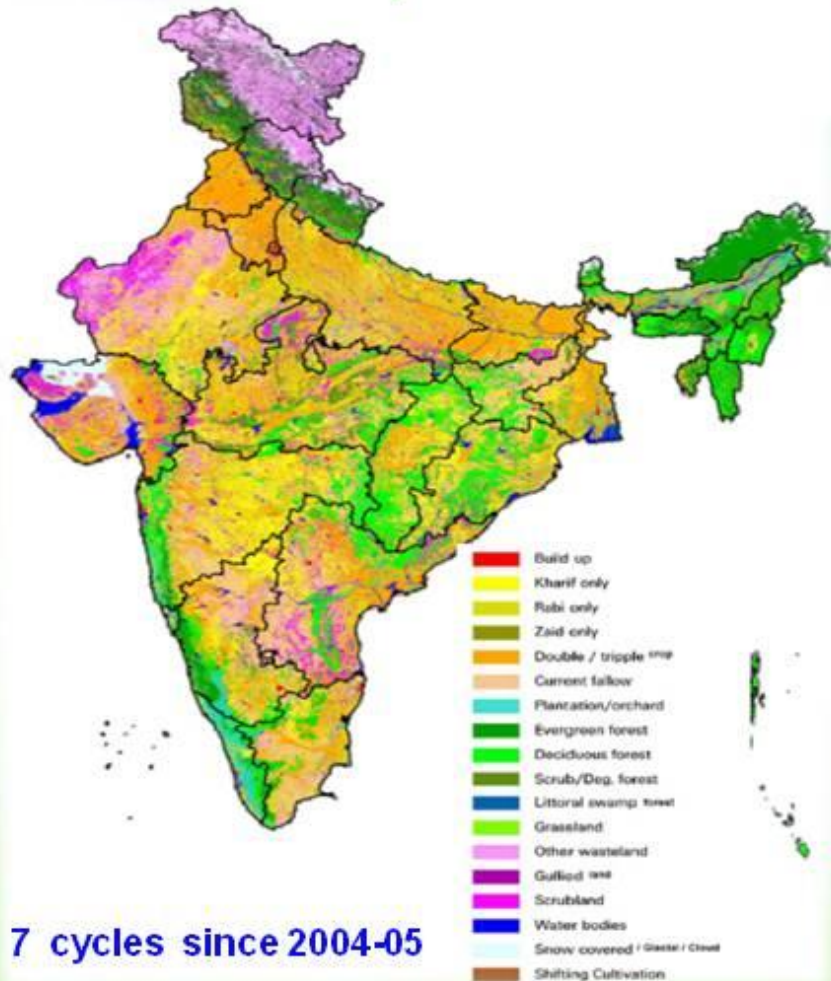


a. Helping to identify the state of **potable water availability in the regions**. Include the parameters of both over and underground water supply, pollution status, water borne disease patterns and usage data. This can be the basis for evolving the Potable Water GRID.

Natural Resources Census

“hot spots” for local energy generation capacity

Geospatial Information on natural resources and depiction of changes on a periodical basis



- Mapping at 1:250,000 scale using 56 m resolution IRS-AWiFS data (7 Cycles)
- Mapping at 1:50,000 scale using 23 m resolution IRS-LISS3 data (1 cycle).

At 1:50,000 scale using IRS-LISS 3

- National level Land-use/ Land cover inventory
- Geomorphology and lineament mapping
- Snow & Glaciers mapping
- Land degradation mapping
- Wetlands mapping
- Soil mapping

- b. Helping to identify **"hot spots" for local energy generation capacity**. This can include energy from waste, energy from bio fuels which can be grown in wastelands, small scale hydro plants etc which can empower the local communities. This can be the basis for the Local Energy GRID.
- c. The technologies developed for sustainable development of rural areas should have potential in empowering employment potential for rural population.

Sustainable technology framework

Formulating the sustainable technological framework is the need of the hour. There are certain questions emerge, which we have to answer. Answers certainly will lead to convergence of technologies, communication technologies which may give birth to the Sustainable technology framework resulting into the Sustainable Development for the benefit of user community.

Certain challenges: Is there any possibility of locating the moving fish resources in bulk quantity underwater through space imagery online dynamically? Is there any possibility of using technology for locating the movement of animals and birds in bulk from one place to other place? Is there any possibility of measuring continuously the green coverage of the world continuously monitoring and updating the system or portal? Is there any possibility of guiding the fishermen in the ocean about the international borderline and its coordinates and gives an alarm when they cross it and guide them to the right direction? Is it possible to help the tourist to move around the forest; locate, see and enjoy the wild-life movement without disturbing them and attract more tourists to enjoy the beauty of mountains and forests? Is it possible to guide the planners to protect the water bodies against encroachments on real-time and dynamically to the administrators so that enforcement authorities can act on immediate basis, rather than act after the precious resources go missing. Multiple technologies including GIS and remote sensing are indeed an "enabling technologies" for marine science, but marine science also can help to improve GIS and remote sensing. For instance, the ability to better handle and visualize time has been a long-standing research issue for GIS. We know the location and the time in sea are the very vital, particularly on the deep seafloor or in the deeper parts of the water column. Since, satellites and GPS measurement may not give the required data, accurate clocks and accurate timing of the travel of acoustic pulses is critical.

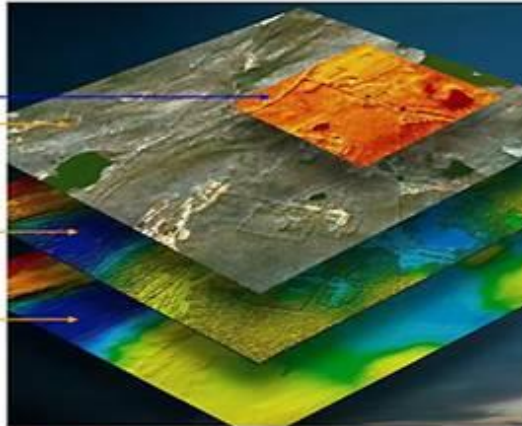
Geospatial Technologies Helps Manage Water, Land and Mobile Resources

Integrated Solutions for GIS

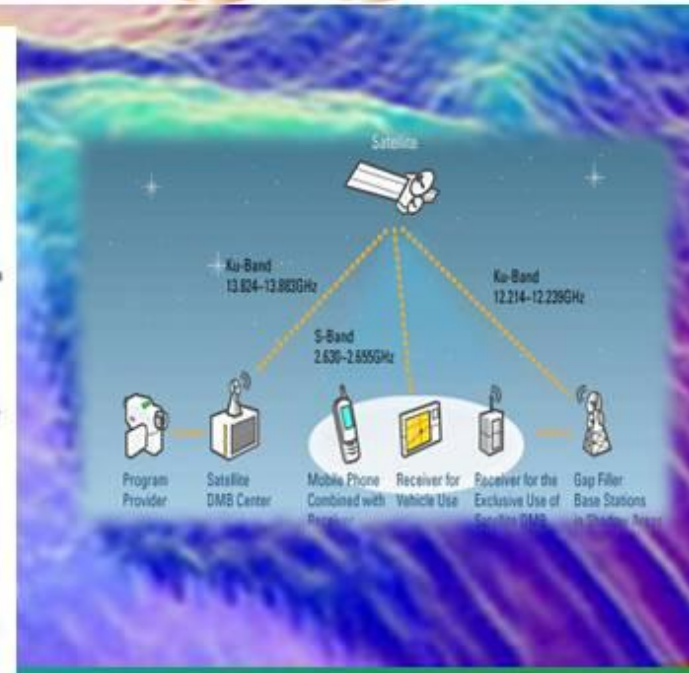
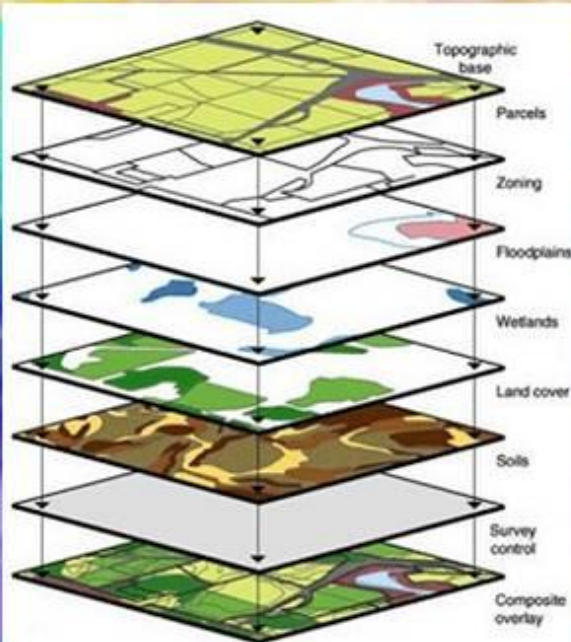
Satellite & Aerial Imagery

- 3D Terrain Modeling
- Stereo Imagery
- Multi & Hyper-Spectral
- Ortho-Imagery
- Film
- Digital (DSS or ADS)
- Thermal

- Digital Surface Model
- GIS Implementation
- Derived Products
- Bare Earth DEM/DTM



- Geographic Data : Through Map service providers
- Infrastructural Data : Directly or through MIS Data Integrator
- Documents : Directly or through Document Management System



In addition to that, if we launch **Digital Multimedia Broadcasting (DMB)** Satellite (S-DMB) using a digital radio

transmission technology coupled with Remote sensing technologies, and then certainly the answers to the above questions are really possible and feasible. Evolving the sustainable technological framework is essential considering the above challenges, so that any effort towards sustainable development will be sustainable in nature.

Suggestions

Friends, in conclusion, let me suggest a few future projects to the student community on sustainable development missions in promoting and protecting the environment:

1. Since Loyola college having multiple Arts, Science, Engineering and Management institutions, you may design and develop a Loyola PURA in the vicinity of Chennai or adjoining districts where there are many villages and establish the 4 connectivities for bringing sustainable development to that region.
2. Since majority of the students are from chennai and around, you may like to study how the city of chennai can achieve carbon neutral city by 2020. This would be a model to be replicated in other cities.
3. It is essential to evolve a comprehensive action map on how the transport sector of the nation can be made energy independent by usage of bio-fuels and ethanol usage and its associated research challenges on cost effective efficient biofuel and ethanol production, associated policy intervention and the necessary laws to make it mandatory and the technological upgradation needed in the automobile sector.
4. You may design research and test a multi lingual, multi-media curriculum on environment which can be used for tele-education for school students, college students and professionals for providing knowledge connectivity.
5. You may run campaign for tree-plantation in all rural and urban schools across the state and nation where each student is encouraged to plant and nurture at least ten trees.
6. You may involve more schools from the rural areas so that the awareness and involvement in bringing sustainable development will reach the unreached.

Friends, so far I have discussed about the need for the sustainable development system for rural areas called PURA. For realizing such mission, what we need is an indomitable spirit. Hence, let me recall a profound saintly message to all of us by Maharishi Patanjali 2500 years ago.

"When you are inspired by some great purpose, some extraordinary project, all your thoughts break their bounds. Your mind transcends limitations, your consciousness expands in every direction, and you find yourself in a new, great and wonderful world. Dormant forces, faculties and talents come alive, and you discover yourself to be a greater person by far than you ever dreamt yourself to be."

My best wishes to all of you in your endeavour for promoting and enhancing the clean green environment.

May God Bless you.

By Dr. APJ Abdulkalam
www.abdulkalam.com

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