

Prepared by





The term information technology in its modern sense first appeared in a 1958 article published in the Harvard Business Review –

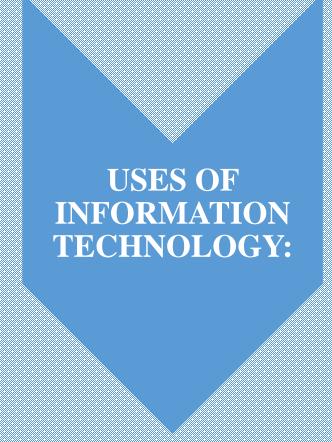
"the new technology does not yet have a single established name. We shall call it information technology (IT)"

INFORMATION TECHNOLOGY

INFORMATION TECHNOLOGY

- Information technology (IT) is the use of any computers, storage, networking and other physical devices, infrastructure and processes to create, process, store, secure and exchange all forms of electronic data.
- The commercial use of IT encompasses both computer technology and telecommunications.
- An information technology system (IT system) is generally an information system, a communication systems, or, more specifically speaking, a computer system including all hardware, software, and peripheral equipment operated by a limited group of IT users.









ROLE OF INFORMATION TECHNOLOGY AND SOFTWARE IN ENVIRONMENT

Information technology has tremendous potential in the field of environment education. Development of internet facilities, Geographic Information System (GIS) and information through satellites has generated a wealth of upto-date information on various aspects of environment.

A number of software have been developed for environment which are user friendly and can help an early learner in knowing and understanding the subject.

DATABASE ON ENVIRONMENT SYSTEM

It is a collection of connected data on some subjects. It comes in a computerized form, and you can retrieve the data at any hour of the day whenever needed. The information of database can easily extract in a computer. When it comes to comprehensive databases, things that include in it are wildlife database, forest cover database, and conservation database, etc. are also available.

- National management information system (NMIS).
- Environmental information system (ENVIS).
- Remote sensing
- The World Wide Web (WWW).

- NATIONAL MANAGEMENT INFORMATION SYSTEM (NMIS): NMIS of the Department of Science and Technology has compiled a database on Research and Development Projects along with information about research scientists and personnel involved.
- **ENVIRONMENTAL INFORMATION SYSTEM:** The Ministry of Environment and Forests, Government of India has created an information System called Environmental Information System (ENVIS). With its headquarters in Delhi, it functions in 25 different centres all over the country. ENVIS established back in 1982, and since then, its main aim is to provide environmental information to all the decision makers, engineers, scientists, and policy planners that reside in all over the country. The ENVIS centres work for generating a network of database in areas like pollution control, clean technologies, remote sensing, coastal ecology, biodiversity, western Ghats and eastern environmental management, media related to environment, renewable energy, desertification, mangroves, wildlife, Himalayan ecology, mining etc.



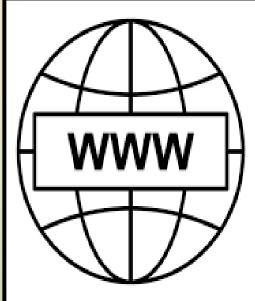
REMOTE SENSING: The process of remote sensing that accesses through satellites can be used to get through the ongoing alterations in the environment as well as to predict the natural hazards before time such as floods, droughts, volcanic eruptions, starvation, etc. It is one of the most useful techniques in exploring the availability of mineral deposits, crude oil, and locating other geothermal powerhouses. We are able to gather digital information on environment aspects like water logging, desertification, deforestation, urban sprawl, river and canal network, mineral and energy reserves and so on.

THE WORLD WIDE WEB: With resources material on every aspect, class-room activities, and digital files of photos, power-point lecture presentations, animations, web-exercises and quiz has proved to be extremely useful both for the students and the teachers of environmental studies.

The role of online learning Centre website has the following features:

Student-friendly features: These include practice quiz, hyperlinks on every topics with detailed information, web exercises, case studies, environmental maps, key-terms, career information, current articles, and interactive encyclopedia and how to contact your elected officials.

Teacher-friendly features: These include in addition to above supplement resources charts, additional case studies, answers to web exercises, solutions to critical thinking, questions, editing facility to add or delete questions and create multiple version of same test etc. Information technology is expanding rapidly with increasing applications and new avenues are being opened with effective role in education, management and planning in the field of environment and health.

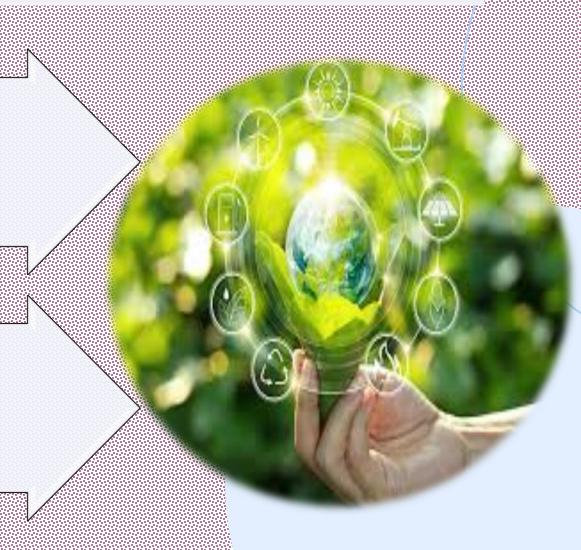




What is Ecoinnovation

Eco-innovation is a new business approach which promotes sustainability throughout the entire life cycle of a product, while also boosting a company's performance and competitiveness

It can help small- and mediumsized enterprises (SMEs) access new and expanding markets, increase productivity, attract new investment into the business, increase profitability across the value chain, and help SMEs stay ahead of regulations and standards – notably those related to the environment.





Importance of Eco innovation

Any society and any company that wants to be environmentally friendly and prosperous must promote a fair type of innovation that allows for new ways of addressing environmental issues, reducing the energy and resources consumption by promoting sustainable economic activities.

Climate change, ozone layer depletion, acidification, eutrophication, decreasing biodiversity and land degradation are some of the environmental threats that face the humanity and also the companies' survival. Hence multiple stakeholders of the societies expect the companies to be sensitive about eco-innovation to protect the environment in order to save the nature and human lives.

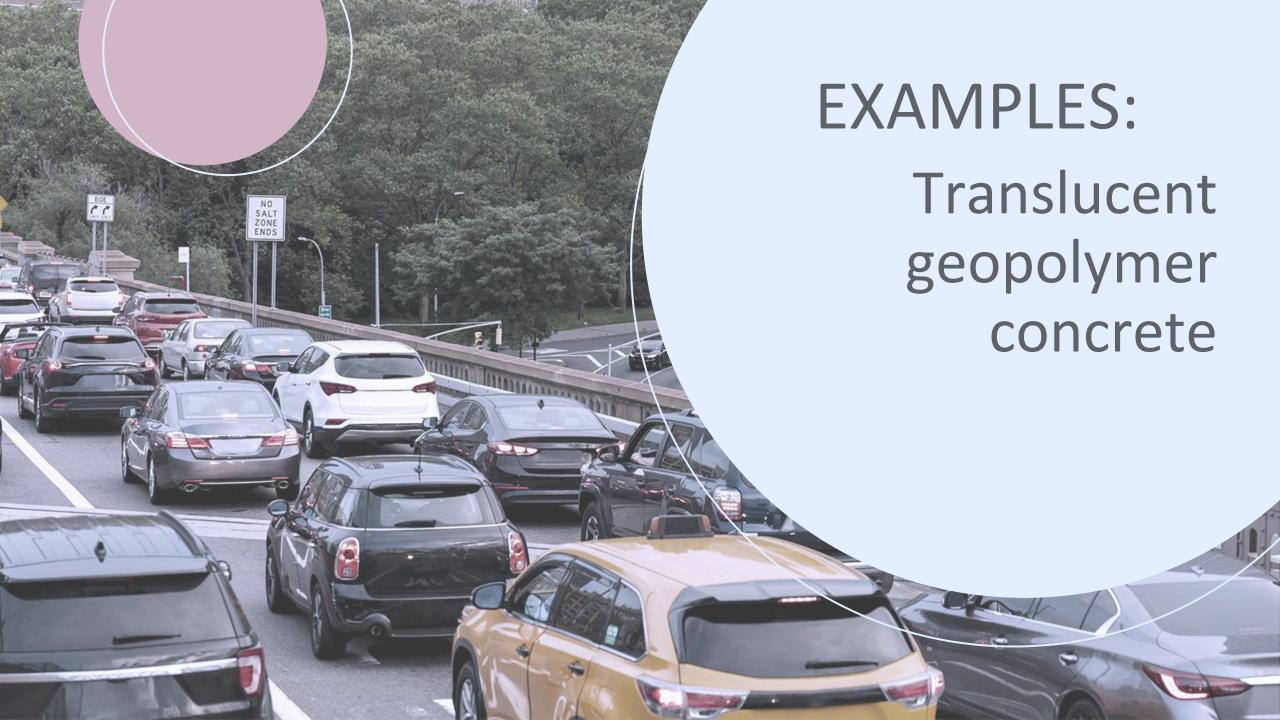
Eco innovation can be analyzed by studying three aspects

1) Target

2) Mechanism

3) Impact





Zero-energy Terracotta Air Conditioner

Monish Siripurapu, an architect at Ant Studio, a design firm in New Delhi, thought of this problem and wanted to create a low-tech air cooling system Monish's design is based on the principle of evaporative cooling, an ancient technique that relies on water and porous materials like terracotta to lower the surrounding temperatures. When water seeps through the porous layers of terracotta, it evaporates at the outer surface, which cools the inner surface due to evaporative cooling. Terracotta made from clary was chosen due to its porous, malleable and robust nature

Principle - Inspired by the beehive structure, the terracotta air conditioner consists of numerous terracotta tubes that have been densely packed and arranged in a spherical form (concentric circles). This installation also gives a beautiful cascade effect when drenched in water. The humid clay traps some heat the air and the surrounding air gets cooled down to around 6-10° C due to the process of evaporative cooling

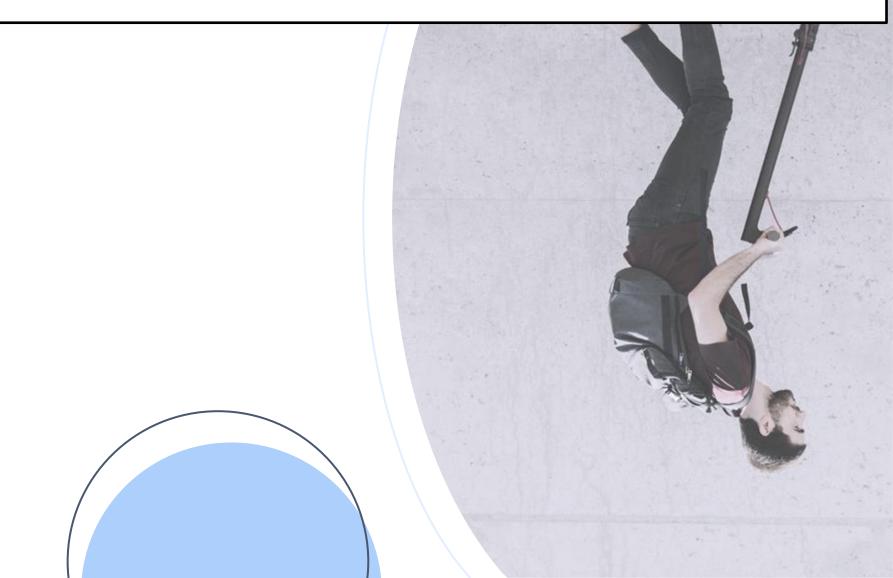


WAVE OF INNOVATION

In 1925, Nikolai Kondratieff proposed that economies tended to go through 50-year cycles, called Kondratieff Waves also proposed as "Theory of waves of innovation"

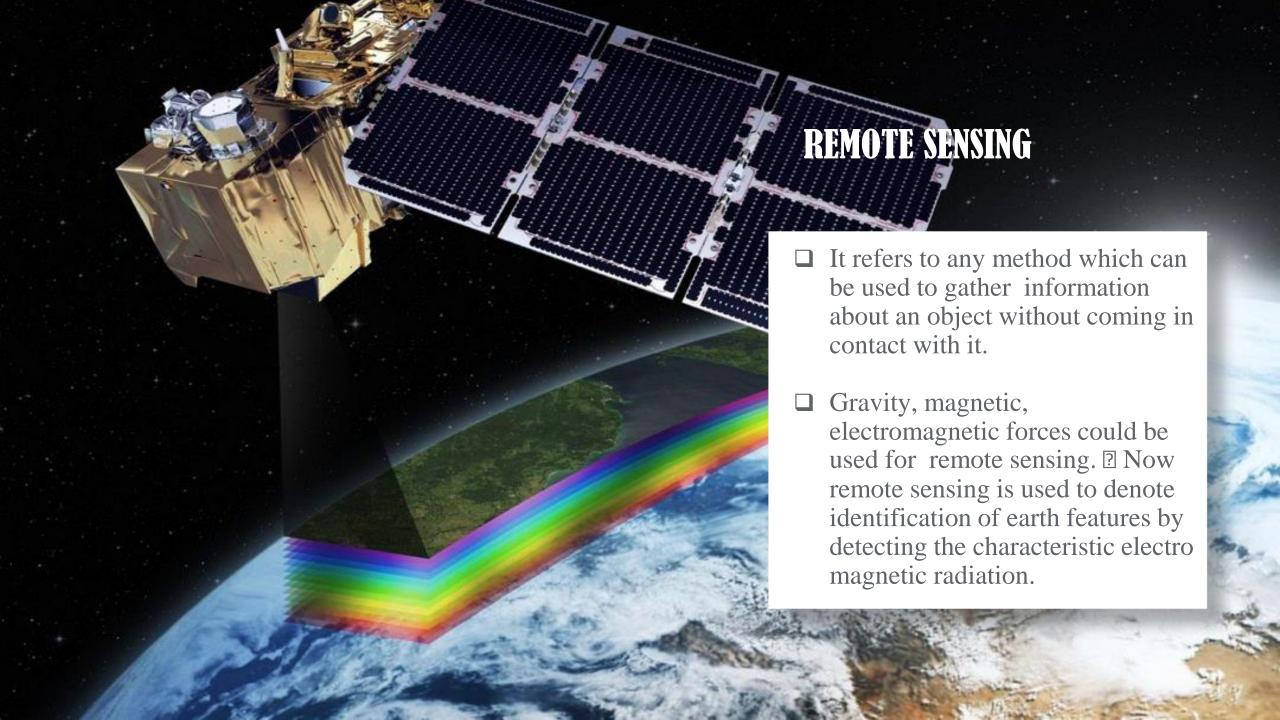
Kondratieff Waves have, at their heart, periods in which a number of key technological (as well as social/political and economic) developments enable bursts of disruptive product or service innovations, fuelling a sharp increase in industrial, and therefore economic, growth. These waves of change also carry with them the seeds of the next wave so the cycles repeat, apparently with periods of approximately 40 to 60 year

Sixth Wave Of Innovation



Kondratieff Waves of Innovation

Waves:	1 st Wave: Industrial Revolution	2 nd Wave: Industrial Production	3 rd Wave: Scientific Revolution	4 th Wave: Scientific- Technical Revolution	5 th Wave: Information and Telecom Revolution	6 th Wave:
Date range:	~1780 – 1830	~1830 – 1880	~1880 - 1930	~1930 – 1970	~1970 - 2010	~2010 – 2050
Economic trend (US S&P 500)	TIT					
Key developments	Steam engine, industrialization	Railways, steel, heavy engineering	Electricity, chemistry, chemical industry	Automobile, mass production, petrochemical industry	Microcomputers, information, telecom	
Events near the peaks	War of 1812	US Civil War	World War I	Vietnam War, Six-Day War		
Events near the troughs		1873/79 Depression	1929 Depression	1974/80 Oil crises	2007/09 Financial crisis	



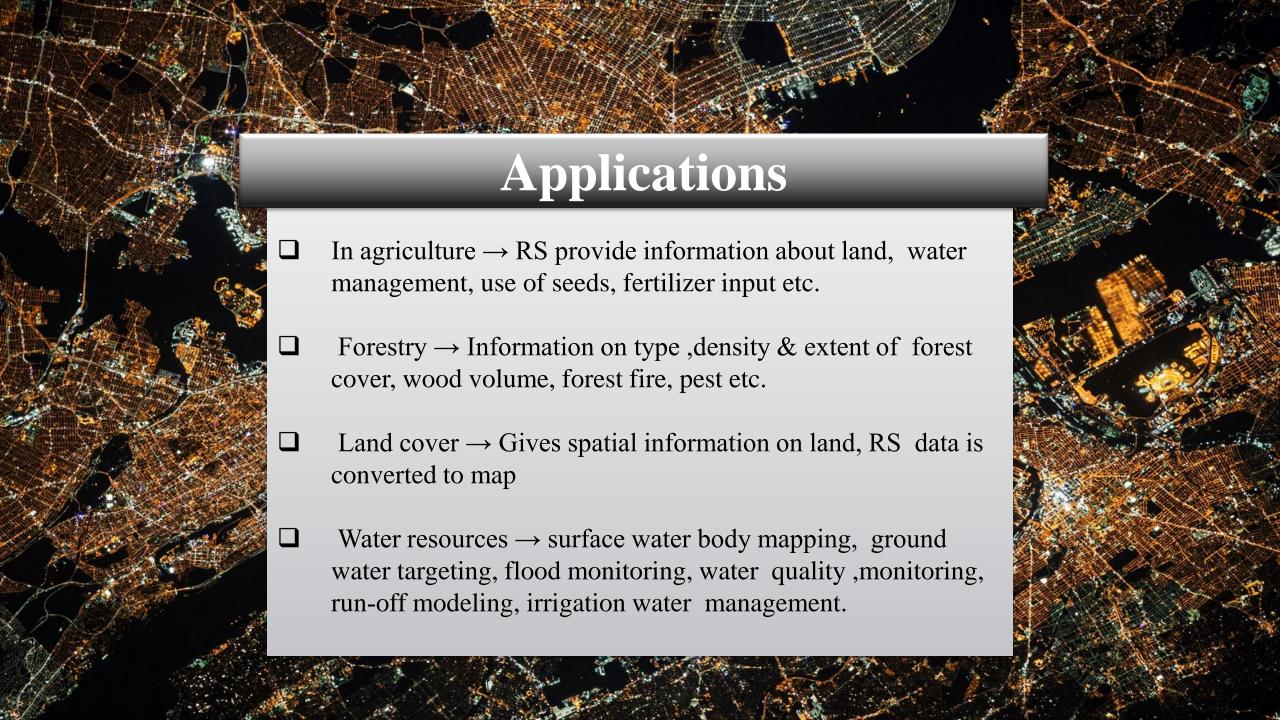
☐ Components Of A Remote Sensing System The system consists of a sensor to collect radiation Other important parts are a platform, an aircraft, a balloon, rocket and satellite. The information received by the sensor is suitably manipulated and transported back to earth. The data's are reformed and processed on the ground to produce photographs, computer compatible magnetic taps and digital storage medium

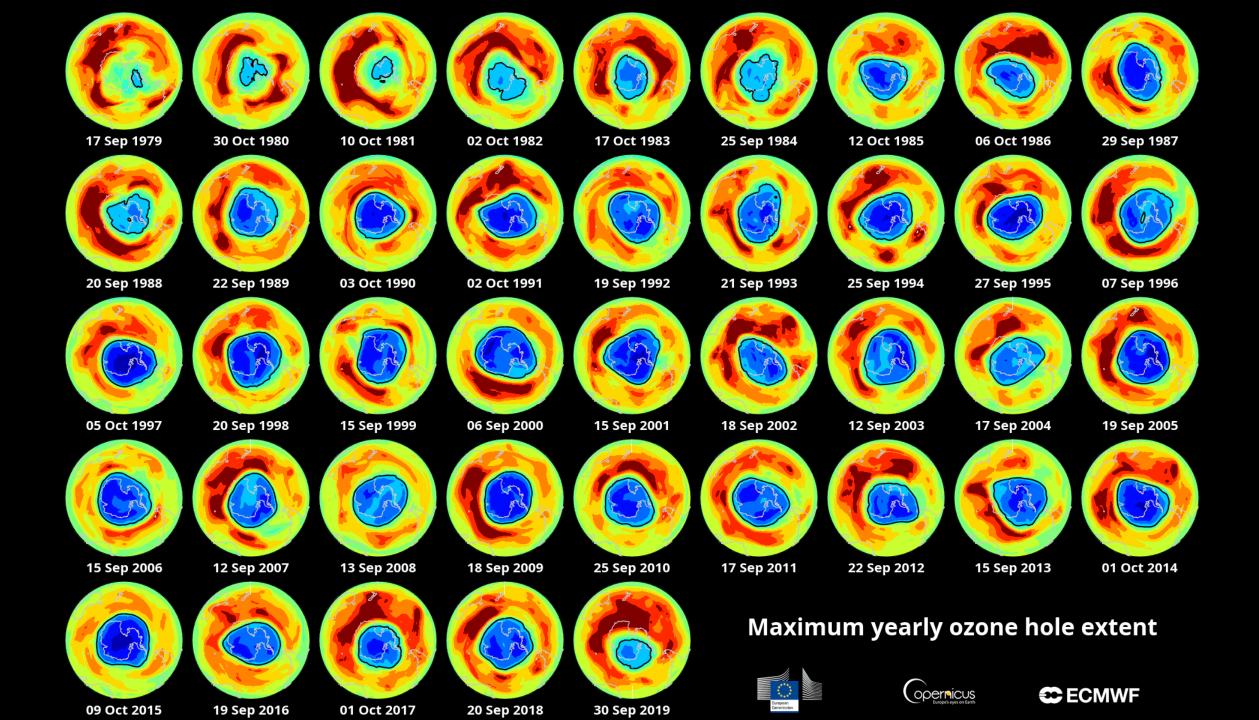




Functions of Remote Sensing

- Origin of electro magnetic energy.
- Transmission of energy from the source to the surface of the earth and its interaction with the intervening atmosphere.
- ☐ Interaction of energy with the earth surface.
- Transmission of reflected or emitted energy to the remote sensor an a suitable platform through intervening atmosphere.
- Transmission or recording of the sensor output.
- □ Collection of ground truth and other information.
- ☐ Data analysis and interpretation.







GEOGRAPHICAL INFORMATION SYSTEM

It is a technique of superimposing various thematic maps using digital data on a large number of inter- related aspects.







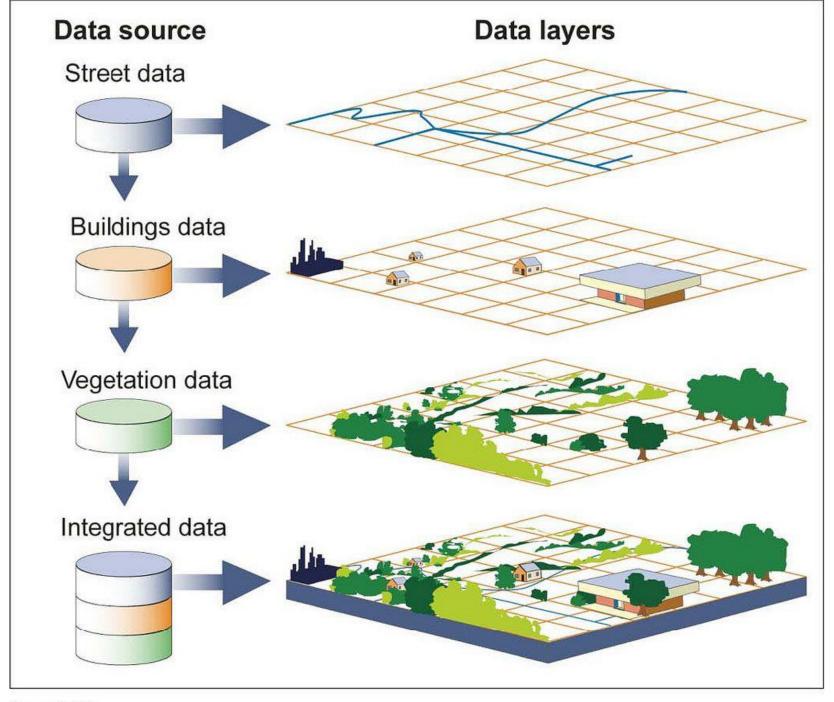
- □ Different thematic maps having digital information on water resources Soil type, forest land, crop land, grass lands are superimposed on a layered form in computer using software.
- ☐ Interpretation of polluted zones, degraded lands.
- ☐ To check unplanned growth and related environmental problems.





WASTE WATER & MANAGEMENT

OIL SPILL & REMEDIAL MEASURES



Source: GAO.

SATELLITE DATA

Satellite data or **satellite imagery** is understood as information about Earth and other planets in the space, gathered by man-made satellites in their orbits.

- ➤ It helps in providing correct and reliable information
- Forest cover, Temperature, wind speed and direction, aerosols, water vapour, cloud cover, precipitation, storms, and tropical cyclones. Satellites can also monitor how winds disperse smoke from wildfires or ash from volcanic eruptions.
- > Satellites provide the following data on the oceans:
- Sea surface temperature, sea level height, ocean currents, and ocean winds. It is also possible to monitor accidents, such as large oil spills, and periodic oscillations in the sea that affect global weather patterns, such as El Niño in the Pacific Ocean.
- ➤ The following land features can also be observed via satellites:
- Land surface temperature, winds, vegetation cover, bodies of water, human settlements, soil moisture, depth and extent of snow and ice.
- ➤ Determining climate conditions





- ☐ The Swachhata-MoHUA is the official app of Ministry of Housing and Urban Affairs(MoHUA), GOI.
 - The app enables a citizen to post a civic-related issue (eg; a garbage dump) which is then forwarded to the city corporation concerned and thereafter assigned to the sanitary inspector of the particular ward.
- □ Carbon Footprint Calculator By Carbon Footprint Ltd. Calculates your carbon footprint for your home and transportation. A carbon footprint is a measure of the impact our activities have on the environment, and in particular climate change. Also includes ways to purchase carbon offsets.
- EcoCalculator By Athena Sustainable Materials Institute. The EcoCalculator offers architects, engineers and others access to instant Life Cycle Assessment (LCA) results for hundreds of common building assemblies. Available in two versions: EcoCalculator for Commercial Assemblies and EcoCalculator for Residential.



WORLD WIDE WEB (WWW) ✓ More current data is available on world wide web The World Wide Web is the primary tool billions use to interact on the Internet **Benefits** □ Obtaining information about environment and its related data in one click. ☐ It is accessible from anywhere around the globe with the availability of the internet. You can create a website for your environment related business and do much more using the Web and the internet. □ Online environment based courses can be completed using the World Wide Web. Finding solution for personal environment health and safety The online marketing and branding of sustainable products can be facilitated with the WWW ☐ Access to online shopping websites

Environmental Impact Calculator App By Siemens AG. This iPhone/iPad app allows you to estimate your building's baseline carbon footprint from purchased electricity, natural gas, and heating oil. In addition, you can measure the impact of energy efficiency improvements on an annual basis or throughout the length of the project term.

□ Paper Calculator By Environmental Défense. Shows the environmental impacts of different papers across their full lifecycle





> Namo E-waste

Started by Akshay Jain, a 28-year-old entrepreneur from Delhi, Namo E-waste processes up to 20 tonnes of e-waste daily. With collection centers across 12 states and union territories across the country, the startup is building strategic partnerships with leading electronic companies, addressing the pressing need for collection of e-waste. These discarded electronic items become a part of toxic ewaste, which is just as dangerous as any other nonbiodegradable item of waste. They also aim to provide green alternatives to electronic assessments by furthering policy changes. By providing eco-friendly solutions to the increasing amount of electronic waste, NAMO e-waste has a significant role in making sure India becomes zero-waste.

Role of social media

- Social media can absolutely help to save the environment, and it's actually one of the best ways of advertising to the next generation about keeping the planet sustainable for years to come
- A large number of people can be connected to spread environment based information is just on go
- Rallies, Plantation, cleanliness drives etc. Are promoted through social media
- ☐ People use art and craft to promote environmental conservations
- ☐ Various environmental days are celebrated via social media by sharing pictures, views etc.
- □ Social media has propelled the rise of the independent activist.
- ☐ It helps in gaining funds for environmental issues





- Promotes environmental friendly brands
- □ Blogs create Virtual Library
- □ Precise Targeting of Audience
- □ Conduct online surveys
- □ Create pages/id dedicated entirely towards environment
- □ Petition can be formed and promoted online
- ☐ It helps build emotional connection towards environment

The triple bottom line: a sustainable model for success

The star of the balance sheet used to be the very last entry: the bottom line.

Now, sustainable businesses use a more comprehensive framework

known as the triple bottom line (TBL) to gauge their overall success.

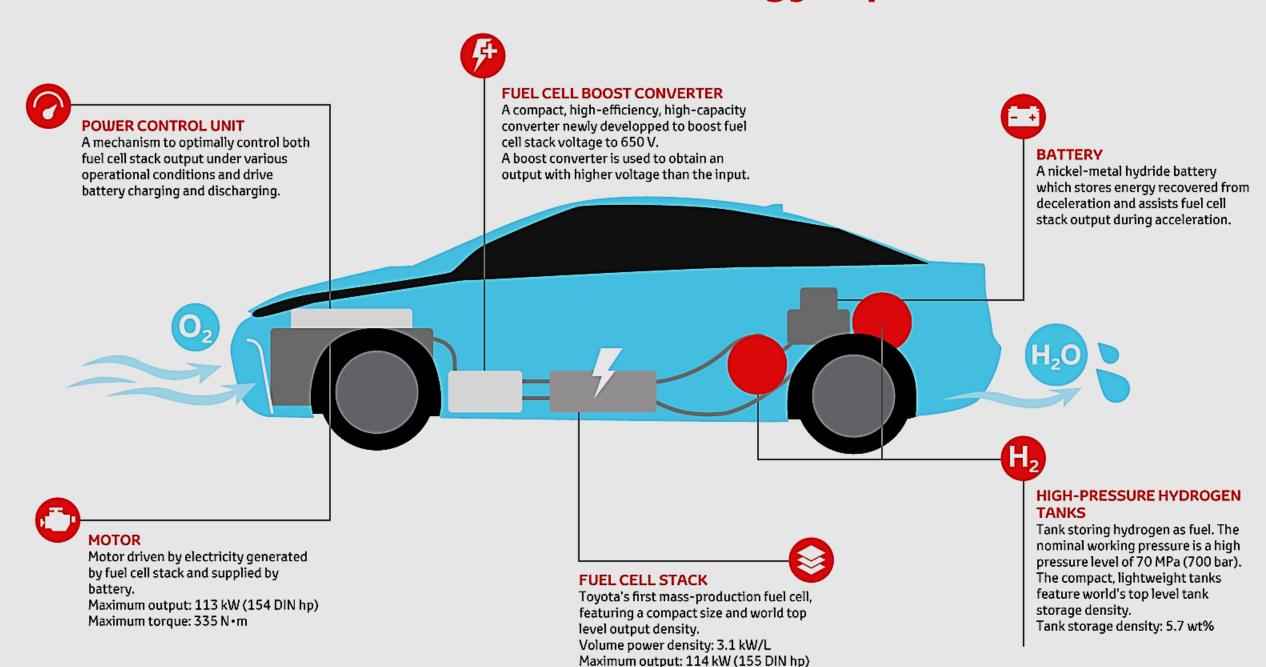


PLANET

PROFITS



Fuel cell electric technology explained



BENEFITS AND LIMITATIONS OF IT



INTRODUCTION

- Deals with use of computers and telecommunication equipment.
- Stores, retrieves, transmits and manipulates data.



INTRODUCTION

 Environmental information technology is the study and practice of technological application designed to deliver user – friendly information about the environment.

INCLUDES:

- Software creation.
- ii. Improvement of simulated environments for human interactions with the immediate or with remote environments.



BENEFITS OF IT

- We can acquire, store, analyze and visualize satellite data for observation, and protection of environment.
- Easily accessible around the world.
- Dramatically reduces costs, increase speed, improved productivity and opens up new challenges and opportunities.
- Helps in Disaster management.
- Reduces waste.



DATABASES

- It is the most important application of IT in environment.
- Collection of inter related data on various subjects.
- Can be retrieved when required .
- User friendly and convenient to store large amount of data and analyze the data gathered.



REMOTE SENSING

- Collection of information about an object or phenomenon without making physical contact.
- Generally refers to using aerial sensor technologies to detect and classify objects on earth.
- New sensors being developed rapidly.
- Important for weather forecast, climate change or natural disaster.



GIS — GEOGRAPHICAL INFORMATION SYSTEM

- It is designed to capture, store, manipulate analyze, manage and present all types of spatial or geographical data.
- Broader academic discipline of geoinformatics .
- Science underlying geographic concept, applications and systems.
- Can use GIS to study the environment.



REDUCES WASTES

- We can store practically unlimited amount of books, pictures and other data that reduces paper wastes to a large extent, that helps us in saving a lots of trees.
- Nowadays the use of E-bills has significantly increased, which also contributes in saving trees.
- Statistical analysis of production and demand over time, accessible worldwide can significantly reduce the wastage.



LIMITATIONS OF IT OR NEGATIVE IMPACT ON ENVIRONMENT

21ST CENTURY

- Information age or computer age
- •77 % of world population owns mobile phones
- 4- 5 % of world population owns pcs!



- Every single computer requires about 1.8 tons of chemicals, fossil fuels and water for its manufacture.
- Emission of about 0.1 tons of carbon dioxide every year.
- Dumping of old computers in landfills causes soil pollution.
- E waste from IT sectors.

Dangerous elements in E- wastes from IT:

- The CRTs contain significant level of lead.
- LCDs are illuminated by mercury –filled panels.
- Circuitry contain chromium, copper, and lead that exceed regulatory limits





Mobile phones and cell towers:

Mobile radiations effect on

Farm animals:

Decreased milk production, spontaneous abortions, reproductive problems.

Birds

interferes with navigation, reproduction, thin shells.

Fall in pigeons, swans, white stork, rock dove.

Honey bees

CCD: colony collapse disorder,

Abrupt disappearance of bees

Cannot find there way back to hive.

these are also of major concern.



UPCOMING SCOPE

- The data of individual sector on environmental science is compiled in information technology (IT) through database software known as Environment Information (EI).
- Environment information is an easy accessible database in individual sector, where people can know both new research scope and impact on environment.
- The present study deals to inform that EI is an area, in which the knowledge of environmental science and IT is combined through database software.

- There are several research areas in which the data viz. Ecology and ecosystem, biodiversity and conservation of important species, health hazards by diseases, health care facilities, toxicological aspects, wastes types, source generation and management, alternative energy generation facilities, environment education and awareness etc.
- It is a conceptual approach to gather knowledge of environment related problems and prospects and can easily make a database for the intellectuals, academicians, scientists, regulatory authorities, policy makers, researchers, students etc.
- These help to know benefits in research area, regulatory process, decision making and proper environment management. People can easily access compiled database in an individual sector of environment science.

Conclusion

- As with anything in life, there are two sides to every story.
- The advantages and disadvantages of using IT in the environment have been debated for quite some time and will continue to be debated into the future. However, as our technology improves environment and our healthcare system evolves, it seems unreasonable not to implement the many benefits gained by technology.

