

## (17E00302) GREEN BUSINESS MANAGEMENT

**Objective :**The objective of the course is to impart students in understanding of green business, its advantages, issues and opportunities and to provide knowledge over the strategies for building eco-business .

**1. Introduction to Green Management:**The Concept of Green Management; Evolution; nature, scope, importance and types; Developing a theory; Green Management in India; Relevance in twenty first century

**2.Organizational Environment;** Indian Corporate Structure and Environment; How to go green; spreading the concept in organization; Environmental and sustainability issues for the production of high-tech components and materials, Life Cycle Analysis of materials, sustainable production and its role in corporate environmental responsibility (CER).

**3.Approaches from Ecological Economics;** Indicators of sustainability; Eco- system services and their sustainable use; Bio-diversity; Indian perspective; Alternate theories

**4.Environmental Reporting and ISO 14001;** Climate change business and ISO 14064; Green financing; Financial initiative by UNEP; Green energy management; Green product management

**5.Green Techniques and Methods;** Green tax incentives and rebates (to green projects and companies); Green project management in action; Business redesign; Eco-commerce models

### **Text Books:**

- Green Management and Green Technologies: Exploring the Causal Relationship by Jazmin SeijasNogarida , ZEW Publications.
- The Green Energy Management Book by Leo A. Meyer, LAMA books

### **References:**

- Green Marketing and Management: A global Perspective by John F. Whaik, Qbase Technologies.
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- Green and World by Andrew S. Winston, Yale Press B

## UNIT – 1

### INTRODUCTION TO GREEN MANAGEMENT

#### 1. Concept of Green Management

Concept of Green Management describes the construction of business. In other words, business management styles focuses on the utilization of competent and talented employees to produce profits on behalf of the business.

Green is the great balancer of mental, emotional and physical energies which is why there is so much green on our planet. Green is the heart centre of the body.

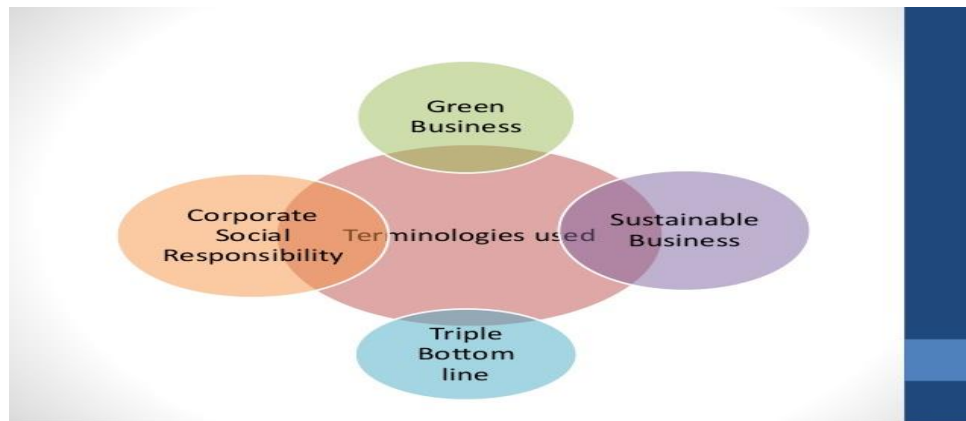
#### 1.1 Meaning:

- Green Business Management is not a concept describing new business management style. It describes the construction of businesses. A Business functioning in a capacity where no negative impact is made on the local or global environment or the community or the economy.
- A Business that serves to meet the triple bottom line often, businesses have progressive environmental and human rights policies. A Green Business will also engage in forward thinking policies affecting human rights.
- These businesses adopt principles, policies and practices that improve the quality of life for their customers, employees and environment.

**1.2 Definition:** According to Brown and Ratledge, "Green Management is defined as an establishment that produces green output".

#### 2. Evolution:

- Green Movement and Green Policies began in the late 1970's when the first Green party was formed in Germany. The Term 'Green' is the English translation of the German word 'Grun'. Green politics advocated issues pertaining to Ecology, Environment, Feminism, Conservation and Peace.
- It is believed that Green politics draws its inspirations from Mahatma Gandhi, Spinoza and Uexkull who advocated and urged personal responsibility to make the right moral choices is the pillar of the green politics ideology.



### 3. Nature of Green Management :( Nature Products like Solar, Local Value Improvement)

**1. Nature-Based Knowledge and Technology:** It involves emulating one's own self in terms of growing their own food, harnessing their energy, constructing things, conducting business, healing themselves, processing information and designing their communities.

**2. Products of Service to Products of Consumption:** Products of Service are durable goods unlike products of consumption which have shorter life span. Products of Service are made of technical materials unlike products of Consumption which are made only of biodegradable materials.

**3. Solar, Wind, Geothermal and Ocean Energy:** These are used extensively without any negative effect on the earth.

**4. Local-Based Organizations and Economies:** This characteristic includes durable, beautify and health communities with locally owned and operated business and locally managed non-profit organizations, along with regional corporations and shareholders working together in partnerships and other collaborations.

**5. Value Production:** The triple value production establishes three simultaneous requirements of sustainable business activities as financial benefits for the company, natural world betterment, social advantages for the employees and members of the local community.

**6. Continuous Improvement Process:** The continuous process of monitoring, analysing, redesigning and implementing is used to intensify value production as conditions change and new opportunities emerge.

#### **4. Scope of Green Management:**

**1. Green Foods:** Green Business ideas allow people to grow garden parks or small seeded trays. Green foods are an extremely important part of a healthy diet. There are numerous options to choose from and they can easily be incorporated into meals.

**2. Green Consulting:** An increasing number of individuals, families and business are starting to look for ways to reduce the carbon footprint and decrease their use of the earth's resources.

**3. Green Vehicles:** Green Vehicles are nothing but clean vehicles or eco friendly vehicles or environmentally friendly vehicles which produces less harmful impacts to the environment than the conventional one's which run on Diesel or gasoline or some other.

- (i) Fuel Efficient Cars
- (ii) Alternative Fuel Vehicles
- (iii) Hybrid Electric Cars
- (iv) Electric Vehicles

**4. Green Appliances:** The more efficient the appliance, the less energy it will use. Lower energy use means less pollution.

#### **5. Importance of Green Business Management:**

(Cost Reduce Health Reduce Tax Decrease Improved Increase Increase and Others)

**1. Cost Saving:** Companies that focus on reducing energy consumption not only help the environment but also reduce their costs in the form of lower energy bills. Smaller businesses can also benefit from reduced energy costs by taking simple steps like switching off lights and fans when they are not required for usage.

**2. Reduced Energy Use:** Green Management often include measures to reduce energy use. To increase the efficiency of the building envelope it may use high efficiency windows and insulation in walls, ceilings and floors.

- 3. Healthier Workplace:** Companies that promote a healthier workplace have a decrease in the number of sick days used by employees. This benefits the companies through increased productivity and less money paid out through medical benefits.
- 4. Reduced Waste:** Green Management also seeks to reduce waste of energy, water and materials. During the construction phase, one goal should be to reduce the amount of materials going to landfills. By collecting human waste at the source and running it to a semi-centralized bio-gas with other biological waste, liquid fertilizer can be produced.
- 5. Tax Credits:** Tax Credits are available to companies that utilize environmentally friendly business practices such as switching to renewable energy source like solar power and using electric or hybrid automobiles and trucks as fleet vehicles.
- 6. Decreased Productivity:** It is easier for the staff to toss paper plastic and other items into one trash can, then it is to sort the trash. If a company adds recycling to the office, company can see a slight decrease in worker productivity
- 7. Improved Public Image:** Anytime companies can add a green initiative to the workplace. Companies can use the event to generate positive public relations. They can also include green initiatives on product packaging, advertisements and marketing materials to appeal to consumers who prefer green products.
- 8. Increased Capital Outflows:** Some green conversions require an initial cash outflow that decreases the bottom line performance while the investment is paying for itself. This can increase the company's quarterly earnings on annual profits.
- 9. Increased Business Opportunities:** Some Government agencies, Commercial businesses and non-profit institutions mandate that only businesses that meet specific green standards can bid on their contracts. Not all standards are government mandated with the office of the management and budget directing federal agencies to look for companies that meet voluntarily rather than Government standards when possible.
- 10. Other Importance:**
  - Green Businesses are socially and environmentally responsible
  - Green Businesses care for their workers
  - Green Businesses protect their customers and clients
  - Green Business improve their communities.



## **6. Types of Green Management: (Management Subject Names- Green Common in all points)**

**1. Green Supply Chain Management (GSCM):** It includes repurchasing, recycling, reuse and substitute of material. This concept gains popularity because the customers are concerned with environment improvement which encourages the supplier to make environment friendly product.

Companies which adopted Green Supply Chain Management are British Telecom, Nike, Toyota and so on.

**2. Green Marketing:** It is the marketing of products that are presumed to be environmentally safe. Green Marketing incorporates a broad range of activities including product modification, changes to the production process, packaging changes.

Eg., Bank of America reduced Paper usage by 32%

**3. Green Production:** With this type of production we could reduce all the harmful pollution to the environment and also reduce the cost from their starting step to finished product.

Companies that follow Green Production are: Ikea - Using Solar & Wind Energy, Nike - Using recycled aluminum frames and underground energy storage

**4. Green Research and Development:** With only proper Research and Development the customer can provide a suitable product.

Eg., Volkswagen Creating cars which are following environmental and safety standards to reduce carbon emissions.

**5. Green Criminology:** Criminology is referred to the study of Crime and Criminals whereas Green is related to environment issues.

Some of the Green Crimes are Deforestation, Animal Trafficking, Cutting of Shark fins for trading.

**6. Green Human Resource Management:** It is based on Green Environment related to protection of environment. The term Human Resource refers to the contribution of Human resource policies and practices towards the broader corporate environmental agendas of protection, prevention and conservation of natural resources.

Eg., Hewlett Packard - Product take back Programs, Green Programs, Green Packing and Integrating Design.

## **7. Developing a Theory: Emergence of Green Theory**

- The theories of sustainable and green operations do not have a judgmental view on the essentiality of business, productions processes and their products.
- The major focus is on environmental impacts - usually represented by their main environmental aspects such as emissions, energy and water consumption, wastes, etc. Green operations are usually understood as economically viable, socially fair and environmentally friendly operations. This theory focuses on the use of alternatives with lower environment impact.
- Greener operations is conceptualized as having environmental considerations in making decisions regarding eco-design, green manufacturing, closed-loop supply chains, etc.

Green business theory focus on providing the answers to the following questions:

- (i) Can there be sustainable operations in an unsustainable economic environment?
- (ii) How endogenous would production need to be when considering sustainability of supply chains?
- (iii) How do we consider specific location advantages or constraints in environmental performance measurement?
- (iv) How do we consider uncontrollable factors such as individual rates of consumption when designing product and operations environment performance?

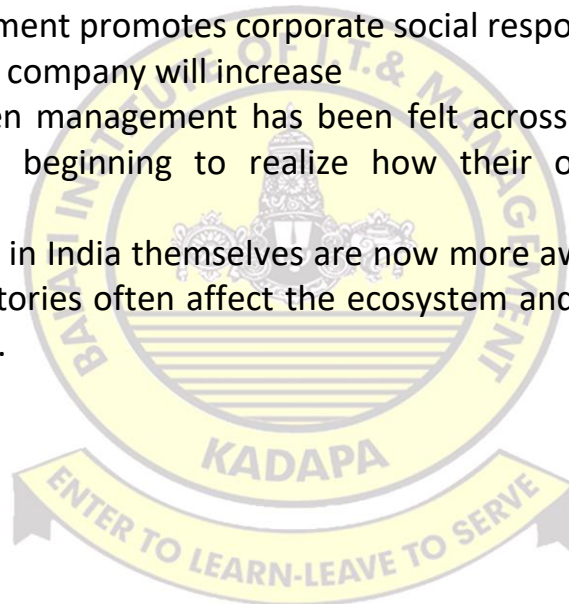
## **8. Green Business Management in India**

- Green Management is an initiative aiming at continuously improving the foundation of environmental management, such as the development of personnel responsible for environmental activities, environmental management systems, and environmental communication as well as conservation of biodiversity.

- Green Management and sustainability are the basis for new firms and integral parts of current businesses. They are elements that generate innovation and market opportunities, as well as new career opportunities.
- Today, Environment issues are seen everywhere in the world. These issues are very crucial i.e., global warming, waste disposal, climate change and pollution etc and influenced our daily life.
- The main reason for this is that firm still thinks that green marketing practice may increase their cost of production and reduce their profit.
  
- Green Management ensures sustained long term growth along with profitability
- Green Management saves money in the long run, although initial costs is more,
- Green Management promotes corporate social responsibility
- Goodwill of the company will increase
- The effort green management has been felt across industries in India, as companies are beginning to realize how their operations impact the environment.
- The Companies in India themselves are now more aware about the ways in which their factories often affect the ecosystem and have taken a greener path to success.

Some of them are:

- LG
- HCL
- Haier
- Samsung
- TCS
- ONGC
- ITC
- WIPRO
- MRF Tyres
- Suzlon Energy
- Infosys
- Indus Ind Bank





- In other sectors, Hindustan Unilever is aiming to cut carbon emission by 22 percent, pune based Kirloskar brothers is marketing a line a highly energy efficient pumps, while in Jaipur Ultra Tech Cement help burn 100 tons of municipal waste at its waste treatment plant every day.
- An Eco friendly product is not harmful to the environment whether in their production, use or disposal.
- Environmentally friendly also referred to as eco friendly, nature friendly and green are sustainability and marketing terms referring to goods and service, laws, guidelines and policies that claim reduced, minimal or no harm upon eco system or the environment.
- This term most commonly refers to products that contribute to green living or practices that help conserve resources like water and energy.
- Eco friendly products also prevent contributions to air, water and pollution.
- This kind of products is easily recognizable and which can help you to reduce waste and make this planet a better place to live.

**Some of them are using eco friendly products in India are:**

- Cotton Shopping Bags
- Rechargeable Batteries
- Reusable Papers/Books
- Reusable Water Bottles
- Solar Powered Outdoors speakers
- Solar Phone Charges
- Eco Friendly Umbrella
- Led Bulbs
- Eco Friendly Chair
- Bio degradable pots
- Bamboo Desktop Dry erase board

## 9. Relevance in 21<sup>st</sup> Century:

Most of the business worldwide is switching on to adopting Green Philosophy in Management function. Some reason or forces for driving such movements are:

**1. Social Responsibility:** Social Responsibility in business or corporate social responsibility (C.S.R.) people and organizations behaving and conducting businesses ethically sensitive towards social, cultural, economical and environmental issues.

**2. International Standard Norm:** The International Organization for Standardization (ISO) is a specialized International agency for standardization and at present comprises the national standard bodies of all 91 countries. It facilitates International trade of goods and services. It obtains competitiveness by obtaining required quantity in a cost effective way. It also promotes a single third party assessment of quality standard.

**3. Statutory Law:** It is the law that's written by a legislative body. It's a law that a government deliberately creates through elected legislators and an official legislative process. Statutory Law is the term used to define written laws usually enacted by legislative bodies.

**4. Growth and Opportunity:** These support a strong economy, fiscal accountability, competitive tax rates, great schools, domestic energy plan and a government that gets out of the way of private sector.

**5. Competition:** One of the major forces that strive to adopt green management into their corporate structure face overwhelming competition and desire to maintain their competitive position in the market. **Competition for better brand and to create image in the eye of the society seek strategy which help them to remain sustain for long.**

**6. Improved Public Image:** The public image of a famous person or organization is the character or attitude that most people think that they have and attempts to improve the same. **The perception people have of your business when they hear your company's name;** a business image is composed of an infinite variety of facts, events, personal history, advertising and goals that work together to make an impression on the public. How to improve them:

- Define your Brand
- Build an amazing website
- Value your employees and establish a healthy company culture
- Recycle, Reduce, Reuse
- Implicitly express your company values
- Build trust and authenticity between your clients and your brand
- Focus on creating high quality products or services.

**7. Increases profit in the organization:** A profitable organization is one that generates more money than it expends. Profitable organizations are businesses that use a variety of tactics to make a profit. Business may use different managerial skills and leadership approaches to increase employee motivation and satisfaction which has been shown to increase worker productivity calculating rate of investment will help business determine whether they are generating a profit.

**8. Better Employee Retention Rate:** It refers to the ability of an organization to retain its employees. Employee Retention can be represented by a simple statistics. However many consider employee retention as relating to the efforts by which employers attempt to retain the employees in their work force. In this sense, retention becomes the strategies rather than the outcomes.

**9. Stimulates Innovation:** Self Confidence is a barrier to Innovation that is tough to turn around in the organisation. As the leader you have to be willing to go out and take some risks to inspire self confidence and stimulate innovation from your team. Green Innovation can be used to achieve CSR goals but can also take place without the existence of CSR Innovation. Management is controlling and making decisions about Innovation process.

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## UNIT – 2

### ORGANIZATIONAL ENVIRONMENT

#### 1. Indian Corporate Structure & Environment:

- A Normal Corporate Structure consists of various departments that consist of various departments that contribute to the companies over all mission and goals. Common departments include marketing, finance, operations, human resource and IT.
- The Indian Business Environment has altered radically since 1991 with the changes in the world.
- While befitting from decontrol and deregulation has now begun to feel the effect of these changes, those most affected are the promoters who are today threatened by the possibility of hostile takeovers.
- At the same time, financial institutions which have a significant stake in many companies have started demanding better corporate governance.
- It is a well known fact that the way to growth is either through Greenfield expansions leading to Organic growth in one's own unit or Brownfield expansions leading to inorganic growth.
- Since the world is moving at a rapid pace and corporate are in a hurry to expand restructuring is the name of the game all over the globe. Indian companies too have learnt that this faster mechanism of intensification.
- Restructuring through Amalgamation and acquisitions if suitably chosen and implemented can permit an organization to leaping into a novel orbit of markets, customers, products and technologies almost overnight.
- Changes in the business environment ensuing from liberalization and globalization have contributed to dynamism in the Indian Economy.
- The new environment poses challenges to the methods of operations practiced under the controlled economy.



## **1.1 Corporate Restructuring:**

- A Bonus for competitive advantage Crum and gold berg define restructuring of a company as a set of discrete significance measures taken in order to boost the competitiveness of the enterprise and thereby to augment its value.
- It generally includes a array of company actions from selling business lines to attaining new business line from rationalizing workforces to stoke repurchase to debt elimination.

Conceptual Scaffold for corporate restructuring and reorganization consists of the following:

- Management of Assets
- Construing new ownership relationships
- Reorganizing financial claims
- Corporate strategies
- Implementing strict MRTTP provisions and new government policy of relicensing.
- Fierce Competition is another key element for giving rise to corporate restructuring.
- Increase pressure on margins have necessitated higher of business, ensuring mergers and acquisitions or the grand concentration of strategy has led to demergers of non-profitable businesses.
- All round resource optimization in active businesses to reorganize functioning profit and to stay fit in competition.

## **Merger:**

- Merger is said to occur when two or more companies are united into one company where one survives and the other lose its corporate. The survivor attains the assets as well as liabilities of the merger company of companies. Merger is also the synthesis of two or more existing companies.
- All assets and liabilities are and payments in the form of equity share of Transferee Company or debentures or cash or a mix of the two or three modes.

## **Acquisition:**

An acquisition takes place when one company purchases another company or a part of it. The company completely buys out another company and the former company remains.

## **Demerger:**

- A business strategy in which a single business is broken into components either to operate on their own to be sold or to be dissolved.
- A demerger allows a large company such as a conglomerate to split off its various brands to invite or prevent an acquisition to raise capital by selling off components that are no longer part of the business' core product line or to create separate legal entities to handle different operations.

## **Restructuring:**

- A Considerable alteration made to the debt operations or arrangement of a company. This kind of business actions is usually made when there are significance troubles in a organization which are causing some form of financial damage and putting the overall business in danger, the hope is that through restructuring an organization can reduce financial harm and improve the business.

## **2. How to go green**

### **2.1 Concept of Green Management:**

- The Green Management is not a concept new business management style. Green Management describes the constructions (Construction process to be exact) of business. In other words business management styles focuses on the recruiting of the management of and the utilisation of competent and talented employees to produce the profits on behalf of the business green management on the hand is the couture method of producing profits.
- Green Business operates in ways that solve rather than cause both environment and social problem.
- These businesses adopt principles, policies and practices that improve the quality of life for their customers, employees and environment.

### **2.2 Propositions for spreading the Green Practices:**

#### **1. Value Chain:**

- Typically companies have approached the value chain and more often the supply supply chain purely cost cutting and logistics efficiency approach. However when a green lens is used there is enormous (profits) potential for the value chain to

#### **2. Energy Efficiency:**

- DuPont has saved \$3 billion from reducing carbon emission showing a chemical company can go from being harmful to the environment to one that is increasingly becoming a green company.
- The solution that led to energy efficiency rarely comes from expert consultants alone because they lack covert knowledge of the client system.

### 3. Product Design:

- Product Design as a verb is to create a new product to be sold by a business to its customers.
- A very broad concept it is essentially the efficient and effective generation and development of ideas through a process that leads to new products Design management is one of the most important elements in the successful business of designing innovative

### 3. Spreading the Concept in Organisation:

- Organization is a knowledge type of company asset to which no value can be defined and name is composed of forces or Institutional surrounding is external environment. It is an organised group of people with a particular purpose such as business or government department. It is a plan of an action of organizing something the organisation of conferences.

#### Environment:

- The neutral environment encompasses all living and non living things the circumstances objects or conditions by which one is surround or forces (as soil climate and living things that influence a plant or animals and micro organism biotic factors) in area functioning together with all of the non-living physical abort factors of the environments

### 3.1 Spreading the Concept in Green Concept in Organization:

- A shift is taking place in organization across the globe is awakening to the reality that green business practices provide competitive advantages while simultaneously producing would benefit.
- As larger organizations begin integrating such practices into their strategic agendas tens of thousands of supply chain organization will need to adjust

how they do business many organizations with a desire to go green lack the know how to desire to change without external help.

- By Green Organization Development people are referring to organization development work that focuses on organization seeking to change core practices so that they benefit society and environment while also adding value of the organization the implicit term of organization development is sustainability from the environmental side meaning nature prevention and social goods and the business value side meaning reputations stock price and validity.

#### **4. Environmental and sustainability Issues related for the production of high-tech components and materials**

**1. Waste:** Waste is any substance which is discarded after primary use or is worthless, defective and of no use. Eg., The manufacturing company should produce the products one place to another place.

**2. Sustainable Development:** All manufacturers use raw materials to put together their goods. Sustainable products are those products that provide environmental, social and economic benefits while protecting public health and environment over their whole life cycle from the extraction of raw materials until the final disposal.

**3. Emission:** Manufacturing processes often generate air or water emissions which includes chemicals filled with smoke and wastages of the products. This is to destroy the environment.

**4. Environmental Regulations:** Regulating business activities is the one way for government agencies to protect the environment. The organisation to decrease the day to day pollution and they formed rules and regulations.

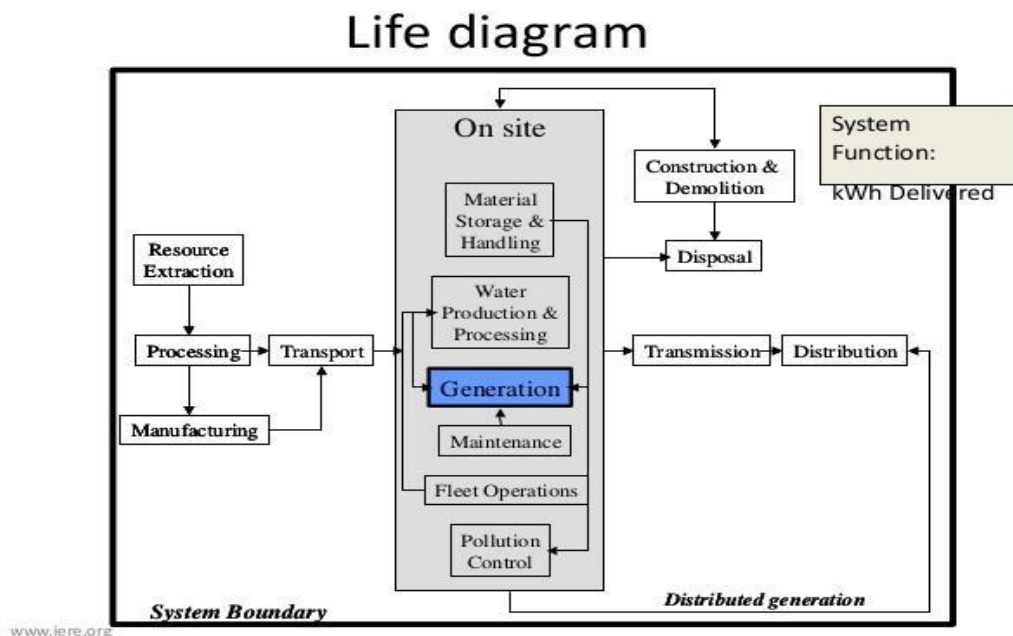
**5. Permit Requirements:** Companies involved in activities that impact their surrounding environment typically have to file for operating permits.



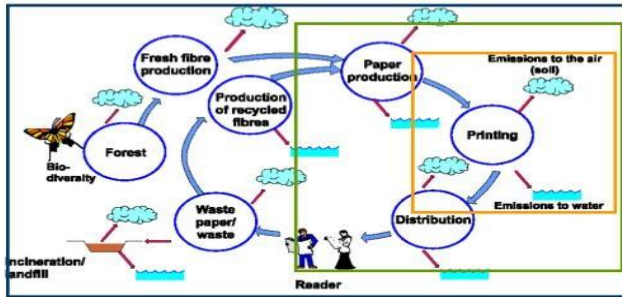
**6. Compliance Requirements:** Compliance is the regulation of all company activities to ensure internal and external policies, laws, identify risk areas and implement controls to protect the organization from those risks.

**7. Demographics:** Changes in Demographics are another external factor that can impact businesses. Shifts in demographics occur for various reasons like displacing a critical client base and so on. Cost of living, the environment, or lack of green space may cause people to move elsewhere.

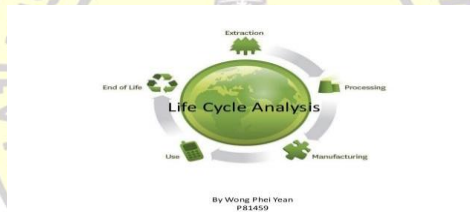
### 5. Life Cycle Analysis of Materials



## Life-cycle – Identify the boundaries



Life cycle analysis (LCA, also known as life cycle assessment, eco balance, and cradle –to- grave analysis ) is a technique to assess environmental impacts associated with all the stages of a product’s life from raw material extraction through materials processing, manufacture, and disposal or recycling.



- Interpreting the results to help make a more informed decision.

The procedures of life cycle analysis (LCA) are part of the ISO14000 environmental management standards: in ISO 14040:2006 and 14044:2006.

### **5.1 Objectives of life cycle analysis of materials:**

Some basic objectives of life cycle analysis are:

- To minimize the magnitude of pollution.
- To conserve non-renewable resources.
- To conserve ecological systems.
- To develop and utilize cleaner technologies.
- To maximize recycling of materials and waste.
- To apply the most appropriate pollution prevention and /or abatement techniques.

## 5.2 Process of Life Cycle Analysis of Materials

According to the ISO14040 and 14044 standards, a life cycle analysis is carried out in four distinct phases. The phases are often interdependent in that the results of one phase will inform how other phases are completed.

Goal and scope definition

Interpretation

Life cycle Inventory Analysis

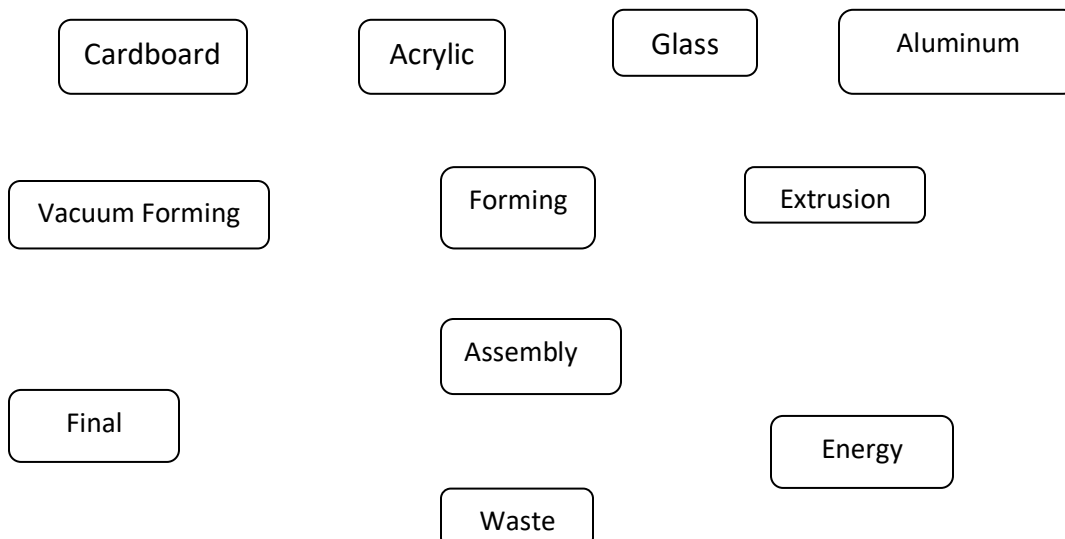
Impact Assessment

### 1. Goal and scope:

An LCA starts with an explicit statement of the goal and scope of the study, which sets out of the study and explains how and to whom the results are to be communicated. The goal and scope document therefore includes technical details that guide subsequent work:

- The functional unit.
- Any assumptions and limitations.
- The system boundaries.
- The allocation methods.
- The impact categories.

### 2. Life cycle inventory:



- Life cycle inventory (LCI) analysis involves creating an inventory of flows from nature for a product system. Inventory flows include inputs of water, energy, and raw materials, and release to air, land, and water.
- The flow model is typically illustrated with a flow chart that includes the activities that are going to be assessed in the relevant supply chain and gives a clear picture of the technical system boundaries.

Inventory flows can number in the hundreds depending on the system boundary.

Some of the LCI methods are

- Process LCA
- 
- Economic input output LCA
- Hybrid Approach

### **3. Life cycle impact assessment:**

Inventory analysis is followed by impact assessment. This phase of LCA is aimed at evaluating the significance of potential environmental impacts based on the LCI flow results. Classical life cycle impact assessment (LCIA) consists of the following mandatory elements:

- a) Selection of impact categories, category indicators, and characterization models.
- b) Life cycle impacts can also be categorized under the several phases of the development, production, use, and disposal of a product.
- c) First impacts include extraction of raw materials, manufacturing (conversion of raw materials into a product).

### **4. Interpretation:**

Life cycle interpretation is a systematic technique to identify, quantify, check and evaluate information from the results of the life cycle inventory and / or the life cycle impact assessment.

According to ISO14040:2006, the interpretation should include:

- a) Identification of significant issues based on the results of the LCI and LCIA phase of an LCA
- b) Evaluation of the study considering completeness, sensitivity and consistency checks; and
- c) Conclusions, limitations and recommendations.

A Key purpose of performing life cycle interpretation is to determine the level of confidence in the final results and communicate them in a fair, complete, and accurate manner.

## **6. Sustainable Production & its role :**

Sustainable Production is the creation of goods and services using processes and system that are:

- a) Non – Polluting, Conserving of energy and natural resources
- b) Economically viable
- c) Safe and healthful for workers, communities and consumers.

Sustainable Production describes the design, development , production and supply of goods/services in a manner that works within the finite limits of the planetary systems people rely upon.

### **6.1 Principles of Sustainable Production:**

#### **1. Products and Services**

- a) Safe and ecologically sound throughout their life cycle.
- b) An appropriate, designed to be durable, repairable readily recycled, compostable or easily bio degradable.

#### **2. Processes and Designed and Operated**

- a) Waste and ecologically incompatible by products and reduced eliminated or recycled on site.
- b) Work spaces are designed to minimise or eliminate chemical, ergonomic and physical hazard



### 3. Workers are Valued

- a) Their security and well being is a priority.
- b) Their work is organised to conserve and enhance their efficiency and creativity.
- c) Communities related to any stage of product life cycle production of raw materials through manufacture.
- d) Continued economic viability does not depend on ever increasing consumption of Material and Energy.

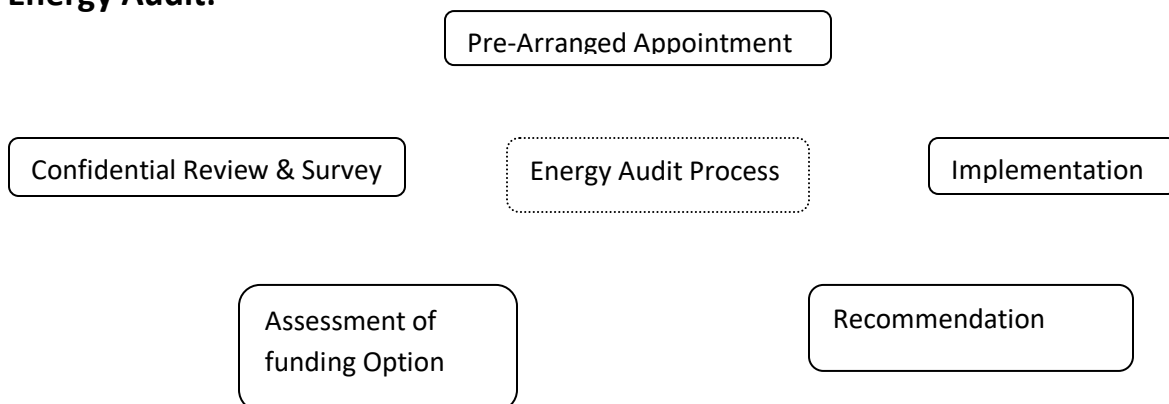
#### 6.3 Ways of Sustainable Production:

Products are made from Sustainable materials while waste is reduced through re-manufacturing, reuse and recycling.

**1. Process Modelling and Material Assessment:** Pursing Clean Production and the Manufacturing of green products are very beneficial in the environment. Thus establishing an assessment model for manufacturing process in terms of environmental impact is necessary for quantitative evaluation of product design.

**2. Chemical Process and Recycling:** Primary objective for the process engineering in this field is, to develop tools for process simulations that can reduce time for development of processes and equipment from years to months. Another aim deals with the investigation of possible pyro chemicals recycling routes for both manufacturing waste as well as the end of life product.

#### 3. Energy Audit:



An energy audit is an inspection, survey and analysis of energy flows for energy conservation in building, processor system to reduce the amount of energy input into the system without negatively affecting the output

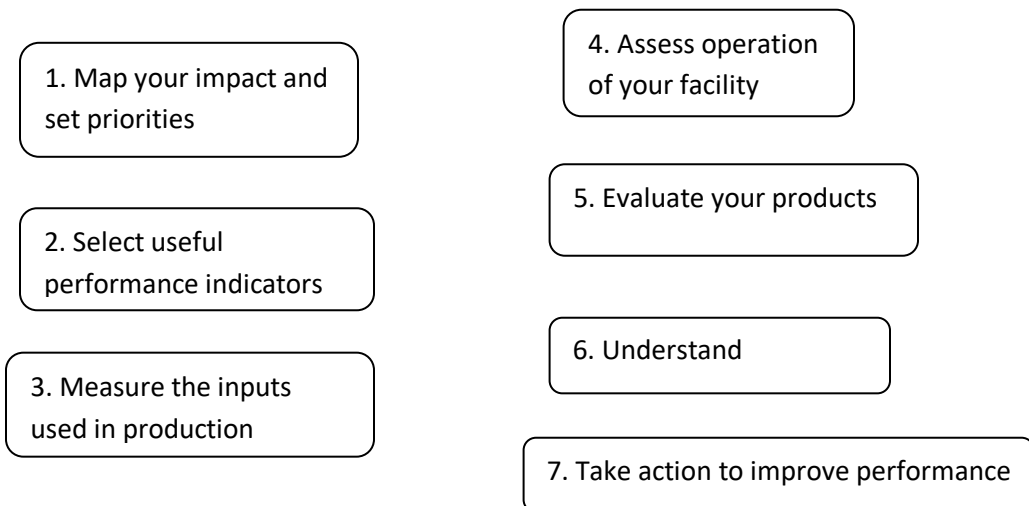
- a) Analysis of Energy usage
- b) Identification of Energy project

4. **Renewable Energy:** Renewable energy is energy that is collected from renewable resources which are naturally replenished on a human timescale such as sunlight, wind, rain, tides, waves and geo thermal, heat. Renewable energy often provides energy in four important areas: electricity generation, air and water heating/cooling, transportation and rural energy services.

### 5. Waste Reduction:

- Waste reduction also known as source reduction is the practice of using less material and energy to minimise waste generation and preserve natural resources.
- Waste reduction is broader in scope than recycling and incorporates ways to prevent materials from ending up as waste reduction includes reusing products such as plastic and glass containers.
- Waste reduction also means economic savings. Fewer materials and less energy is used when waste reduction practices are applied.

### 6.4 Steps of Sustainable Production:



### **1. Map your impact and set priorities:**

- In Step1, we focus on where you are starting and where you want to end up, which is essential to ensure that you have all you need to get there.
- The aim of this first step is to establish a general understanding of your positive and negative environmental impact by mapping your activities and determining which ones affect your performance the most.

### **2. Select useful performance indicators:**

- Identify indicators that are important for your business and what data should be collected to help drive continuous improvement.
- Some companies will benefit from adding more indicators overtime, while other companies may also want to use a handful of the indicators provided.

### **3. Measure the inputs used in production:**

- Identify how materials and components used into your production process influence environmental performance.
- The first set of indicators related to the raw materials and intermediate products used in your production processes to make your products.
- Let's take a closer look at the impact that material inputs can have on your environmental performance.

### **4. Assess Operations of your facility:**

- Consider the impact and efficiency of the operations in your facility (e.g., energy intensity, green house gas generation, emissions to air and water) transform a variety of inputs (step 3) into end products for delivery and sale and manufacturing functions and design of your facility and the related back office functions.

## 5. Evaluate measured results:

- Evaluate measured results or evaluate your products identify factors such as energy consumption in use, recyclability and use of hazardous substances that help determine how sustainable your end products.
- These are the items or goods that you deliver to market and that in their own right will have a range of environmental qualities and impact arising from their composition and use.

## 6. Understand measured results:

- Read and interpret your indicators and understand trends in your performance. The next step is to understand the performance.
- The next step is to understand the different ways to review and analyse the information generated by the indicators to identify options for improving the performance of your facility

## 7. Take action to improve performance:

- Choose opportunities to improve your performance and create action plans to implement them. You have reviewed the data and taken decisions on options for improving performance.
- Now you need to make your decisions happen by setting clear targets and creating a tangible action plan.

The seven steps are not necessarily a one way journey. We recommend that you apply them for a cyclical management process. It **will help you measure and understand your environment impact as well as improve your performance on an ongoing basis.**

### **7. Corporate Environmental Responsibility:**

In this study we examine the determinants of corporate environmental responsibility (C.E.R.) as well as the relationship between legal systems and CER as measured by a unique set of global environmental cost data.

#### **7.1 FAO Corporate Environmental Responsibility Strategy:**

## 2017-2020:

- The designation employed and the presentation of material in this information product do not imply the expression of any opinion whatever on the part of the Food and Agricultural Organisation of the United Nations (FAO) any country, territory, city or area or of its authorities or concerning the delimitations of its frontiers or boundaries.
- The mention of specific companies or products of manufacturers whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO in preference to others of a similar nature that are not mentioned.

## 7.2 Contents:

**1. Acknowledgements:** This strategy was produced under the direction of Jean Phillipe, Chief of the FAO infrastructure and facilities unit and Tina, FAO Environmental Sustainability Management Focal Point.

**2. Authors:** Hary Ranalli & Mitchell Hall (FAO Corporate Environmental Responsibility of the FAO infrastructure and Facilities Unit)

**3. Peer Review/Guidance:** Saulo Ceolin (FAO Office of the Director General), Werner Deutsh (FAO Office of the Director General)

**4. Key Manager:** In 2007, the UN Secretary General Ban Ki Moon called the United Nations to contribute to global efforts to safeguard our planet and climate. In succession the Chief Executive Board for Co-Ordination officially decreased their commitment towards this movement in October of the same year.

**5. Executive Summary:** In the past 8 years, FAO has monitored the carbon footprint of its functional operations and worked on several projects to lower its environmental impact in line with the moving towards a climate neutral UN initiative and in collaboration with the issue management Group on Environmental Sustainability Management.

This strategy includes an analysis of the current environmental performance of the organisation in the areas of green house gas emissions, energy efficiency,



sustainable procurement, waste management and water usage. The strategy also identifies the key aspects.

- Adhere to the internal Corporate Environmental Responsibility policy
- Development Environmental Management System to systematically improve the environmental footprint of key FAO offices.

### **7.3 Mandates and Environmental Governance:**

- In order to fulfill the organisations mandate and achieve its strategic objectives, FAO must utilise a significant amount of physical and human resources in the operations considering these are 500 global locations and more than 1000 personnel.
- These activities often carry with them environmental impacts which directly affect those most vulnerable whom the organisation strives to protect. While it is impossible to completely eliminate these impacts in the foreseeable future. There are many opportunities to reduce them.
- FAO joined moving towards a climate neutral UN Initiative in 2008 after it was launched in 2007 by Secretary General Ban Ki Moon and consequently endorsed by the chief Executive Board for Co-Ordination (CEB).

### **Where we stand:**

- FAO defines the quality of its work also by the degree to which it can reduce its impact on the environment. For this reason, since 2008 the organisation has translated its commitment to environmental sustainability into a holistic approach, which includes its functionals activities.
- In line with several SDG's, FAO has embedded environmental protection into its daily operation and developed evasion for environmental sustainability underpinned by targets in key impact areas.

### **Way Forward:**



- Considering that climate change and sustainability are some of the world's most Assessing issues and with more and more public and private organisation looking to partner and work with other organisations that are following the path towards climate neutrality it is an opportunity time for FAO to take the next step.
- Today, the organisation has set second generation targets for reducing green house gas emission and other environmental impacts to make certain our collective ecological footprint is minimised and a culture of environmental responsibility is fostered.

### **Funding Mechanism:**

- Continuing to reduce the organisations environmental footprint while achieving climate neutrality is the core goal of the overall approach.
- The funds necessary to accomplish this goal and implement the proposed projects amount to more than USD 3 millions. Never the less, the proposed projects are mostly associated with infrastructural work which is led by CSAI.
- As the most advantageous ones require high upfront investment, CSAI will prioritize low hanging fruit and smaller projects that will cumulatively producing saving overtime. The organisation will hence be able to use these saving to invest in projects having larger initial price tags but with comparatively higher financial and environmental saving potentials.

### **Conclusion:**

With this strategy, FAO can continue to be a leader within the UN system and among other global entities while also contributing to minimising negative environmental impacts a motivating factor which closely aligns with the organisations strategic objectives and the sustainable development.

## (17E00302) GREEN BUSINESS MANAGEMENT

**Objective :**The objective of the course is to impart students in understanding of green business, its advantages, issues and opportunities and to provide knowledge over the strategies for building eco-business .

**1. Introduction to Green Management:**The Concept of Green Management; Evolution; nature, scope, importance and types; Developing a theory; Green Management in India; Relevance in twenty first century

**2.Organizational Environment;** Indian Corporate Structure and Environment; How to go green; spreading the concept in organization; Environmental and sustainability issues for the production of high-tech components and materials, Life Cycle Analysis of materials, sustainable production and its role in corporate environmental responsibility (CER).

**3.Approaches from Ecological Economics;** Indicators of sustainability; Eco- system services and their sustainable use; Bio-diversity; Indian perspective; Alternate theories

**4.Environmental Reporting and ISO 14001;** Climate change business and ISO 14064; Green financing; Financial initiative by UNEP; Green energy management; Green product management

**5.Green Techniques and Methods;** Green tax incentives and rebates (to green projects and companies); Green project management in action; Business redesign; Eco-commerce models

### Text Books:

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### References:

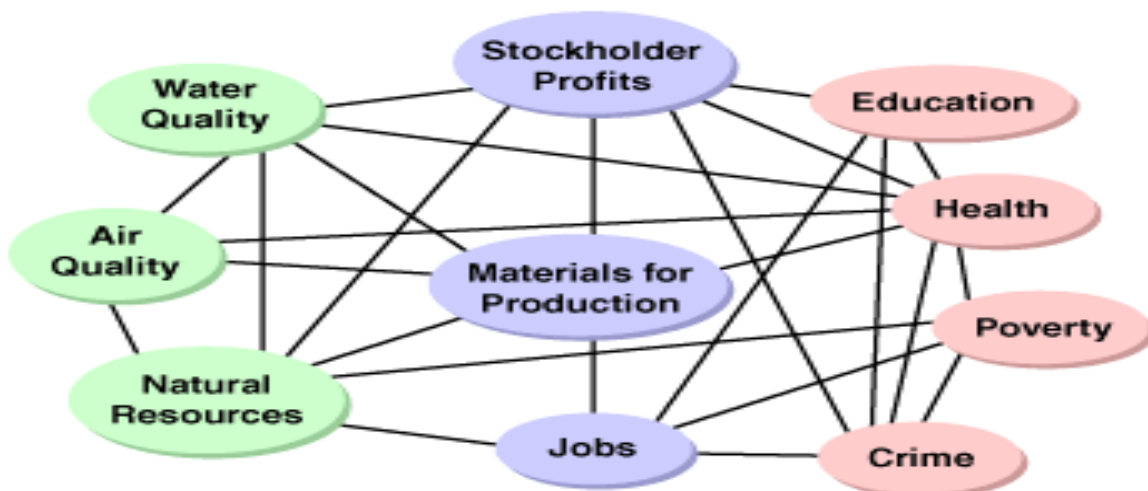
- Green Marketing and Management: A global Perspective by John F. Whaik, Qbase Technologies.
- Green Project Management by Richard Maltzman And David Shiden, CRC Press Books.
- Green and World by Andrew S. Winston, Yale Press B

## UNIT-3

### APPROACHES FROM ECOLOGICAL ECONOMICS

#### 1. INDICATORS OF SUSTAINABILITY:

- An Indicator helps understand where we are, which way we are going and how far we are from our goal. It alerts us to a problem before it gets too bad and helps recognize solutions to fix the problem.
- Indicators of Sustainability are different from traditional indicators of economic, social and environmental progress.



- As this figure illustrates, the natural resource base provides the materials for production on which jobs and stockholder profits depend. Jobs affect the poverty rate and the poverty rate is related to crime.
  - Air quality, water quality and materials used for production have an effect on health. They may also have an effect on stockholder profits: if a process requires clean water as an input, cleaning up poor quality water prior to processing is an extra expense, which reduces profits.
  - Likewise, health problems, whether due to general air quality problems or exposure to toxic materials, have an effect on worker productivity and contribute to the rising costs of health insurance.
- Sustainability requires this type of integrated view of the world -- it requires multidimensional indicators that show the links among a community's economy, environment, and society.
- For example, the Gross Domestic Product (GDP), a well-publicized traditional indicator, measures the amount of money being spent in a country.

- It is generally reported as a measure of the country's economic well-being: the more money being spent, the higher the GDP and the better the overall economic well-being is assumed to be.
- However, because GDP reflects only the amount of economic activity, regardless of the effect of that activity on the community's social and environmental health, GDP can go up when overall community health goes down.
- For example, when there is a ten-car pileup on the highway, the GDP goes up because of the money spent on medical fees and repair costs.
- On the other hand, if ten people decide not to buy cars and instead walk to work, their health and wealth may increase but the GDP goes down.
- Thus, the indicators of sustainability point to an issue or condition. The following are certain characteristics that are the sustainability indicators have in common:
  - Alert a problem before it gets too bad
  - Helps recognize what needs to be done to fix the problem
  - Build clarity and accountability
  - Reflect a sense of purpose
  - Illustrate relationships
  - Show Trends

Such Multidimensional sustainability indicators that possess all these characteristics and show the links among a community's economy, environment, and society are described below:

**a.Gross National Happiness (GNH):** It is an attempt to define quality of life in more holistic and psychological terms than Gross National Product. It serves as a Unifying vision for the Five Year Planning process and all the derived planning documents that guide the economic and developments plans of a country.

- GNH is based on the assertion that true development of human society takes place when material and spiritual development occur side by side to complement and reinforce each other.

**b.Human Development Index (HDI):**

- It is the measure of life expectancy, literacy, education and standard of living for countries worldwide. It is a standard means of measuring well-being, especially child welfare.
- It is used to determine and indicate whether a country is developed, developing or underdeveloped country and also to measure the impact of economic policies on quality of life.

**c.Ecological Footprint (EF):**

- It compares human consumption of natural resources with Earth's ecological capacity to regenerate them. It is an estimate of the amount of biologically productive land and

- sea area needed to regenerate the resources human population consumes and to absorb the corresponding waste, given prevailing technology and current understanding.
- Using this assessment, it is possible to estimate how many planet Earths it would take to support humanity if everybody lived a given lifestyle.
  - Per Capita EF is a means of comparing consumption and lifestyles, and check this against nature's ability to provide for this consumption.

#### **d.The Happy Planet Index (HPI):**

- It is an index of human well being and environmental impact. The index challenges other well-established indices such as Gross Domestic Product (GDP) and the Human Development Index (HDI).
- The HPI is based on the principle that most people want to live long and fulfilling lives, and the country which is doing the best is the one that allows its citizens to do so, whilst avoiding infringing on the opportunity of future people and people in other countries to do the same.

## **2.ECO SYSTEM SERVICES AND THEIR SUSTAINABLE USE:**

- Eco System services are the benefits that humans derive from ecosystems. Recently, the importance of research into ecosystem services has been widely recognized and many advances are being made in tis field.
- The dynamics of an Ecosystem are strongly affected by natural and human disturbances and such changes can have direct and cascading effects on spatial and temporal variations in the composition, structure and processes of ecosystems.
- In developing countries, where short-term economic growth and social delivery are more important than conservation, placing a monetary value on ecosystems services is the only way to ensure intervention.
- Sustainability science is motivated by fundamental questions about interactions between nature and society as well as compelling and urgent social needs.
- The purpose of sustainable development is to create and maintain prosperous social, economic and ecological systems. These systems are intimately linked with each other: humanity depends on services that are provided by ecosystems for wealth and security.
- According to Fisher and Turner, Ecosystem services are aspects of ecosystem utilized (actively or passively) to produce human well-being.



## **2.1 Types of Ecosystem Services:**

1. **Regulating Services:** These are the benefits people obtain due to the regulation of natural processes and the control or modifications of biotic and abiotic factors. Being hardly visible and comparably difficult to understand, these services are not widely acknowledged by the society.
2. **Provisioning Services:** It comprises all material outputs from ecosystem processes that are used for human nutrition, processing and energy use.
3. These products can be traded and consumed or used directly, thus they are the desired 'end-products' of nature providing clearly visible benefits to society. Provisioning services can be divided into the sub-categories of food, materials and energy.
4. **Cultural Ecosystem Services:** These are the intangible benefits people obtain from ecosystems in form of non-material spiritual, religious, inspirational and educational experience.
5. These services provide benefits for human recreation and mental and physical health, experience by tourism, aesthetic appreciation and inspiration for culture, art and design, spiritual experience and sense of place.

## **2.3 Importance of Sustainable Development:**

### **1. Communities:**

- Sustainable Development has a major impact on communities that work together toward sustainable living.
- Residential homes can benefit from sustainable development through the conservation of energy, water and other resources. Green spaces are created in urban areas that residents can use for conserve the natural environment. These green spaces also help to conserve the natural environment.

### **2. Enhancing the Environment:**

- Much of sustainable development works toward preserving wildlife, including both plants and animals.
- Development can often push native species from the homes, but with sustainable development, humans and nature should live in harmony, while affecting the ecosystem as little as possible.



### 3. **Growing Green:**

- Sustainable Development still aims to help communities grow, but to do so in a manner that is green and good for the environment.
- In this way, people can help to improve air and water quality, redevelop properties that may have been contaminated or run-down, and help to preserve the natural environment

### 4. **Global Impact:**

- Sustainable Development expands past the community level, since all communities affect one another.
- There are global benefits for the environment, such as the upkeep of biodiversity, forest and the ozone layer all of which are important at global level.

### 5. **Accommodate City Development:**

- As populations rise, cities will need to become larger to accommodate the influx of new residents.
- If these cities are developed non-sustainably, they will become more and more expensive to build and maintain over time.
- If cities use sustainable development practices, they can conceivably make way for new housing and business developments indefinitely.

### 6. **Provide Financial Stability:**

- Sustainable Development can also produce more financially sustainable economies throughout the world.
- Resource-poor economies will gain access to free and accessible energy through renewable while also having the opportunity the opportunity to train workers for jobs that won't be displaced by the basic reality of finite resources.

### 7. **Sustain Biodiversity:**

- Biodiversity suffers through over consumption and unsustainable development practices.
- Beyond the basic ethical quandary presented by this fact, there is the further concern that these species are a part of a food web that humans rely on.

## **2.4 Challenges in Sustainable Development:**

Although the idea of Sustainable Development has often been used by people such as environmentalists, sociologists and politicians in their speeches and various agreements, the pace of achieving this sustainability, so far, has been quite poor. Many challenges have been attributed to this failure. These include the following:

### **1. Disagreements between Stakeholders:**

- In a society, there exist many stakeholders such as men, women, children, youth, non-governmental organizations, local authorities, workers and trade unions and agricultural and technological communities.
- Before implementing any decision, all these stakeholders have to be considered.

### **2. Uncertainty:**

- There is always an uncertainty regarding different global environmental issues and the manner in which they interact with the global ecosystem.
- There is also uncertainty regarding how the implementation of new policies will affect the normal functioning of the biosphere.

### **3. Consumption and Life Style:**

- Level of Consumption and lifestyles of different people of the area are upheld in any programme to achieve sustainable development.
- Developing Countries aspire to achieve a more comfortable living standard.

### **4. Arguments over Cause and Responsibility:**

- Global Warming, a problem attributed to the wealthy developed nations of the west, has led to a rise in the sea level causing large portions of coastal area to submerge.
- The victims are inhabitants of low lying coastal areas and islands. The vision of sustainable development will not be realized unless people around the world and their governments share sustainability a common concern and work towards it.

### **5. Demographic Challenges:**

- Only by accounting for and addressing demographic factors will it be possible to achieve sustainable development.
- Investments in human capital should be emphasized alongside other measures to promote sustainable development, a green economy, and adoption to environmental change.

## 6. **Globalization:**

- It also took the form of the spread of new technologies including genetic engineering that has the potential of impacting significantly on the environment and human health.
- The competition between the two paradigms, with globalization running away as the winner and moreover a winner whose speed direction and effects seem to be uncontrollable, has resulted in more unsustainable development.

## 7. **Gender Equity:**

- In many of the developing countries, women are still considered second class citizens.
- It is important that the role of the women as legitimate owners, users and producers of the built environment is recognized.

## 8. Education:

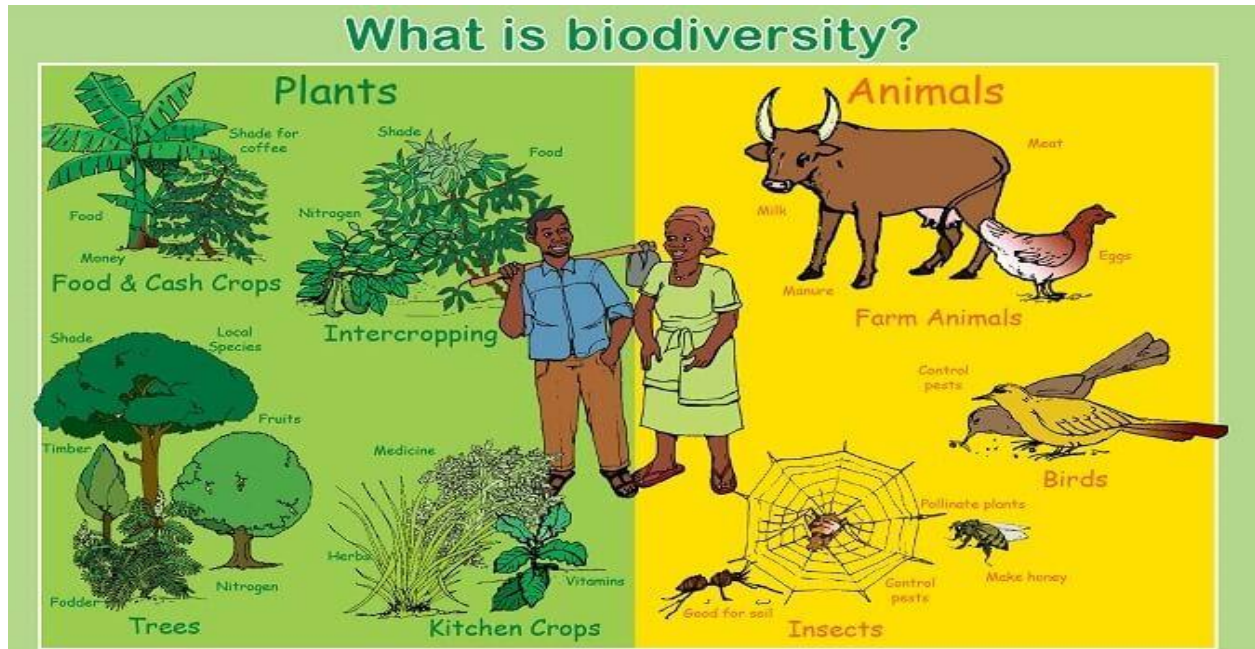
- Ignorance and lack of information on Sustainable Issues and Solutions is a major obstacle that needs to be overcome.
- To bridge this gap, it will require interventions at all three levels of education, continued education programmes for professionals and technicians, education and awareness raising programmes for government officials and politicians and a concerted public education programme.

## 9. **Urbanization and Rural Development:**

- There are several interlinked issues as people and government are not paying enough attention to the linkages between urban development and investment strategies and the impact this has on rural areas, as well as the possible synergies that can be developed through, e.g., transportation links and tourism.







### **3.1 DEFINITION:**

According to the United Nations Environment Programme (UNEP), biodiversity typically measures variation at the genetic species and ecosystem level. Biologists most often define biodiversity as the "**totality of genes, species and ecosystems of a region**".

- Biodiversity generally tends to cluster in hotspots, and has been increasing through time, but will be likely to slow in the future.
- The number and variety of plants, animals and other organisms that exist is known as biodiversity.
- It is an essential component of nature and it ensures the survival of human species by providing food, fuel, shelter, medicines and other resources to mankind..
- The age of the Earth is about 4.54 billion years.
- The earliest undisputed evidence of life on Earth dates at least from 3.5 billion years ago, during the Eoarchean Era after a geological crust started to solidify following the earlier molten Hadean Eon.
- There are microbial mat fossils found in 3.48 billion-year-old sandstone discovered in Western Australia.
- Other early physical evidence of a biogenic substance is graphite in 3.7 billion-year-old meta-sedimentary rocks discovered in Western Greenland. More recently, in 2015, "remains of biotic life" were found in 4.1 billion-year-old rocks in Western Australia. According to one of the researchers, "If life arose relatively quickly on Earth .. then it could be common in the universe

- An advantage of this definition is that it seems to describe most circumstances and presents a unified view of the traditional types of biological variety previously identified:
- Taxonomic diversity (usually measured at the species diversity level)
- Ecological diversity (often viewed from the perspective of ecosystem diversity)
- Morphological diversity (which stems from genetic diversity and molecular diversity)
- Functional Diversity (which is a measure of the number of functionally disparate species within a population (e.g different feeding mechanism, different motility, predator vs prey, etc.)
- The term biodiversity, a contraction of the words biological and diversity, can simply be described as “the variety of life on Earth” Biodiversity includes all ecosystems: both human-managed as well as natural ecosystems.
- This means not only unmanaged ecosystems such as wild lands, nature preserves or national parks are relevant features of biodiversity, but also managed systems like croplands, plantations, farms, rangelands, or even urban parks have their own biodiversity.
- Biodiversity can be measured in several ways, yet no single metric is able to capture all its dimensions
- Biodiversity generally tends to cluster in hotspots, and has been increasing through time, but will be likely to slow in the future.
- The United Nations designated 2011–2020 as the United Nations Decade on Biodiversity.



#### 4. India Perspectives



India Perspectives is the flagship publication of the Ministry of External Affairs. Richly illustrated, this magazine provides our readers with an insight into India's culture and tradition along with elements of contemporary India.

#### 4.1 Recent Indian perspectives ASEAN summit 2018



- The ASEAN-India Commemorative Summit, held for the first time in India on January 25, 2018, marked a historic milestone on India's diplomatic journey with ASEAN.
- The 10 heads of state of ASEAN nations arrived to a warm welcome in New Delhi, and even as the summit itself brought to light an array of issues of mutual interest, their presence as guests of honour at the 69th Republic Day celebrations at Rajpath reaffirmed the strength and spirit of this enduring partnership.
- In this issue of India Perspectives, get a glimpse of the successful proceedings of the summit as well as the grand Republic Day celebrations.
- **January to march 2018**
- The 10 ASEAN leaders and PM Modi pledged their commitment to strengthening ASEAN-India's Dialogue Relations
- PM Trudeau and PM Modi laid tremendous emphasis on the importance of people-to-people ties between India and Canada
- Iranian President, Dr Hassan Rouhani's three-day state visit to India from February 15 to 17, 2018, marked significant progress in the bilateral cooperation between the two nations.
- India and Israel, and has consolidated the foundation for the Strategic Partnership between the two countries.
- Carnatic practitioner TS Sathyavati has found that some ragas help alleviate headaches and lower blood pressure in the perspectives summit.

## **5. Alternative Theories:**

The difference between alternative theories to neo-classical economics are as follows:

### **1). Austrian Economics:**

- It lacks a formalised, self-conscious theory of environment economics. But in fact all of the major elements of such a theory already exist and in that sense that since what is needed is to piece together the relevant aspects of Austrian economics in order to draw out and focus a theory that is already there.
- in particular, environmental economics is an outgrowth of the theory of externalities and is primarily focused on maximising the social value of resource user.
- This is defined as that allocation of resources obtained in a perfectly competitive general equilibrium.
- Social inefficiency arises when the social costs associated with external effects, such as air or water pollution, are not incorporated into the cost of producing the pollution

generating product or its market price.

- From this perspective, the overall value of production can be increased to society by conforming the output of the pollution-generating product to the level that would be generated if the pollution costs were being reflected to its price.
- Under such a circumstance there would be an efficient re-allocation of resources where less of the offending product and more of other goods and services would be produced.

## **2)Green Economics:**

- It is an influential approach in which an economic system is considered to be a component of the ecosystem.
- The main contributors to Green Economic theory are E.F Schumacher, Murry Bookchin, Lewis Mumford, Miriam Kennet, Rachel Carson, Brian Tokar, Robert Cosyanza, David Korten, Buckminster Fuller, Huerman Daly, Paul Hawken, Amory Lovins, Jane Jacobs, and Robin Hanson.
- Like the Austrain economists, Green economists also claim that their view is fundamentally different from the Neo-classical Economic view.
- They argue that even though Noe-classical Economics rresents the main body of modern economics today, Green Economics shares broader ecological and social concens including rejecting capitalism itself. For this reason.
- Green Economics goes beyond the narrower concerns of Neo-classical Environmental Economics Resource Economics, and Sustainable Development, which are considered as subsets of Green Economics.
- Many Green economists have been heavily influnced be Marxian views to develop an understanding of ecological issues and ecological economic alternatives.

## **Key Principles**

- To be able to eliminate environmental pollution and its negative impacts, such as health-related problems, Green economists suggest a number of key principles:
- We need to focus simultaneously on both human and environmental needs, not materialistic well-being itself. We should understand that matter exists to satisfy our needs, and it is not the main purpose for our existence, However, human beings need more than material well-being. They also need values, peace, harmony, and so on.



- For millions and millions of years, nature itself has not created as much waste as we have over the last 100 or 200 years. In nature there is no waste, as every process output is an input for some other process. Therefore, we can copy nature in terms of our economic activities, such as production, which can be non-toxic food for some other process.
- Each regenerative activity should have its own matching appropriate scale of operation. Even the smallest activities have larger impacts on nature and human health. Therefore, we have to be very careful when we decide what to produce and how much to produce so as not to cause any irreversible action.
- We should protect the diversity of life on Earth, as our existence depends on it. Each day, more than 200 species are becoming extinct, and natural resources that sustain life on the planet, air, water, and soil are becoming polluted or depleted at an alarming scale together with exponentially increasing human population growth. Even though we cannot reverse this extinction, we can stop it. We should realise that our existence depends on clean water, air, and soil.
- Self-reliance is a very important ingredient to being independent. In an economy that moves with ecosystem processes, there is tremendous scope for local response. Design and adaptation must be provided for these local and regional responses for more flexible and holistic interdependence. This will bring about greater success.
- Participation in environmental-related decisions is fundamental for direct and widening democracy. Pluralistic societies with established democracies will take better environmental-related decisions than non-democratic societies.

### 3) Ecological Economics:

- It is a newly adopted branch of economics that addresses the interdependence and co-evolution between human economics and natural ecosystems.
- The main scholars in this field are Robert Costanza, Human Daly, Nicholas Georgescu-Roegen, David Harvey, and John Bellamy Foster.
- It has similarities to Green Economics, but it differs from this theory in its distinctive objective, which combines economic thinking, knowledge of biology, and the laws of physics. In other words, it is a mixture of social science and scientific principles. Therefore, its goal is to improve human welfare through economic development, which is based on a balance between ecology and human needs.
- Similarly, the main differences, principles, and solutions of Ecological Economics will be examined closely in order to understand the basic conceptual framework.

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## UNIT-4

### **ENVIRONMENTAL REPORTING AND ISO 14001**

#### **1.CLIMATE CHANGE BUSINESS AND ISO 14064**

- The climate change phenomenon refers to seasonal changes over a long period with respect to the growing accumulation of greenhouse gases in the atmosphere. Tackling this phenomenon is of utmost importance given the pivotal role that climate plays in the formation of natural ecosystems and the human economies and civilizations on which they are based.
- Recent studies have shown that human activities since the beginning of the industrial revolution – manifested in fossil fuel consumption for power generation, land deforestation for agriculture, and urban expansion – have contributed to an increase in the concentration of carbon dioxide in the atmosphere by as much as 49%, from about 280 parts per million in the pre-industrial period, to 400 parts per million in 2016, which in turn has led to global warming.
- Indeed, the Intergovernmental Panel on Climate Change has described anthropogenic climate change as “inevitable” in view of the numerous changes observed in the temperature of the atmosphere, oceans, and sea ice, in addition to some extreme changes in the climate cycle over the course of the 20th century.
- Several parts of the world have already experienced the warming of coastal waters, high temperatures, a marked change in rainfall patterns, and an increased intensity and frequency of storms. Rising sea levels and temperatures are expected to be an increasing trend.
- Moreover, the potential for severe and irreversible climate and environmental changes, including the continued melting of polar ice layers, such as those found in Greenland and West Antarctica, could cause sea level rises exceeding 10 meters, harmful fluctuations in ocean currents, and increased methane emissions.
- The probability that most global warming of the last 15 years is the result of human actions is estimated to be more than 90%. The failure to address climate change will inevitably undermine both the world’s economic and social stability.

- The Intergovernmental Panel on Climate Change has issued an urgent call to bring about a marked reduction in global greenhouse gas emissions and for adaptation measures to respond to the effects of anthropogenic climate change.

## **1. 1DEFINITION:**

Climate change refers to changes in the earth's climate, especially the gradual rise in temperature caused by high levels of carbon dioxide and other gases. Human activity has led to deforestation, species becoming extinct, rising sea levels and climate change.

-COBUILD Advanced English Dictionary.

### **1.2 What is ISO 14064?**

ISO 14064 is an international standard against which GHG emissions reports are voluntarily verified. In parallel with the emergence of regulated or mandatory schemes relating to monitoring, reporting and verification of Greenhouse Gases (GHG), organizations outside of these schemes are now increasingly wishing to monitor and report their emissions (commonly referred to as the organization's carbon footprint). In response to this demand and to provide an international standard against which such reports can be voluntarily verified, ISO 14064 has been developed.



### **1.3 WHAT DOES ISO 14064 GREENHOUSE GAS EMISSIONS DO?**

ISO 14064 has been prepared in three parts:

Part 1 details the principles and requirements for designing, developing, managing and reporting organization level GHG inventories. It includes requirements for determining boundaries, quantifying emissions and removals, and identifying specific company actions or activities aimed at improving GHG management. It also includes requirements and guidance on quality management of the GHG inventory, reporting, internal auditing and the organization's responsibilities for verification.

Part 2 focuses on GHG projects or projects specifically designed to reduce GHG emissions or increase GHG removals. It includes principles and requirements for determining project baseline scenarios and for monitoring, quantifying and reporting project performance relative to that baseline and provides the basis for GHG projects to be validated and verified.

Part 3 provides principles, requirements and guidance for those conducting GHG information validation and verification. It describes a process for providing assurance to intended users that an organization's or project's GHG assertions are complete, accurate, consistent, transparent and without material discrepancies.

ISO 14064 benefits:

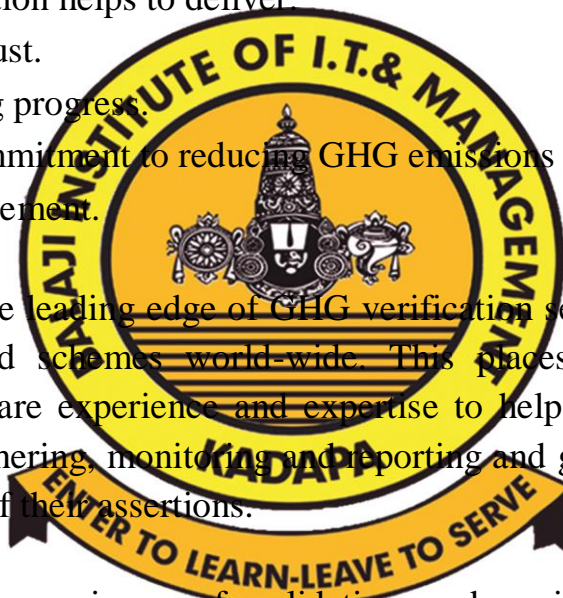
ISO 14064 certification helps to deliver:

- Credibility and trust.
- Robust monitoring progress.
- Demonstrable commitment to reducing GHG emissions
- Stakeholder engagement.

➤ LRQA is at the leading edge of GHG verification services across a range of sectors and schemes world-wide. This places LRQA in a prime position to share experience and expertise to help clients manage their GHG data gathering, monitoring and reporting and gain robust third party verifications of their assertions.

➤ LRQA have experience of validation and verification within both voluntary mechanisms such as ISO 14064 and the Japanese Voluntary Emissions Trading Scheme and regulated schemes at a national level such as the UK Emissions Trading Scheme, at regional level such as the EU Emissions Trading Scheme and at international level such as the UNFCCC Clean Development Mechanism (CDM) and Joint Implementation.

➤ LRQA also have experience within other relevant areas of corporate report verification, including Corporate Sustainability and/or Environmental Reports.



## 1.4 STANDARDS

- Enormous economic and population growth worldwide in the second half of the twentieth century aggravated the factors that threaten health and the world — ozone depletion, climate change, depletion, fouling of natural resources, and extensive loss of biodiversity and habitat.
- In the past, the standard approaches to environmental problems generated by business and industry have been regulatory-driven "end-of-the-pipe" remediation efforts. In the 1990s, efforts by governments, NGOs, corporations, and investors began to grow substantially to develop awareness and plans for investment in business sustainability.

- One critical milestone was the establishment of the ISO 14000 standards whose development came as a result of the Rio Summit on the Environment held in 1992. ISO 14001 is the cornerstone standard of the ISO 14000 series
- It specifies a framework of control for an Environmental Management System against which an organization can be certified by a third party. Other ISO 14000 Series Standards are actually guidelines, many to help you achieve registration to ISO 14001



They include the following:

- ISO 14004 provides guidance on the development and implementation of environmental management systems
- ISO 14010 provides general principles of environmental auditing (now superseded by ISO 19011)
- ISO 14011 provides specific guidance on audit an environmental management system (now superseded by ISO 19011)
- ISO 14012 provides guidance on qualification criteria for environmental auditors and lead auditors (now superseded by ISO 19011)
- ISO 14013/5 provides audit program review and assessment material
- ISO 14020+ labeling issues



- ISO 14030+ provides guidance on performance targets and monitoring within an Environmental Management System
- ISO 14040+ covers life cycle issues.

## 2.DEFINITION:

- Green finance refers to any financial instrument or investment – including equity, debt, grant, purchase & sale or risk management tool (for example: investment guarantee, insurance product or commodity, credit or interest rate derivative, etc.) – issued under contract to a firm, facility, person, project or agency, public or private, in exchange for the delivery of positive environmental externalities that are real, verified and additional to business as usual, whereby such positive externalities result in the creation of transferrable property rights recognized within international, regional, national and sub national legal frameworks.
- Green financing is to increase level of financial flows (from banking, micro-credit, insurance and investment) from the public, private and not-for-profit sectors to sustainable development priorities.
- A key part of this is to better manage environmental and social risks, take up opportunities that bring both a decent rate of return and environmental benefit and deliver greater accountability.

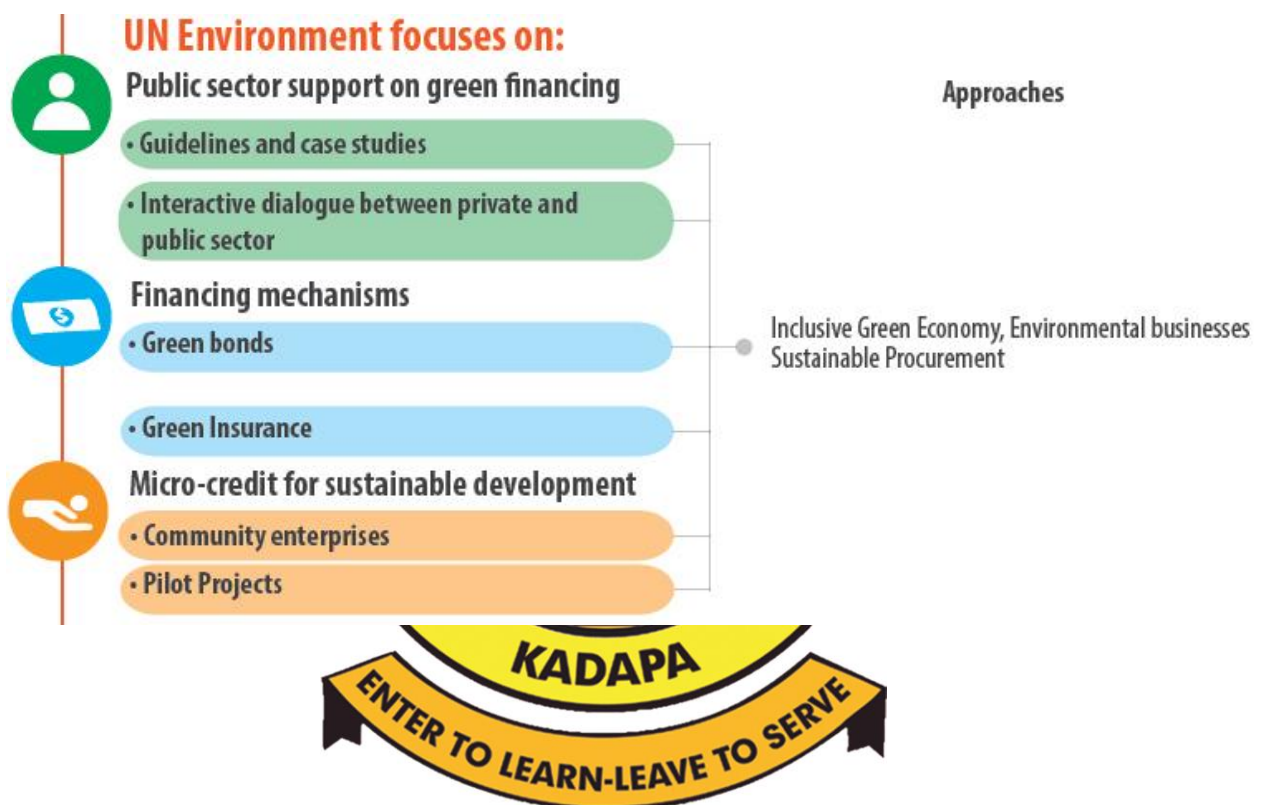


**GREEN FINANCING IN ASIA AND THE PACIFIC**  
Five Approaches to Aligning the Financial System to Sustainable Development





- Green financing could be promoted through changes in countries' regulatory frameworks, harmonizing public financial incentives, increases in green financing from different sectors, alignment of public sector financing decision-making with the environmental dimension of the Sustainable Development Goals, increases in investment in clean and green technologies, financing for sustainable natural resource-based green economies and climate smart blue economy, increase use of green bonds, and so on.



## 2.1 SUSTAINABLE DEVELOPMENT GOALS (SDGS) AND GREEN FINANCING

- UN Environment has been working with countries, financial regulators and finance sector to align financial systems to the 2030 sustainable development agenda – to direct financial flows to support the delivery of the Sustainable Development Goals.
- At the core of today's globalized economy are financial markets through which banks and investors allocate capital to different sectors. The capital allocated today will shape ecosystems and the production and consumption patterns of tomorrow.

The main areas for the current work on green financing are:

- Supporting public sector on creating enabling environment
- Promoting public-private partnerships on financing mechanisms such as green bonds
- Capacity building of community enterprises on micro-credit



- UN Environment through its resource efficiency programme will offer countries the service of reviewing their policy and regulatory environment for the financing system and developing sustainable finance roadmaps, and assisting central banks, regulators on how to best improve the regulatory framework of domestic financial markets to shape the way and supporting multi-country policy initiatives at sub-regional, regional and global level.
- UN Environment will build on current initiatives such as private climate finance and will work with policy makers and private sector leaders to connect to green economy initiatives. UN Environment will also catalyze

the policy action that inspires and informs both public and private investors.

## 2.2 PARTNERSHIPS

Multi-stakeholder partnerships will be promoted to include major actors in financial markets, banks, investors, micro-credit entities, insurance companies along with public sector.





Every dollar spent restoring degraded forests can result in \$30 in economic benefits.

### 3. FINANCIAL INITIATIVES BY UNEP:

**INTRODUCTION:** Founded in 1992 in the context of the earth summit in Rio, and based in Geneva Switzerland, the United Nations environment programmed finance initiative (UNEP FI) was established as a flat form associating the united nations and the financial sector globally.

The Initiative's work includes:

- 1.Capacity building and the sharing of best practices ;
- 2.Pioneering research and tools;
- 3.Setting global standards and principles;
- 4.Engaging stakeholders, both public and private;and
- 5.Facilitating the networking of memebers and stake holders through global events and regional activities.

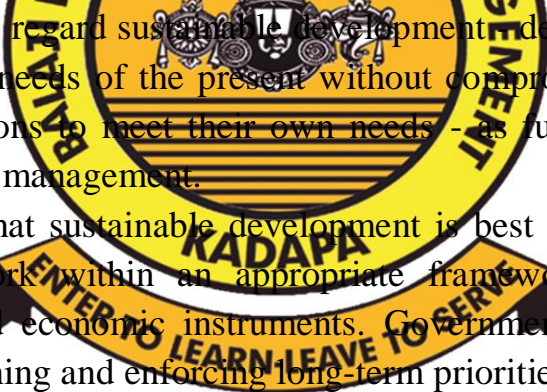


### **3.1 UNEP STATEMENTS OF COMMITMENT BY FINANCIAL INSTITUTIONS (FI) ON SUSTAINABLE DEVELOPMENT:**

The UNEP Statement of Commitment by financial Institutions on Sustainable Development represents the backbone of the Initiative. By signing up to the financial services sector in making our economy and lifestyles sustainable and commit to the integration of environmental and social considerations into all aspects of their operations.

All financial institutions wishing to join the UNEP Finance Initiative must adhere to the Statement:

#### **1). commitment to Sustainable Development:**

- 
- The institutions regard sustainable development, defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs - as fundamental aspects of sound business management.
  - They believe that sustainable development is best achieved by allowing markets to work within an appropriate framework of cost efficient regulations and economic instruments. Governments have a leadership role in establishing and enforcing long-term priorities and values.
  - Institutions also regard financial institutions to be important contributors to sustainable development, through their interaction with other economic sectors and consumers and through their own financing, investment and trading activities.
  - The financial institutions recognize that sustainable development is an institutional commitment and an integral part of our pursuit of both good corporate citizenship and the fundamentals of sound business practices.
  - They recognize that the sustainable development agenda is becoming increasingly inter-linked with humanitarian and social issues as the global environment agenda broadens and as climate change brings greater developmental and security challenges.



## 2).Sustainability Management:

- Financial institutions support a precautionary approach to environmental and social issues, which strives to anticipate and prevent potential negative impacts on the environment and society.
- The institutions comply with all applicable local, national and international regulations on environmental and social issues. Beyond compliance, it works towards integrating environmental and social considerations into our operations and business decisions in all markets.
- They recognize that identifying and quantifying environmental and social risks should be part of the normal process of risk assessment and management, both in domestic and international operations.
- They Endeavour to pursue the best practice in environmental management, including energy and water efficiency, recycling and waste reduction. It seeks to form business relations with customers, partners, suppliers, and sub-contractors who follow similarly high environmental standards.
- The institutions intend to update its practices periodically to incorporate relevant developments in sustainability management. It also encourages the industry to undertake research accordingly.
- Financial institutions also recognize the need to conduct regular internal reviews and to measure our progress against our sustainability goals.
- They recognize the need for the financial services sector to adapt and develop products and services which will promote the principles of sustainable development.



## 3).Public awareness and communication:

- The financial institution recommends that financial institutions develop and publish a statement of their sustainability policy and periodically report on the steps they have taken to promote the integration of environmental and social consideration into their operation.
- They are committed to share relevant information with customers, as appropriate, so that they may strengthen their own capacity to reduce environmental and social risk and promote sustainability development.
- It fosters openness and dialogue relating to sustainability matters with relevant stakeholders, including shareholders, employees, customers,

regulators, policy-makers and the public.

- It encourages other financial institution to support this statement. and is also committed to share with them our experiences and knowledge in order to extend best practices.
- Financial institution are under closer scrutiny than ever before. Investors and regulators are increasingly asking challenging questions about corporate governance, the social and environmental impact of operations and investments and how FIs support their local communication.

### 3.1 TERMS AND CONDITIONS OF JOINING UNEP FI:

1). **Show commitment to the principles of sustainability finance:** sign the UNEP statement of commitment by financial institutions on sustainable development.

2) **Get actively involved in the UNEP FI network and the initiatives's activities:** Availability to exchange experiences/best practice and to participate in the initiatives groups/activities (one or several focal points should be established, with availability and authority to participate in meetings, conference calls as well as to relevant events in particular UNEP FI, s annual general meetings).

3) **Report about the progress:** Submit a brief report annually ,on implemented or planned sustainable development policies and measures, as well as the most updated reports that the company has related reports.

4) **Pay a membership fee:** Membership fees are annual. they are management, If an asset management company. subsidiaries of existing UNEP FI members are welcome to join as independent members. subsidiary members annual contribution fees are determined taking into account the total assets of the subsidiary itself, excluding those of the parent company.



## 3.2 WORK STREAMS OF UNEP FI

**1) Core Activities:** UNEP FI's strategic work programme is focused on current and emergent issues which are relevant to the signatories. They work collaboratively to find innovative approaches to issues around finance and sustainability:

- **Banking:** Finding innovative ways of addressing sustainability issues in the banking sector.
- **Climate Change:** Through its Climate Change Working Group, UNEP FI'S work focused on policy and strategy, outreach, and tools and training.
- **Insurance:** Promoting the global adoption and implementation of the Principles for Sustainable Insurance
- **Investment:** Exploring how material, social, environmental and governance considerations can best be incorporated into investment practice.
- **Property:** New building development and existing structures contribute significantly to global carbon emissions, pollution and energy use. The Property Working Group analyses the role of financial institutions in promoting sustainable development in the real estate and property finance sectors.
- **Sustainability Management and Reporting:**
  - a) Developing the Global Reporting Initiative Financial Services Sector Supplement (Environmental Performance).
  - b) Building the business case for sustainability management and reporting in emerging economies.

**2). Other Activities:** Other activities are UNEP FI are as follows :

- **Biodiversity and Ecosystem Services:** Assisting the financial services sector to address the challenges arising from the loss of biodiversity and degradation of ecosystem services.
- **Finance and Conflict:** Developing and promoting the business case for conflict prevention within the financial sector and raising awareness of the opportunities of engaging proactively with the issue of conflict prevention.

- **Human Rights and Finance:** Driving socially and environmentally sustainable development by seeking to understand and clarify how human rights relate to the activities of financial institutions worldwide, so financial professionals can make responsible decisions within their spheres of influence.
- **Water and Finance:** Promoting a proactive approach financial institutions when it comes to water-related challenges and opportunities through awareness raising and capacity building.

### 3.3 BENEFITS OF JOINING UNEP FI

Membership in UNEP FI is not only about surviving this public scrutiny; it is also about learning how to turn it into an opportunity for growth and shaping this sustainable finance agenda as it develops.

Members enjoy a range of benefit from their involvement with UNEP FI:

- Keep abreast of the latest trends, tools and practices relating to sustainable finance.
- Be part of an international network of financial institutions and engage in peer-to-peer information and experience sharing.
- Take part in shaping the global sustainable finance agenda by participating the initiative's various thematic, sectoral regional groups.
- Show leadership on a global level by endorsing and participating in UNEP FI's various conferences, seminars, and training workshops.
- Gain preferential access to the ground-breaking research, implementation tools and capacity-building offered by UNEP FI.
- Gain access to key stakeholders from the government and civil society.





## **4. GREEN ENERGY MANAGEMENT**



### **4.1 MEANING:**

Green energy comes from natural sources such as sunlight, wind, rain, tides, plants, algae and geothermal heat.

- These energy resources are renewable, meaning they're naturally replenished.
- In contrast, fossil fuels are a finite resource that take millions of years to develop and will continue to diminish with use.
- Renewable energy sources also have a much smaller impact on the environment than fossil fuels, which produce pollutants such as greenhouse gases as a by-product, contributing to climate change.
- Gaining access to fossil fuels typically requires either mining or drilling deep into the earth, often in ecologically sensitive locations.
- Green energy, however, utilizes energy sources that are readily available all over the world, including in rural and remote areas that don't otherwise have access to electricity.
- Advances in renewable energy technologies have lowered the cost of solar panels, wind turbines and other sources of green energy, placing the ability to produce electricity in the hands of the people rather than those of oil, gas, coal and utility companies.



## 4.2 DEFINATION:

- “Energy management is the proactive, organized and systematic coordination of procurement, conversion, distribution and use of energy to meet the requirements, taking into account environmental and economic objectives”.
- Energy management includes planning and operation of energy production and energy consumption units. Objectives are resource conservation, climate protection and cost savings, while the users have permanent access to the energy they need.
- It is connected closely to environmental management, production management, logistics and other established business functions.
- Green energy can replace fossil fuels in all major areas of use including electricity, water and space heating and fuel for motor vehicles.

### 4.2.1 TYPES OF GREEN ENERGY

Research into renewable, non-polluting energy sources is advancing at such a fast pace, it's hard to keep track of the many types of green energy that are now in development. Here are 6 of the most common types of green energy:

#### a..Solar power –

- The most prevalent type of renewable energy, solar power is typically produced using photovoltaic cells, which capture sunlight and turn it into electricity.
- Solar energy is also used to heat buildings and water, provide natural lighting and cook food. Solar technologies have become inexpensive enough to power everything from small hand-held gadgets to entire neighborhoods.



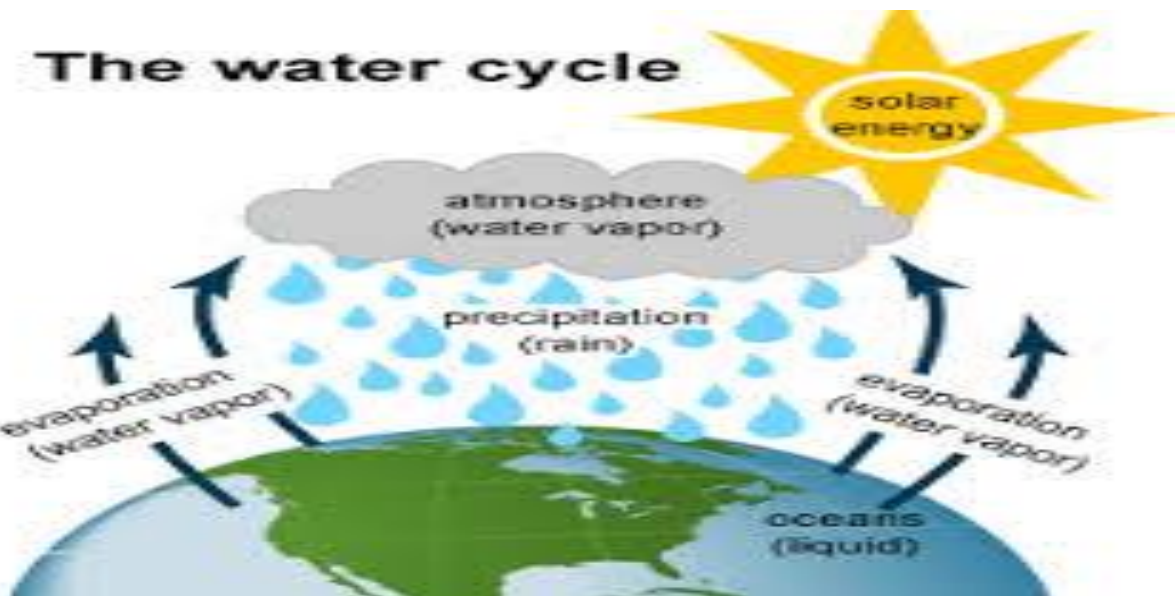
### b..Wind power –

- Air flow on the earth's surface can be used to push turbines, with stronger winds producing more energy. High-altitude sites and areas just offshore tend to provide the best conditions for capturing the strongest winds.
- According to a 2009 study, a network of land-based, 2.5-megawatt wind turbines in rural areas operating at just 20% of their rated capacity could supply 40 times the current worldwide consumption of energy.



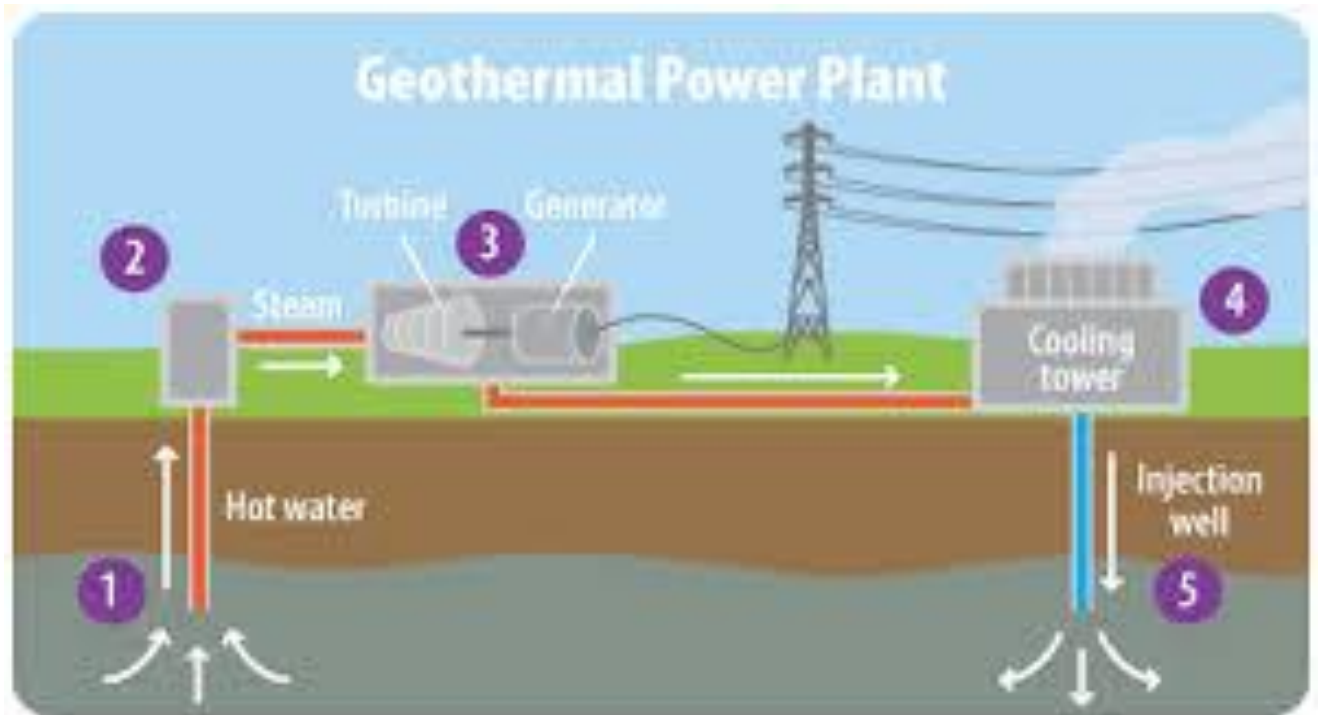
### c.Hydropower –

- Also called hydroelectric power, hydropower is generated by the Earth's water cycle, including evaporation, rainfall, tides and the force of water running through a dam. Hydropower depends on high precipitation levels to produce significant amounts of energy.



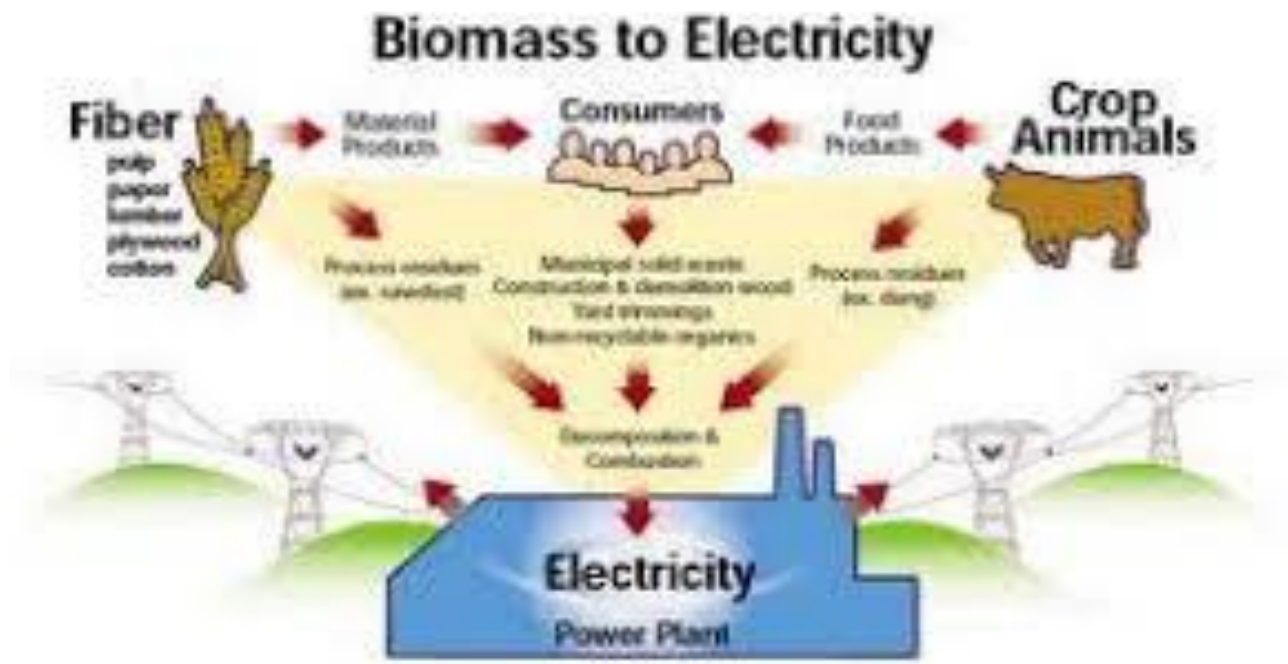
#### d. Geothermal energy –

- Just under the earth's crust are massive amounts of thermal energy, which originates from both the original formation of the planet and the radioactive decay of minerals. Geothermal energy in the form of hot springs has been used by humans for millennia for bathing, and now it's being used to generate electricity.
- In North America alone, there's enough energy stored underground to produce 10 times as much electricity as coal currently does.



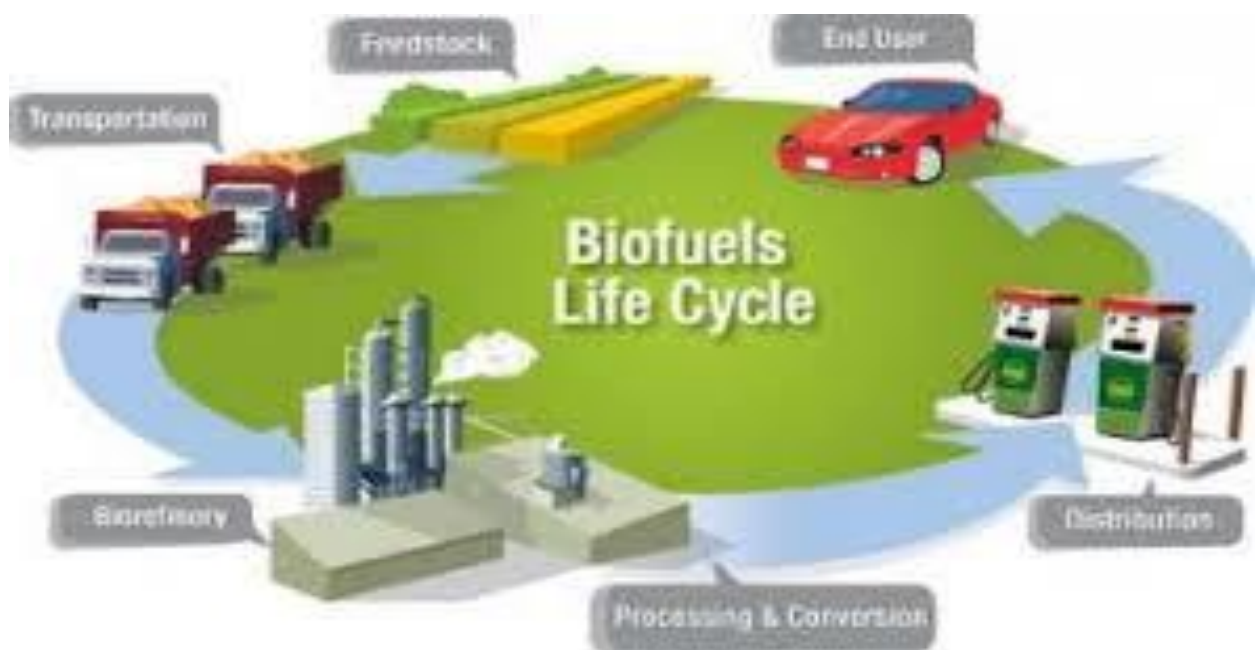
#### e. Biomass

Recently-living natural materials like wood waste, sawdust and combustible agricultural wastes can be converted into energy with far fewer greenhouse gas emissions than petroleum-based fuel sources. That's because these materials, known as biomass, contain stored energy from the sun.



### f. Biofuels

Rather than burning biomass to produce energy, sometimes these renewable organic materials are transformed into fuel. Notable examples include ethanol and biodiesel.





Biofuels provided 2.7 percent of the world's fuels for road transport in 2010, and have the potential to meet more than 25 percent of world demand for transportation fuels by 2050.



## **5. INTRODUCTION TO GREEN PRODUCT MANAGEMENT**

- Green Product Management is a complete system that looks at products right from the project planning stage, to its design, development, pilot production, and mass production, right up to the end of the product life.
- The Green Product Management strategy is aimed at an industry mission to supply products that can fulfill customer needs, while taking advanced steps towards product innovation using technology and developing a sustainable production mechanism.

## 5.1 KEY ELEMENTS

So, what are key elements of the Green Product Management that can help to achieve product sustainability?

### a) Sustainable design

- Sustainable (or green) design of a product considers all the factors right from acquisition of the raw materials required for the product, to its final disposal. All these factors can have possible impacts on our environment.
- Sustainable design (or green product design) needs to be adopted from the early stages of the product designing and development, and must look at objectives, such as reduction of environmentally-harmful substances used in the product, the ease of assembling and disassembling the product, as well as the reduction of consumed energy to manufacture the product.
- As an example to demonstrate the eco-friendliness of their products, companies have set plant laboratories to detect the use of any hazardous substance in the supplier's products or raw materials.

### b) Green supply chain management

- To implement this key element, all components for product assembly and other used materials, during the product manufacturing and maintenance are checked for containing any hazardous materials.
- A supply chain audit of the manufacturers and its suppliers is conducted to ensure that all the involved parties meet the necessary requirements of sustainable development.
- Research in collaboration with customers to develop more environment-friendly and halogen-free materials is also aimed to reduce the environment damages.



### c) Green manufacturing

- The aim of this key element is to manufacture products using only those materials and processes that pose the least harmful impact on the environment. Additionally, green manufacturing is aimed at conserving energy used for manufacturing, and to ensure maximum safety for the employees and the society.
- Additional aspects of green (or sustainable) manufacturing include the adoption of manufacturing technologies and plant design, that can contribute to this objective.

### d) Sustainable production and logistics

- Key factors such as mass production and outsourcing can contribute to this objective, as detailed in the book titled, “Technology Management for Sustainable Production and Logistics,” innovative technologies provide opportunities to make manufacturing and logistics greener and more energy efficient.
- Engineering tools, such as LCA, can quantify the carbon footprint or the energy consumption in any particular manufacturing process.

### e) Responsible use and maintenance

Customer service may include methods for sustainable maintenance and servicing systems that help with interacting with the customers.

### f) Ease of recovery and disassembly

Consideration of a green product life cycle extends to the final disposal of the product, including reduction in resource waste and the product recycling costs. Product materials with a higher proportion of recycled materials can be selected.



### *5.2 The practices for ease of recovery can include:*

- The use of recycled paper for the product manual.
- Product packaging using recyclable corrugated paper.
- Product cartons bearing the recycle system mark.

### *5.3 The practices for ease of disassembly can include products:*

- With modular design.
- With easy disassembling design, meaning products that can be broken down using normal tools such as screwdrivers.
- With reduced number of fastening bolts.
- With easy to separate design, particularly true for electronic products.

**5.4 Product disposal:** This involves the final “6R” analysis for the product end of life, which include:

- Retire, in which case, the manufacturer must have a waste disposal management strategy.
- Reuse, which will involve the reintegration of product part back into the manufacturing cycle.
- Remanufacture
- Reduce and Redesign that involves the learned knowledge, which will help in the next product to recycle.
- Renewal, which is the final stage of the Green product management process.



## (17E00302) GREEN BUSINESS MANAGEMENT

**Objective :**The objective of the course is to impart students in understanding of green business, its advantages, issues and opportunities and to provide knowledge over the strategies for building eco-business .

**1. Introduction to Green Management:**The Concept of Green Management; Evolution; nature, scope, importance and types; Developing a theory; Green Management in India; Relevance in twenty first century

**2.Organizational Environment;** Indian Corporate Structure and Environment; How to go green; spreading the concept in organization; Environmental and sustainability issues for the production of high-tech components and materials, Life Cycle Analysis of materials, sustainable production and its role in corporate environmental responsibility (CER).

**3.Approaches from Ecological Economics;** Indicators of sustainability; Eco- system services and their sustainable use; Bio-diversity; Indian perspective; Alternate theories

**4.Environmental Reporting and ISO 14001;** Climate change business and ISO 14064; Green financing; Financial initiative by UNEP; Green energy management; Green product management

**5.Green Techniques and Methods;** Green tax incentives and rebates (to green projects and companies); Green project management in action; Business redesign; Eco-commerce models

### Text Books:

- Green Management and Green Technologies: Exploring the Causal Relationship by Jazmin SeijasNogarida , ZEW Publications.
- The Green Energy Management Book by Leo A. Meyer, LAMA books

### References:

- Green Marketing and Management: A global Perspective by John F. Whaik, Qbase Technologies.
- Green Project Management by Richard Maltzman And David Shiden, CRC Press Books.
- Green and World by Andrew S. Winston, Yale Press B



## UNIT-5

### GREEN TECHNIQUES AND METHODS

#### 1. GREEN TAX INCENTIVES AND REBATES

- Green tax incentives are one of the numerous ways *to get back a material percentage of your taxes*.
- The federal government offers **incentives** for homeowners to make **green** improvements in the form of **tax rebates**. One popular **incentive** pays for 10% of the cost of items including biomass stoves, efficient heating and cooling, insulation, new roofing, water heaters, and efficient windows and doors.
- Tax time is always a hectic time of year and for corporations and individuals on extension tax time can last through October 15th. Trying to navigate the myriad of Federal and California tax credits while in the middle of preparing last year's returns can often result in understating or completely missing these highly valuable credits.
- With the growth of green initiatives and incentives, renewable energy and pollution control mandates California's efforts to be at the forefront of this market.
- Corporations that understand the numerous eco tax incentives and green tax credits available to them stand to benefit tax-wise while helping to save the planet.
- Both the state and federal governments have introduced numerous ways to get back a material percentage of our taxes by providing for more green tax incentives and corporate energy tax credits than ever before.
- Eco tax planning for corporations is a specialty of Blake's.
- Not only are corporations eligible for California energy credits but federal, as well. Residential renewable green tax incentives allow you to reduce California taxes by up to 40% of the cost of any applicable systems you install in your business, up to a total cost of \$10,000, up to \$4,000 of tax credit.
- It is important to remember that this is a deduction and not a credit. Blake Christian, CPA, provides resources and insights into these various green energy tax incentives along with other vital information on tax, financial and economic information that affect corporations.

#### 1.1 Corporate Energy Tax Credits

- The new, green energy tax incentives for corporations are widespread and apply to virtually any industry – but they are under-utilized and mis-understood by the vast majority of companies.
- These credits can dramatically reduce state and federal taxes and unused credits can also be carried forward to future years with any labor costs also used towards the qualifying costs for credits.
- Figuring out which assets qualify for these eco credits can be a bit confusing for companies and CPAs due to the specialized nature of the credits and complexities of certain types of lease structuring.
- The American Recovery and Reinvestment Act of 2009 extended many consumer tax incentives originally introduced in the Energy Policy Act of 2005 (EPACT) and amended in the Emergency Economic Stabilization Act of 2008 (P.L. 110-343).

- A tax credit is generally more valuable than an equivalent tax deduction because a tax credit reduces tax dollar-for-dollar, while a deduction only removes a percentage of the tax that is owed.
- Consumers can itemize purchases on their federal income tax form, which will lower the total amount of tax they owe the government.
- Fuel-efficient vehicles and energy-efficient appliances provide benefits such as better gas mileage, lower energy bills, and reduced air pollution. Below is a summary of tax credits available to consumers.

### **1.2 Home Energy Efficiency Improvement Tax Credits**

Consumers who purchase and install energy-efficient windows, insulation, doors, roofs, and heating and cooling equipment in existing homes can receive a tax credit for 30% of the cost, up to \$1,500, for improvements "placed in service" starting January 1, 2009, through December 31, 2010.



See EnergyStar.gov for a complete list of tax credits available.

#### **Residential Renewable Energy Tax Credits**

Consumers who install solar water heating and solar electric systems, small wind systems, geothermal heat pumps, and residential fuel cell and microturbine systems can receive a 30% tax credit for systems placed in service before December 31, 2016.

#### **Hybrid Gas-Electric and Alternative Fuel Vehicles Tax Credits**

Consumers who buy or lease a new hybrid gas-electric car or truck are eligible for an income tax credit for vehicles "placed in service" starting January 1, 2006, and purchased on or before December 31, 2010.

Alternative-fuel vehicles, diesel vehicles with advanced lean-burn technologies, and fuel-cell vehicles are also eligible for tax credits. See the IRS's Qualified Hybrid Vehicles list.

## Plug-In Electric Vehicles

The Recovery Act modifies the credit for qualified plug-in electric drive vehicles purchased after Dec. 31, 2009.

The minimum amount of the credit for qualified plug-in electric drive vehicles is \$2,500 and the credit tops out at \$7,500, depending on the battery capacity.

To qualify, vehicles must be newly purchased, have four or more wheels, have a gross vehicle weight rating of less than 14,000 lbs, and draw propulsion using a battery with at least four kilowatt hours that can be recharged from an external source of electricity.

## **2. GREEN PROJECT MANAGEMENT IN ACTION**

- Sustainable products and services are usually labeled as quality products. Governments, designers, project developers, producers and suppliers are all getting more convinced of their value. Both from a view of urgency as from a view of social responsibility.
- Both the supply of and the demand for eco innovations have risen significantly during the last years. These are necessary conditions for new markets.
- An important issue in marketing the eco-innovations is the business model that is chosen by companies to scale up technologically successful innovations. Business models are an important criteria for funders to provide access to venture capital.
- When entrepreneurs meet and start talking about their business model everyone seems to have a different perception of the business model. New products are made very quickly, lean and efficient production is a challenge from the past, the network economy challenges companies to create different value proposition for every possible group of clients and experiment on this.
- Disruptive innovations bring both winners and losers. The roadmap to business success in a period of change will demand a premium for innovation, collaboration and smart investments to shape a globally prosperous and sustainable future.

Characteristics of Eco-Innovations

### **2.1 Definitions and categories**

- The term environmental innovation - short: eco-innovation, and defined broadly:
- "eco-innovations are all measures of relevant actors - firms, politicians, unions, associations, churches, private households which:
- Develop new ideas, behavior, products and processes, apply or introduce them; Contribute to a reduction of environmental burdens or to ecologically specified sustainability targets." --- or "eco-innovation is any form of innovation aiming at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment or achieving a more efficient and responsible use of natural resources, including energy".

### **2.2 Eco-innovations in two categories:**

- Activities of traditional eco-industries, i.e. products and services whose main purpose relates to pollution prevention and management, or natural resources management. In this case, any innovation related to their core activities can be considered eco-innovation.

- Other activities where eco-innovation can reduce pollution and/or optimize resources use. In this case, an innovation can be considered to be an eco-innovation if the expected benefit for the environment is clearly identified (measurable as far as possible) and substantial (going beyond gains in re-sources efficiency generally resulting from process improvements).
- A life-cycle approach should ensure that the environmental impact is not shifted from one part of the life-cycle to another (for example from production to use or disposal).
- To overcome the barriers that hinder the development of environmental technologies, is being achieved through a series of measures to promote eco-innovation and the take-up of environmental technologies. Priority is given to:
  - Getting inventions from the research laboratories to markets;
  - Improving market conditions, particularly by providing positive incentives such as a supportive regulatory framework and access to finance;
  - Acting globally with actions supporting developing countries and promoting foreign investment;
  - The innovations in three phases differ in complexity and scope: short term (40 years).

### **Short term**

- In the first phase technologies can be used mainly for 'good housekeeping' and 'end-of-pipe' measures. Good Housekeeping entails all actions within the organization to prevent waste of material and energy.
- A more efficient organization and communication in the production process is often sufficient to prevent unnecessary emissions.
- This goes hand-in-hand with cost reductions and support is therefore easily found.
- End-of-Pipe measures are intended to counter attack polluting emissions. This technology does not alter the production process dramatically and is therefore relatively easy to install and implement.
- Companies most of the times do not implement this technology unless it is compulsory by regulation.

### **Mid term**

- Contrary to end-of pipe measures that counter attack the emissions, process innovations prevent emissions. Environmental Process Innovations are aimed at the prevention of unnecessary emissions in the productions process.
- Environmental Product Innovations aimed to the development of new products with the characteristics to minimize the use of resources, minimize the use of energy, minimize emissions and upgrade the quality, life cycle and the ability to be repaired and taken apart of the ultimate product.
- Integral Supply Chain Management contains a broader scope than production within one company, but instead examines the entire supply chain as a whole.
- It examines environmental load in four phases, the use of resources, production, use of the product and the disposal phase. The goal is to develop products and services designed to their entire life cycle. To close the material and energy cycles.
- This can be done by designing products or services that are easily recycled for example. The promising these types of innovations appear, there is a remark to be made.

- The risk of these types of innovations is that the focus lies within known framework of production processes. By focusing on integral supply chain management one builds upon processes that itself are in essence not environmental friendly and thereby possibly restraining the development 'real' eco-innovations.

### **Long term**

System Innovations are fundamental changes in the way demand is met - and markets arise or are created. Innovative solutions to reach a more sustainable society can only be reached by changing vested interests and processes (transitions), creating new products and services to fulfill demand. The question is not how we can make cars more environmental friendly, but the question is, how to fulfill the demand for transport in a sustainable fashion.

### **2.3 Determinants of Eco-innovations**

- Significant eco-innovations have occurred in the energy sector but only a small share has been implemented and been scaled up. Higher initial costs are one of the major barriers for eco-innovations.
- Together with information asymmetries this prevents the market diffusion of eco-innovations. Information asymmetries are based upon the general impression of 'green and expensive' versus 'brown and cheap'.
- Recently suggested research on energy efficient products breaking down the costs of eco-innovations into two dimensions, namely initial costs and operating costs. This in order to clarify that a wide range of eco-innovations has a different investment profile, higher initial costs versus lower operating costs.

### **Market pull factors**

- A supportive basis from the demand side is vital for sustainable up scaling of our long term eco-innovation. Customer support has several known barriers that can occur while up scaling the innovation.
- Long term systematic innovation demands a broad social basis in which customer support plays a vital role for long term transition in a systematic scope. Barriers influencing the market pull factors: "Customer investment decisions regarding eco-innovations are characterized by: Different investment profiles over time – that is, often higher initial costs (purchase price and set-up costs) and lower operating costs (maintenance and running costs).
- Information asymmetries due to search experience, and credence attributes. Externalities (e.g. environmentally sound alternatives imply a higher collective benefit but lower or equal private benefits than conventional alternatives);
- Environmental benefits have the characteristics of a public good and therefore underlie double externality and enhanced quality does not benefit solely the innovator; Infrequent decisions that require the consumer to engage in an extensive decision making process, which implies high involvement, high cognitive effort, and a substantial need for information due to limited experience).
- Up-scaling phase of eco-innovators in entering the niche-markets; Every niche market exhibits several barriers. Aside from the barrier of infrequent decision making, it is to be believed that the barriers in the business to consumer market are equal to the barriers in the business to business market, so called customer barriers.



## Technology push factors

- Often when firms fail to commercialize their product or innovation it is perceived as a failure in their vision or management. However in reality there seems to be a gap in what is demanded from investors and what investors are willing to provide.
- Public funding is aimed at the early innovation phases and decreases rapidly when the innovation reaches market introduction. Private investors and angel investors have to take over. In this phase the demand for capital is high but the availability is rather low (or very expensive).
- This is called the 'Valley of Death'. Eco-innovations in niche markets can experience serious barriers in the access to capital, as niche markets are often small and/or immature markets. Investors tend to be careful in providing capital given the uncertainty concerning up scaling a niche markets.

## 3. BUSINESS REDESIGN ECO-COMMERCE MODELS

### 3.1 Ecological Entrepreneurship

- An "entrepreneur" is someone who thinks of a new idea or opportunity in business and who takes the risks necessary to convert his or her vision into a reality. Entrepreneurs are absolutely essential to the forwarding of human progress.
- An ecological entrepreneur is someone who is driven not only by the possibility of making a profit, but is also driven by environmental and social concerns. They want to make the world a better place by improving the environment.
- One interesting thing about entrepreneurship is that it is a market-based approach, which encourages us to seek out positive rewards, mainly in the form of profit. Governmental oversight, the main way we address environmental issues, often involves punishing offenders in order to change people's approach to the environment.
- Ecological entrepreneurship is a reward-based approach to addressing environmental problems, rather than a punitive approach, and may prove more successful at changing attitudes and practices in the long run. Business practices fundamentally affect the business world, the environment and our lives.
- Ecology implies community, and ecological entrepreneurs understand the connections between their actions and the greater community as a whole.
- The field is socially important because ecological entrepreneurs are instrumental in reshaping the way we approach the environment and its relation to business.

## **3.1 Types of Innovation**

### **A Process Innovation**

The implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software.

### **A Product Innovation**

The introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics.

### **A Marketing Innovation**

The implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing. This includes changes in positioning of products or services offered by companies e.g. low-cost airlines.

### **An Organizational Innovation**

The implementation of a new organizational method in the firm's business practices, workplace organization or external relations.

### **Material Flow Innovation.**

This type will capture innovation across the material value chains of products and processes that lower the material intensity of use while increasing service intensity and well-being. It aims to move societies from the extract, consume, and dispose system of today's resource use towards a more circular system of material use and re-use with less total material requirements overall.

### **Social Innovation**

Social innovation is characterized by different rationale and mechanisms. This is closely linked with the field of social entrepreneurship. Social innovation is "a novel solution to a social problem that is more effective, efficient, sustainable than existing solutions and for which the value created accrues primarily to society as a whole rather than private individuals. Two key elements of social innovation:

1. To create social change and value, rather than commercial innovation and financial value
2. Social innovation processes often involve not only business, but also the public sector and non-governmental organizations.

### **Eco Innovation**

Eco innovation is a term used to describe products and processes that contribute to sustainable innovation. Eco Innovation is the commercial application of knowledge to elicit direct or indirect ecological improvements. It is often used to describe a range of related ideas, from environmentally friendly technological advances to socially acceptable innovative paths towards sustainability.

## Cleantech

Clean tech is a term used to describe products or services that improve operational performance, productivity, or efficiency while reducing costs, inputs, energy consumption, waste, or pollution. Its origin is the increased consumer, regulatory and industry interest in clean forms of energy generation.

### 3.2Eco commerce

- **Eco commerce** is a business, investment, and technology-development model that employs market-based solutions to balancing the world's energy needs and environmental integrity.
- Through the use of green trading and green finance, eco-commerce promotes the further development of "clean technologies" such as wind power, solar power, biomass, and hydropower .
- EcoCommerce is an integrated ecological-economical model that provides a means to account for and value land management activities that improves the condition of natural capital and values the output of ecoservices.
- EcoCommerce is more comprehensive than a compilation or organization of ecosystems service markets as it provides the framework to build an ecological intelligence system that allows the public arena of commerce to define sustainability.
- Eco Commerce Is a business, investment, and technology development model that employs market-based solutions to balancing the world's energy needs and environmental integrity.
- Eco Innovation Is a term used to describe products and processes that contribute to sustainable innovation. Eco Innovation is the commercial application of knowledge to elicit direct or indirect ecological improvements.
- It is often used to describe a range of related ideas, from environmentally friendly echnological advances to socially acceptable innovative paths towards sustainability.
- Cleantech Is a term used to describe products or services that improve operational performance, productivity, or efficiency while reducing costs, inputs, energy consumption, waste, or pollution. Its origin is the increased consumer, regulatory and industry interest in clean forms of energy generation.