Green Issues & Sustainable Development

> Dr A K Bhattacharya 3rd June 2021

The Green Pledge

I pledge for my life time commitment for the cause of environmental protection and amelioration to sustain a safer environment for healthy life for all. I shall adopt myself and will encourage all stakeholders to adopt all the measures of best management practices to maintain the environment around us in the best possible conditions. I will reduce and help others to reduce our carbon footprint and shall make all efforts to achieve the carbon neutral lifestyle.

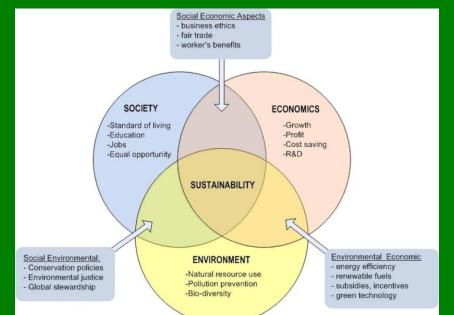


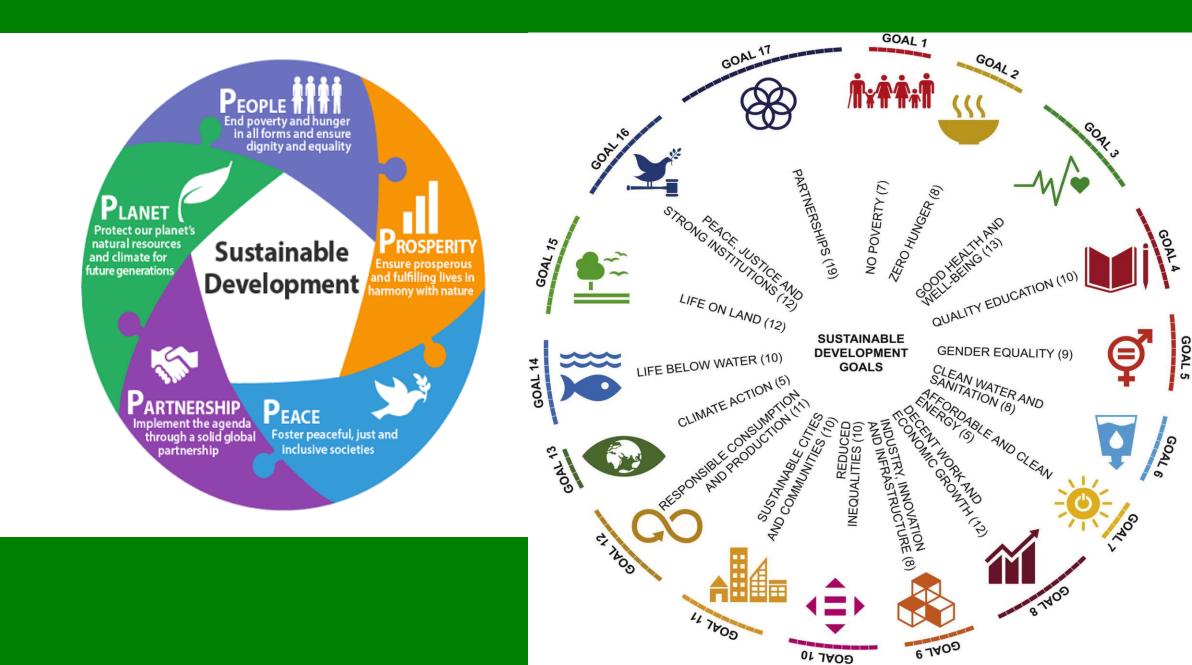
Sustainable Development vs Sustainability

There are over 200 different definitions to answer what is sustainable development. However, the most common definition was defined by the Brundtland Commission in 1987, who documented the sustainable development definition as:

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

- Sustainability is a broad term that describes managing resources without depleting them for future generations. Sustainability aims at balancing economic, environmental and social factors in equal harmony.
- Sustainability Venn diagram three pillars of sustainability







Gandhi's Perception of Sustainable Development



VILLAGES AND FORESTS – COEXISTENCE

AN IDEAL VILLAGE IS THAT WHEREIN THE DAY-TO-DAY GOODS OF BASIC NECESSITIES, VIZ., TWIGS FOR ROOF, BAMBOO, FUEL, FODDER ARE AVAILABLE WITHIN THE PERIPHERY OF FIVE MILES. Earth provides enough to satisfy everyman's needs, but not everyman's greed

Community Perception of Sustainable Development

- SFM
- Community Ownership {*custodian*} of Natural Resources
- Community as integral component of Ecosystem

What will society be like in 2030?



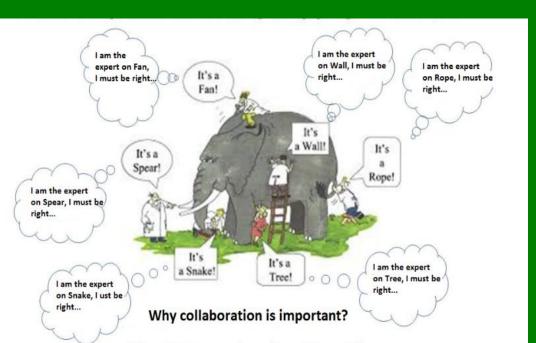
URBAN PLANNING

We will live in houses powered by renewable energy and urban vegetable gardens will be found on rooftops and in the streets.

AGRICULTURE

The reduction in livestock farming will have a positive effect on **reforestation** and will **free up more land** for the cultivation of food.

Goal vs Tool



- Training vs achievement
- Skill development vs employment
- Protection vs Conservation
- SD vs SDG

Green Economy

Green Economy is one that results in increased human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.



Circular Economy

The circular economy refers to an industrial economy that is restorative by intention; aims to rely on renewable energy; minimizes, tracks, and hopefully eliminates the use of toxic chemicals; and eradicates waste through careful design.

Blue Economy

The Blue Economy permits to respond to the basic needs of all with what we have. As such, it stands for a new way of designing business: using the resources available in cascading systems, where the waste of one product becomes the input to create a new cash flow.

THE BLUE ECONOMY

10 YEARS 100 INNOVATIONS 100 MILLION JOBS

Gunter Pauli

REPORT TO THE CLUB OF ROME

Blue Economy

The blue economy fosters transition from a product-based economy to a system-based economy.



• The most popular environmental concern on anvil

Environment Days



4th R
5th R

Cause ->Effects->Mitigation

Causes

- Human Over Population
- Intensive farming
- Land Use
- Nuclear Issues
- Hydrology
- Can you add to the list..?

Effects

- Climate change
- Environmental Degradation
- Pollution
- Energy crisis
- Resource Depletion
- Toxicants
- Waste
- Any other..?

Mitigation

- Conservation
- Renewable energy
- Environmental law
- Green technology
- Sustainability
- What more..?

The genesis of concern

"The holocoenotic nature of environment"

Change in one ecological or environmental factor can concurrently affect the dynamic state of an entire ecosystem

Climate change

• Climate change is a long-term shift or alteration in the climate of a specific location, a region or the entire planet.

 Climate change is perhaps the most pressing and urgent environmental issues on the world agenda.

Causes of Climate Change

Natural events and processes

 Human influences in the form of Emission of green house gases, local air pollution, alteration in land use, deforestation

Global Warming - A major threat

 Every scientific institution and national government in the world now endorses the conclusions of the UN's Intergovernmental Panel on Climate Change (IPCC) that global warming is a major threat to the planet's future

Global Warming A Process of Mass Destruction

 A global warming episode 250 million year ago wiped out 95% of all species. It took a rise in average global temperature of only 6°C to trigger this catastrophe.

Global Warming

- Heating of the earth's atmosphere due to increasing concentration of carbon dioxide and other green house gases.
- Global warming refers specifically to any change in the global average surface temperature of the earth. In other words global warming is one type of planetary scale change.

Warming Impacts

- Disappearing glaciers
- Migratory birds arrive earlier summer breeding grounds
- Insects and amphibians breed earlier
- Increased survival of pest populations
- Coral reef "bleaching" of reef building corals
- Changes in gene frequency in wild fruit fly populations

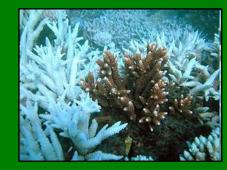




Shift in species geographic ranges











Economic Cost of Global Warming

- The world's largest reinsurer, Munich Re, estimates that the cost of global warming by 2050 will run at more than S300bn a year at the "moderate" end of IPCC predictions.
- The cost of climate change is growing two to three times faster than the global economy that pays for it.
- Greater risk lurks at the upper end of the IPCC predictions.

Green House Gases

- Carbon dioxide
- Methane
- Water vapor
- Nitrous dioxide
- Ozone

 Human-made green house gases -(halocarbons and other chlorine and bromine containing substances)

Green House Gases - Expected Scenario

 Concentration of greenhouse gases is expected to approach 1000 ppm by 2100 under 'business as usual scenario. The ambient temperature is expected to increase 1 to 5.8°C over the next 100 years.

• The rate of change of temperature predicted by the *IPCC* is 15-30 times faster than any global temperature change ever know before.



Development without planning



Green Energy

- 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 byproduct, 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

- 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.
- Green energy can replace fossil fuels in all major areas of use including electricity, water and space heating and fuel for motor vehicles.

CO_2 sequestration

The uptake and storage of atmospheric carbon in, for example, soil and vegetation.



Carbon credit

Permit that allows an entity to emit a specified amount of CO_2 . Also called emission permit. Carbon Catalog is a directory of carbon offsets. Carbon reduction projects include solar, wind, biomass, methane.

Carbon Credit

- A carbon credit is a generic term for any tradable certificate or permit representing the right to emit one tonne of carbon dioxide or the mass of another greenhouse gas with a carbon dioxide equivalent (tCO₂e) equivalent to one tonne of carbon dioxide.
- One carbon credit is equal to one tonne of carbon dioxide, or in some markets, carbon dioxide equivalent gases.

Carbon Trading

• **Carbon trading** is an application of an emissions trading approach. Greenhouse gas emissions are capped and then markets are used to allocate the emissions among the group of regulated sources.

 Carbon emissions trading is a form of emissions trading that specifically targets carbon dioxide (calculated in tonnes of carbon dioxide equivalent or tCO₂e) and it currently constitutes the bulk of emissions trading.

Carbon Trading

- This form of permit trading is a common method countries utilize in order to meet their obligations specified by the Kyoto Protocol; namely the reduction of carbon emissions in an attempt to reduce (mitigate) future climate change.
- Under Carbon trading, a country having more emissions of carbon is able to purchase the right to emit more and the country having less emission trades the right to emit carbon to other countries. More carbon emitting countries, by this way try to keep the limit of carbon emission specified to them.

Clean Development Mechanism (CDM)

The Clean Development Mechanism (CDM), defined in Article 12 of the Protocol, allows a country with an emission-reduction or emission-limitation commitment under the Kyoto Protocol (Annex B Party) to implement an emission-reduction project in developing countries. Such projects can earn saleable certified emission reduction (CER) credits, each equivalent to one ton of CO₂, which can be counted towards meeting Kyoto targets.

Green Development

Green development is a land use planning concept that includes consideration of community-wide or regional environmental implications of development, as well as site-specific green building concepts. This includes city planning, environmental planning, architecture, and community building.



Green Development vs. Sustainable Development

- Green development is generally differentiated from sustainable development in that Green development prioritizes what its proponents consider to be environmental sustainability over economic and cultural considerations.
- Proponents of Sustainable Development argue that it provides a context to improve overall sustainability where cutting edge Green development is unattainable.

Environmental Sustainability

Environmental sustainability is the process of making sure current processes of interaction with the environment are pursued with the idea of keeping the environment as pristine as naturally possible.

Environmental Values

- Environmental Values brings together contributions from philosophy, economics, politics, sociology, geography, anthropology, ecology and other disciplines, which relate to the present and future environment of human beings and other species. In doing so we aim to clarify the relationship between practical policy issues and more fundamental underlying principles or assumptions.
- Environmental Values is concerned with the basis and justification of environmental policy.

Environmental Ethics and Philosophy

- Environmental ethics is the part of environmental philosophy which considers extending the traditional boundaries of ethics from solely including humans to including the non-human world. It exerts influence on a large range of disciplines including law, sociology, theology, economics, ecology and geography.
- Environmental philosophy is a branch of philosophy that is concerned with the natural environment and humans' place within it. It includes environmental ethics, environmental aesthetics, eco-feminism & environmental theology.

Green Technology

- The United Nations and Pacific Centre for Agriculture Engineering and Machinery (APCAEM) aims at promoting sustainable agriculture development for the eradication of poverty by guaranteeing environmental sustainability
- Such agro-based environmentfriendly technology has been termed as Green Technology

GOALS OF GREEN TECHNOLOGY



Green Technologies for Environmental Management and Sustainable Development (Giving Better Quality of Life to People at Lower Environmental Cost) Rajiv K. Sinha and Margaret Greenway, Jaipur, Pointer, 2004

- Appropriate Technology
- Sustainable Development

 "Green Technology", otherwise known as environmental technology, is basically application of our environmental sciences and technology to help save our environment.

• Sustainable development is the core of environmental technologies.



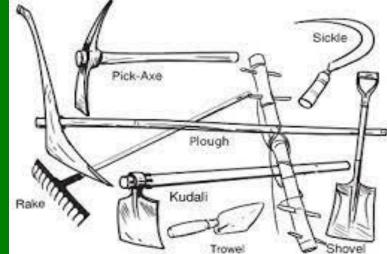
Can we supplement and complement GT??

- Conserve energy
- Conserve water
- Use alternate sources of energy solar
- Plant saplings way of life
 - Plants act as sink as well as resistant to pollution
 - Reduces warming effects

Appropriate Technology

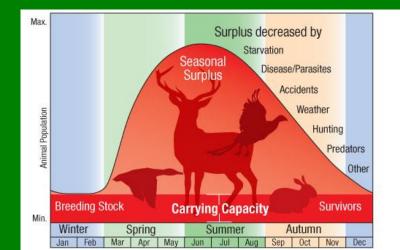
AT is technology that is designed with special consideration to the environmental, ethical, cultural, social and economical aspects of the community, it is intended for. With these goals in mind, AT typically requires fewer resources, is easier to maintain, has a lower overall cost and less of an impact on the environment compared to industrialized practices.

- Indigenous knowledge
- Indigenous resource human / material
- Indigenous tools



Carrying capacity

- The supportable population of an organism, given the food, habitat, water and other necessities available within an environment is known as the environment's carrying capacity for that organism.
- Carrying capacity is thus the number of individuals an environment can support without significant negative impacts to the given organism and its environment.
- NOT a number game



Environment auditing

A management tool compromising a systematic documented, periodic and objective evaluation of how well the management systems are performing with the aim of

- waste prevention and reduction
- assessing the compliance with regulatory requirements
- facilitating control of environmental practices by a Company's Management
- placing environment information in the public domain

(CPCB)

Environmental audits are reviews of a company's operations and processes to determine compliance with environmental regulations

Green Audit

- Inspection of a company to assess the total environmental impact of its activities or of a particular product or process.
- A green audit of a manufactured product looks at the impact of production (including energy use and the extraction of raw materials used in manufacture), use (which may cause pollution and other hazards), and disposal (potential for recycling, and whether waste causes pollution).
- Such surveys allow a widening of the traditional scope of economics by ascribing costs to variables that are usually ignored, such as despoliation of the countryside or air pollution.

- Green Economics represents the first venture by Green Audit along the route to developing a humane and sustainable economic system.
- An economics for people, and which would meet their basic needs of food, clothing, shelter, and a decent quality of life.
- Gandhian philosophy of SRM (1930s)

Social Audit

- Socially Responsible Investments
- Corporate Social Responsibility

Socially responsible investment (SRI) can be defined as combining an investor's financial objectives with their commitment to social responsibility and environmental sustainability.

Corporate Social Responsibility

CSR, also called **corporate conscience**, is a form of corporate self-regulation integrated into a business model. CSR policy functions as a self-regulatory mechanism whereby a business monitors and ensures its active compliance with the spirit of the law, ethical standards and international norms. CSR aims to embrace responsibility for corporate actions and to encourage a positive impact on the environment and stakeholders including consumers, employees, investors, communities, and others.

Certification

Refers to the confirmation of certain characteristics of an object, person, or organization. This confirmation is often, but not always, provided by some form of external review, education, or assessment.

The Environmental Legislations

- Environment Protection <u>Act</u>, 1986.
- Environment Protection Rules, 1988.
- Water (Prevention & Control of Pollution) Act, 1974.
- Water (Prevention & Control of Pollution) Rules, 1975.
- Water (Prevention & Control of Pollution) Cess Act, 1977.

- Water (Prevention & Control of Pollution) Cess Act, 1978.
- Air (Prevention & Control of **Pollution**) Act 1981.
- Air (Prevention & Control of Pollution) Rules, 1982.
- Hazardous Wastes (Management & Handling) Rules, 1989.
- Manufacture, Storage and Import of Hazardous Chemical Rules, 1989.
- Rules for the Manufacture, Use, Import, Export of Hazardous Micro-organisms, Genetically Engineered Organisms or Cells.

- The Chemical Accidence (Emergency Planning Preparedness and Response) Rules, 1996.
- The Bio-medical Waste (Management and Handling) Rules, 1998.
- The Municipal Solid Waste (Management and Handling) Rules, 2000.
- The Recycled Plastic Manufacture & Uses Rules, 1999.
- The Noise Pollution (Regulation & Control), Rules, 2000.
- The Batteries (Management & Handling) Rules, 2001.

- The Ozone Depleting Substances (Regulation & Control) Rules, 2000.
- Public Liability Insurance Act, 1991.
- Public Liability Insurance Rules, 1991.
- National Environment Tribunal Act, 1995.
- National Environment Appellate Authority Act, 1997.
- National Environment Appellate Authority (Appeal) Rules, 1997.

Forest and Wildlife Statutes

- National Forest Policy, 1988.
- Indian Forest Act, 1927.
- Forest Conservation Act, 1980.
- Forest Conservation Rules, 2003.
- Wildlife Protection Act, 1972.
- Wildlife Stock Declarations Rules, 2003.

Environmental Treaties / Agreements / Conventions

The Kyoto Protocol

An international treaty, which extends the 1992 United Nations Framework Convention on Climate Change (UNFCCC) that commits State Parties to reduce greenhouse gases emissions, based on the premise that (a) global warming exists and (b) man-made CO_2 emissions have caused it. The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005. There are currently 192 Parties to the Protocol.



General Assembly resolution 44/228 of 22 December 1989, United Nations Conference on Environment and Development

Agenda 21 addresses the pressing problems of today and also aims at preparing the world for the challenges of the next century. It reflects a global consensus and political commitment at the highest level on development and environment cooperation. Its successful implementation is first and foremost the responsibility of Governments.

Millennium Development Goals (MDGs)

MDGs are eight international development goals that were established following the Millennium Summit of the United Nations in 2000, following the adoption of the United Nations Millennium Declaration.

- 1. To eradicate extreme poverty and hunger
- 2. To achieve universal primary education
- 3. To promote gender equality and empower women
- 4. To reduce child mortality
- 5. To improve maternal health
- 6. To combat HIV/AIDS, malaria, and other diseases
- 7. To ensure environmental sustainability
- 8. To develop a global partnership for development



The Bali Action Plan (COP 13/2007) calls for: "Policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries"

Mitigation Options	Objective	Policy Instrument	Activities
Reducing GHG Emissions	Reducing Deforestation	REDD (first D)	Maintain existing forests through governance reforms, tenure reforms, payments for environmental services
	Reducing Degradation	REDD (second D)	
Increasing Sequestration	Enhancing existing forests/Increasing forest cover	REDD "Plus"	Conservation + Enhancement of existing carbon stocks
	Creating new forests	CDM Afforestation/ Reforestation	Includes Agroforestry and plantations

National Green Tribunal

The National Green Tribunal has been established on 18.10.2010 under the National Green Tribunal Act 2010 for effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental thereto. It is a specialized body equipped with the necessary expertise to handle environmental disputes involving multidisciplinary issues. The Tribunal shall not be bound by the procedure laid down under the Code of Civil Procedure, 1908, but shall be guided by principles of natural justice.

National Green Tribunal

The Tribunal's dedicated jurisdiction in environmental matters shall provide speedy environmental justice and help reduce the burden of litigation in the higher courts. The Tribunal is mandated to make and endeavour for disposal of applications or appeals finally within 6 months of filing of the same. Initially, the NGT is proposed to be set up at five places of sittings and will follow circuit procedure for making itself more accessible. New Delhi is the Principal Place of Sitting of the Tribunal and Bhopal, Pune, Kolkata and Chennai shall be the other 4 places of sitting of the Tribunal.



The Hon'ble Supreme Court on 10th July 2009 issued orders that there will be a **Compensatory Afforestation Fund** Management and Planning Authority (CAMPA) as National Advisory Council under the chairmanship of the Union Minister of Environment & Forests for monitoring, technical assistance and evaluation of compensatory afforestation activities.

Sustainability Practices Examples

Convergence of SDGs with

- Ecotourism
- Bamboo based Development
- Green Highways Program

Ecotourism for Sustainable Development



Ecotourism has been recognised globally as tool for sustainable development. There are over 36 recognised definition for Ecotourism which are based on three core principles

- Conservation Conservation of natural and cultural resources of the tourism destination
- Conservation Education Awareness generation amongst tourists and local communities towards the pristine ecological and cultural assets.
- Community Participation Making local communities not only beneficiary but business partner.

Ecotourism Defined

• The International Union for the Conservation of Nature (IUCN) has adopted the definition of 'ecotourism' as given by *Ceballos-Lascurain (1996)*

"environmentally-responsible travel and visitation to relatively undisturbed natural areas, to enjoy, study and appreciate nature (and accompanying cultural features, both past and present), that promotes conservation, has lower visitor impact, and provides for beneficially active socio- economic involvement of local populations."

Ecotourism included in 12th Five Year Plan with this definition









Principles of Ecotourism:

Minimize impact.

- Build environmental and cultural awareness and respect.
- Provide positive experiences for both visitors and hosts.
- Provide direct financial benefits for conservation.
- Provide financial benefits and empowerment for local people.
- Raise sensitivity to host countries' political, environmental, and social climate.

www.ecotourism.org

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Ecotourism & Sustainable Development Goals

THE GLOBAL GOALS

For Sustainable Development



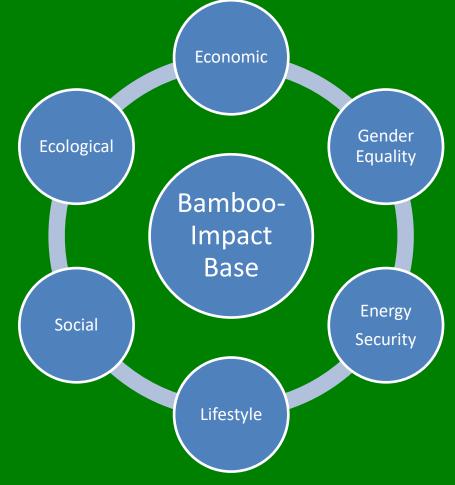
Convergence of Ecotourism with SDGs

- Helps in reverse migration and reduced inequality (Young educated population of villages who were moving towards cities now find employment option thro' ecotourism)
- Employment Generation: Ensure economic well being of local villages (Ecotourism not only generates direct employment opportunities but various indirect jobs are also created dairy products, vegetables, groceries are procured from local vendors)
- Locals develops an understanding that they could earn higher from non-consumptive use of forest (Ecotourism) as compared to consumptive use of forest
- Locals become ambassadors of conservation & education thereby aiding in ecological security of tourist destinations.

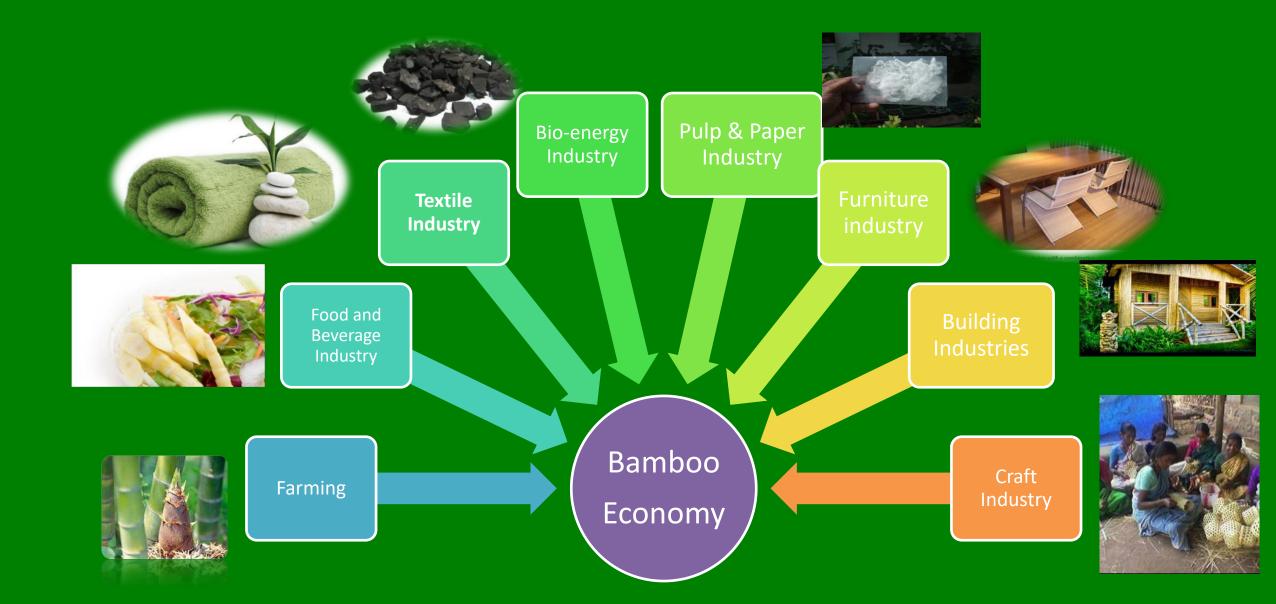
UN resolution for transforming world by 2030, through concerted efforts for achieving Sustainable Development Goals, specifically **SDG** no. 1 (No Poverty), 8 (Decent Work & Economic Growth), 9 (Industry, Innovation & Infrastructure), 10 (Reduced Inequality), 11 (Sustainable Cities & Communities), 13 (Climate Action) & 15 (Life on Land).

Convergence of Bamboo with SDGs





Bamboo based Economy



Role of Bamboo in sustainable development

- Shelter security, through the provision of safe, secure, durable and affordable housing and community buildings.
- Livelihood security, through the generation of employment in planting, primary and secondary processing, construction, value-added products.
- Ecological security, by conservation of forests through timber substitution, as an efficient carbon sink, and as an alternative to non-biodegradable and high-embodied energy materials.
- Food security through bamboo-based agro-forestry systems, by maintaining the fertility of adjoining agricultural lands, and as a direct food source
- Energy Security as an alternative clean fuel; ethanol and bamboo pellets.

UN resolution for transforming world by 2030, through concerted efforts for achieving Sustainable Development Goals, specifically SDG no. 1 (No Poverty), 2 (Zero Hunger), 7 (Affordable & Clean Energy), 8 (Decent Work & Economic Growth), 9 (Industry, Innovation & Infrastructure), 11 (Sustainable Cities 8 Communities) & 13 (Climate Action).

Bamboo based Sustainable Development in MP

(Win-Win Situation)

Extensive Bamboo Resource	 18167 Sq Km Bamboo cover Only 33% under Active Management of FD Potential Production - 4 lakh Ton (Present - 25%)
Skilled Human Resource	 Strong Base - More than 20000 skilled Bamboo Artisans are available Artisans have been rated and ranked through NID & SPA. The process can continue
Strong Technical Support	 13 Bamboo CFCs in place (IPIRTI had agreed to convert these to state of art centres) These can be converted in theme-based Bamboo Centres for Excellence INBAR ToT model can be replicated
Huge Niche Market	 Tourism Department (Furniture / Souvenir) Schools (Furniture) Bamboo Housing / Bamboo Timber / Bamboo Textiles Treated Bamboo Demand (10 lakh bamboo each year - INR 20 Crore)
Actions	 State Bamboo Policy (Draft in place) State Bamboo Development Authority Implementation of INBAR Proposal Bamboo Investors Incentive Strategy Regular Bamboo Investor Summits Annual World Bamboo Summit

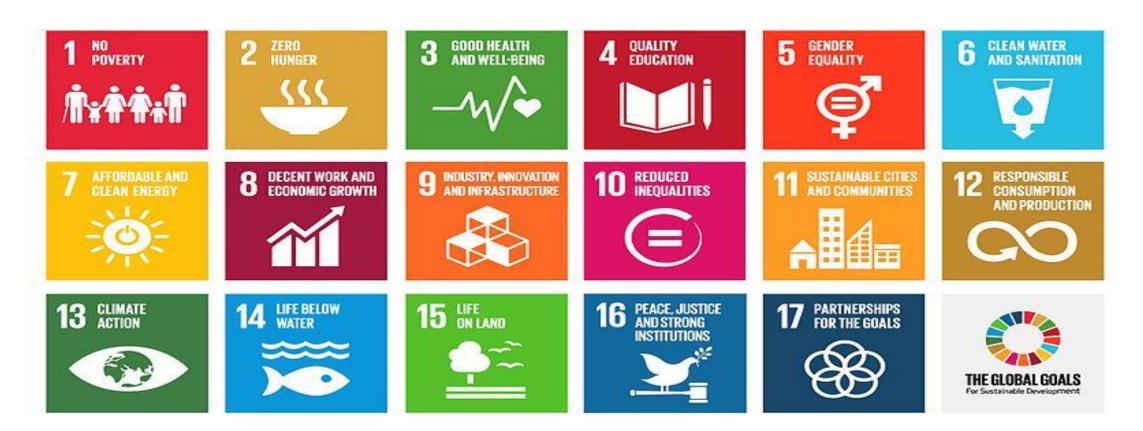
Bamboo based Sustainable Development in MP

Bamboo based Sustainable Development

Madhya Pradesh as the Bamboo Capital of India

Convergence of GHPs with SDGs

THE GLOBAL GOALS For Sustainable Development



Guidelines for Green Highways Projects

Guidelines comprise following components –

- Green Corridor Development Methodology
- Empanelment/ Registration procedure for implementing agencies
- Work Award Process
- Plantation Species Matrix for selection of trees / shrubs species for roadside plantation.
- Monitoring & Payment procedure of Plantation Projects



Sustainable Livelihood – Environment Interface

- NGHM envisions a participatory approach for development of Green Corridors along NHs.
- Plantation and allied activities require large manual workforce, generating livelihoods opportunities for semi / unskilled workers.
- Highways plantations are expected to generate sustained employment opportunity for 1 lakh semi / unskilled workers for minimum 250 days a year in next 10 years.
- Equal amount of self employment / entrepreneurial opportunities in Nursery development, tree guard manufacturing, organic manure, agri-processing sectors etc.



Convergence of GHPs with SDGs

- Employment Generation: 1 lakh employment generation for semi-skilled and unskilled workers thereby aiding in poverty alleviation and economic growth.
- Climate Change Mitigation: Additional annual carbon sink of 2.13 to 2.46 million tons by 2030 thereby reinforcing CoP 21 (NDC) commitments and aiding climate action.
- Sustainable Linear Infrastructure: Institutionalizing Integrated green corridor development and management approach thereby aiding in sustainable infrastructure development in cities.

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Rays of hope

Thank You