

SUSTAINABLE DEVELOPMENT AND GREEN TECHNOLOGY- THE BEST ANSWER TO CLIMATE CHANGE

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➤ INTRODUCTION

Present world is burdened with the need of rapid industrialisation as well as proper environment protection. Industrialisation and anthropogenic intervention has brought in its wake rapid degeneration of the environment by increased pollution, indiscriminate use of natural resources and others. Such indiscriminate use of non-renewable natural resources has led to change in atmospheric composition which is visible in climate change. Climate change has an adverse impact on the economy of the countries especially developing countries. For the mentioned reasons sustainable development is a necessity in present world. The paper's first objective is to explain the necessity of Sustainable Development in recent times to check climate change. There are many ways of sustainable development but the use of green technologies is one of the most effective possible solution. Usage of green technology will lead to Sustainable Development thereby preserving the present climatic conditions from further change. Green technology ensures preservation of the environment as well as it spearheads economic growth.

The effect of the changes in climate is universal, one region gets effected by the pollution of the other region. Sharing and exchanging of green technology is an essential step for preservation of the climate in global basis. A number of Conventions at the International level have been held on Climate Change, Sustainable Development and usage of Green Technology. Several guidelines have been outlined in these Conventions for different countries. India is a member of many of such Conventions, notable among them are - The Kyoto Protocol, The United Nations' Framework Convention on Climate Change (UNFCCC), etc. Steps have been taken by the Indian Government to implement some of the guidelines framed in these legal conventions.

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Modern lifestyle of man has great impact on the composition of the climate of a region. This has led to global warming and climate change²⁸⁷. Various countries of the world are trying to find solution to curb these negative effects. Human needs have to be met along with sustainability of environment. This has led to the need of huge investment in the development of new green technologies to prevent further changes in the environment. Several Conventions, Protocols and Conferences like Kyoto Protocol, UNFCCC, RIO CONFERENCE have been held at the international level but improper implementation prevents reaching the main objectives.

➤ CLIMATE CHANGE AND ITS EFFECTS

The main reason of climate change is global warming (increase in the proportion of green house gases in the atmosphere) caused by a number of factors- the most intensive among them is the anthropogenic sources.

The result of climatic changes is an increase in natural disasters and their intensity like typhoons, cyclones, earthquakes, tsunamis in the world. Little can be done to mitigate it.

Cyclones and earth quakes are increasingly on the rise. After 2006 tsunami which wrecked havoc in some countries of the world the scientists proclaimed to coming up with new technology for preventing such catastrophic disasters. Till date there has been no such relief, moreover one after another cyclones are wreaking havoc in different parts of the world.

The number of cyclones has risen by leaps in 2013. Phailan which struck India in 2013 has caused widespread destruction.

The climate has already altered a lot from that of the previous milenia. People have seen and will continue to see extremes of weather during and after 21st century respectively.

➤ SUSTAINABLE DEVELOPMENT

"We do not inherit the Earth from our ancestors; We borrow it from our children" ²⁸⁸ .

The term was coined in 1987 by the United Nations-appointed World Commission on Environment and Development, also known as the Brundtland Commission--

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

It can also be explained as utilising the available resources in such a way as to maintain the balance of the natural environmental composition. Sustainable development can also be

²⁸⁷ kyoto protocol, 1997 . In 1997, the Kyoto Protocol was concluded which established legally binding obligations for developed countries to reduce their greenhouse gas emissions.

²⁸⁸ Ancient Indian Proverb , Available at www.goodreads.com. Last Accessed November 31, 2013.

achieved if there is optimum use of the natural non-renewable resources. Technology which leads to this concept can also be called as green technology.

➤ GREEN TECHNOLOGY

Green technology is defined as the technology which uses renewable resources and do not have any harmful effects. It can also be defined as sustainable energy generation or clean energy. Not all clean technology leads to sustainable development. Nuclear technology can also be claimed as a clean technology as it does not emit green house gases. It generate huge amount of energy without causing pollution but the negative consequences of nuclear energy is tremendous when struck by unpredicted natural calamity. For example - the recent disaster of nuclear technology due to tsunami at Fukushima, 2011, in Japan²⁸⁹, where the uranium pollution, has lead to pollution of water, land and surroundings thereby killing a number of animals and fish creating an imbalance in the food chain which led to further deaths.

By Green Technology in we mean those technology which are environment friendly, makes optimal utilisation of available resources , without any side effects on the environment. Energy is essential for the development of any economy which cannot be limited. Crops production cannot be reduced because it emits huge quantities of green house gases. Green technology can enable the people to lead a comfortable and luxurious life as well as not compromise on it.

Green technology makes survival possible even in drastic conditions.

➤ INITIATIVES BY COUNTRIES TO HELP FELLOW COUNTRIES

Japan is trying to help Africa in adopting green technologies and respond to climate change effects.²⁹⁰ Japan has taken lot of initiatives to protect the environment. Japan has developed the joint credit mechanism (JCM) to mitigate climate change and help developing countries achieve low-carbon growth by mobilising technology and finance. Japan is also pushing for widespread use of advanced low-carbon technologies and products in various fields. After

²⁸⁹ Weisenthal, Joe (11 March 2011). "Japan Declares Nuclear Emergency, As Cooling System Fails At Power Plant". Business Insider. March 11, 2011

²⁹⁰ Supra 34

Mongolia signed a bilateral pact with Japan to implement JCM in capital Ulan Bator, Bangladesh, Ethiopia, Kenya, Maldives, Vietnam and Laos have followed.²⁹¹

Mongolia, one of the world's top 10 countries with the worst air quality, has adopted Filipino technology to reduce pollution in urban centres. Eco-G NanoTechnology (Philippines) and Erdene & Gochioco LLC Company (Mongolia) had signed an memorandum of agreement to avert the life-threatening conditions due to fuel emissions²⁹². Philippines has invented and shared many clean technologies.

➤ RECENT GREEN TECHNOLOGIES

The transition to green economy have to take place within a specific limited time period Governments will have to assume a much more central role in the acceleration of technological innovation and diffusion, which is unlikely to occur if they are left to market forces alone. Strong technology policies is required for proper circulation²⁹³

According to Bloomberg rankings United States , South Korea, Germany are the first three innovative countries in the world.²⁹⁴ Though these countries make more innovation than other countries but their diffusion rate is slow.

Some of the recent green technologies are as follows:-

Swedish tech company Orbital Systems developed the OrbSys shower (claims to save up to 90 percent of the soapy water through a purification process) with NASA's Johnson Space Centre, being inspired by the designs used in space missions. The used water only needs to be reheated slightly, the shower saves up to 80 percent in energy²⁹⁵

Japan has developed White Goat which converts normal paper into toilet paper²⁹⁶

Swedish Company Volvo is designing a new technology in collaboration with other European tech companies at Imperial College which will eliminate battery use by using a car's body

²⁹¹ Mizuno Yuji, Made in Japan: the new tool to mitigate climate change Tokyo Guardian Professional, Thursday 3 October 2013 . Available at www.theguardian.com. Last Accessed- December 15, 2013.

²⁹² Filipino invention to help Mongolians breathe free, November 12, 2012 <http://english.news.mn/content/>

²⁹³ UNESCO, Zukang Sha, UN Under-Secretary-General for Economic and Social Affairs and Secretary-General of the UN Conference on Sustainable Development (Rio+20) Challenges Of A Green Economy And Green Societies: Attitudes, Policies, Governance ,UNESCO Future Forum 24 May 2011

²⁹⁴ By Bloomberg Rankings - Feb 1, 2013 <http://www.bloomberg.com/slideshow/2013-02-01/50-most-innovative-countries.html#slide49>

²⁹⁵ orbital-systems.com

²⁹⁶ White Goat, www.techeblog.com Last Accessed- 4 January 2014

panels as a source of power. It can eliminate the need for the battery used in start or stop engine technology. Another innovative Volvo technology is "I-See" software which cuts fuel consumption in trucks, basically by running them on auto-pilot. The company is considered one of the three sustainable brands by Swedish people²⁹⁷.

Smart Wheel, a pedal assist that fits into any bicycle frame, encases an ultra-thin electric motor and intelligent electronics within a robust housing, neatly fitted onto the spokes of a bicycle rim. It helps to use the bike more efficiently and comfortably and saves time by getting to our destination faster without losing breath or breaking a sweat. This inspires the working people to go to their workplace through no-pollution cycle.²⁹⁸

Their eco-friendly Ecovative mushroom, which won the Buckminster Fuller Challenge developed by college buddies Eben Bayer and Gavin McIntyre in New York could replace existing plastic foams with a substitute derived from fungi for applications in furniture, building insulation, and even footwear or surfboards.²⁹⁹

The Solara, a giant solar plane developed by Titan Airspace can remain suspended in air for a period of 5 years. It acts slightly like a satellite and is expected to replace some satellites in future.³⁰⁰

➤ LAWS IN INDIA

Small steps lead to success. In India a number of laws has been made for using pollution free technologies. Defaulters of these laws is met with huge amount of punishments. India has shown signs of more proactive engagement on climate change issues both internationally and at home³⁰¹.

²⁹⁷ Green Technology Spotlight: Electric Cars Without the Battery SustainableBusiness.com News, October 18, 2013.

²⁹⁸ Available at www.kickstarter.com. Last accessed January 11, 2014.

²⁹⁹ challenge. bfi.org. Last Accessed January 13, 2014.

³⁰⁰ Richard Michael Graham ,Giant solar plane could stay airborne for 5 years, replace some satellites, August 26, 2013, Available at www.treehunger.com ..

³⁰¹ Environment Minister, Jairam Ramesh,

Protection of Environment is a constitution mandate in India. Several provisions like Article 21, Article 48A³⁰² and Article 51A(g)³⁰³ has been incorporated in the constitution. Environment includes plants, animals, land, soil, rocks, climate in brief nature's bounty. The state is made the trustee for the protection of the environment and climate is a part of the environment of a country.

In *T. Damodhar Rao v. Municipal Corporation Hyderabad*³⁰⁴, the court has held that the enjoyment of life and its attainment is guaranteed by Art. 21 of the Constitution. Protection and preservation of nature's gift is essential for life's enjoyment. Environmental management requires a strong legal framework to regulate the sources responsible for causing pollution.

Several laws have been made for the preservation of the environment which includes

The Air (Prevention and Control of Pollution) Act, 1981 (Amended in 1987) was passed under Article 253 of the Constitution of India and in pursuance of decisions of Stockholm Conference. The objective of Air (Prevention and Control of Pollution) Act, 1981 is to provide for the prevention, control, and abatement of air pollution³⁰⁵. The Central Pollution Control Board keeps a vigilant watch over this aspect.

It is mandatory for persons carrying on an industry, operation, etc., not to allow emission or discharge of environmental pollutants over and above the limits stipulated by the relevant standards. Indian government has punitive punishments for the defaulters.

"The Precautionary Principle" and "The Polluter Pays" principle are essential features of "Sustainable Development".

³⁰² Protection and improvement of environment and safeguarding of forests and wild life. - The State shall endeavour to protect and improve the environment and to safeguard the forests and wild life of the country.

³⁰³ To protect and improve the natural environment including forests, lakes, rivers and wild life, and to have compassion for living creatures.

³⁰⁴ (AIR 1987 AP 172)

³⁰⁵ Myneni S. R., p 690-718, Direct Regulation by Government - Command and Control Instrument, Environmental Studies, Edition 2008

The Ozone Depleting Substances Rules 2000³⁰⁶ prohibits new investments with ozone depleting substances³⁰⁷, regulation of sale, purchase, use, control of production³⁰⁸ and consumption of ozone depleting substances³⁰⁹.

In Indian Council for *Enviro-Legal Action v. Union Of India & Ors*³¹⁰ the polluters pay principle was developed. The Supreme Court held that "The Polluter Pays Principle³¹¹ means that absolute liability of harm to the environment extends not only to compensate the victims of pollution, but also to the cost of restoring environmental degradation. Remediation of damaged environment is part of the process of sustainable development."³¹² This is a part of the process of "Sustainable Development"

This principle has been followed in several other cases like *Addl. Distt. Magistrate Jabalpur v. Shivakant Shukla*³¹³, *Vellore Citizens case*³¹⁴ and Jolly George Varghese's case. In *M.C.Mehta v. Union Of India*³¹⁵, SC after referring to *Enviro-Legal Action Case* directed the tanneries not to discharge effluents without treatment to relocate and pay compensation for the loss of ecology environment of the affected areas and the suffering of the residents.

India has taken several measures for the implementation of the policies taken in the mentioned international conventions to reduce greenhouse gases. Two missions which works towards energy efficiency - the Jawaharlal Nehru National Solar Mission (increasing solar energy sources) and the National Mission on Sustainable Habitat (NATCOM - 1)(increasing efficiency in the residential and commercial sectors)³¹⁶. India is also encouraging organic agriculture over synthetic agriculture to reduce greenhouse gas emission caused due to agricultural activities.

In India bio-fuel in the form of Jatropha Cultivation has been a boon. These plants can grow in ant terrain are not eaten by grazing cattle and they produce fuel. Example- In huge tracts of

³⁰⁶ Leelakrishnan P., p 197- 214, Environmental Law in India, LexisNexis Butterworths Wadhwa, Third Edition-2008

³⁰⁷ r 2 (d) of 2000 Rules

³⁰⁸ r3(1) No person shall produce or cause to produce any ozone depleting substance after the date specified in column (5) of Schedule V, unless he is registered with the authority specified in column 4 of that Schedule

³⁰⁹ r 2(i) of 2000 Ozone

³¹⁰ AIR1996 SC1446

³¹¹ Dhirajlal and Ratanlal, p 385-450, The Law of Torts, 2011

³¹² Id

³¹³ 1976 2 SCC 571

³¹⁴ Vellore Citizen Welfare Forum v. Union Of India 1996 5 SCC 647

³¹⁵ AIR 1988 SC1037

³¹⁶ [www.devalat.org/knowledgebase/pdf/ CDM](http://www.devalat.org/knowledgebase/pdf/CDM)

waste lands in Kharagpur, West Bengal, Jatropha cultivation is carried on. The government is deciding to use the oil produced to bio-fuel. Usage of waste land for bio-fuel production is positively productive.

But the destruction of forests and grassland for growing bio-fuel has negative effect.³¹⁷

According to recent Supreme Court order, National Environmental Appraisal and Monitoring Authority will be created before March 31, 2014. The industry would be queuing up before a new autonomous agency to seek environment clearances under the Environment Protection Act, 1986³¹⁸

➤ **SUGGESTIONS**

- The developed countries should take more initiative in innovating green technology and disperse them without charging a huge price to other countries. Technology transfer should be done through international Co-operation.
- The countries of the world should implement the decisions taken in the Conventions like IPCC, UNFCCC, Rio 20. The United Nation should make a separate body to look into such affairs and the violator should be punished with a huge penalty as punitive punishment.
- Though a developing country like India has several laws like Green certificate for environment friendly industries and others, it should make stricter laws to curb environment pollution and monitor and regularize the use of non-renewable resources. It must strive to use green appliances in all aspects of life, like green buildings, cars running on solar energy, long route transportation and others.
- Every country should make strict laws for the punishment of the violators of the international and national policies taken for mitigating climatic changes thereby preserving the environment.

³¹⁷ Bullis Kevin ,A new study fuels the debate over the impact of growing crops for fuel. May 20, 2011 www.technologyreview.com

³¹⁸ Supreme Court breathes life into environment regulator proposal, January 7, 2014, The Times Of India

- World Community must prefer green products over conventional products even if it is expensive, but at the same time strive to come up with inexpensive means and cost-efficient samples of such green products
- The maximum utilisation of available resources of energy should be used. India can become one of the most successful producer of solar and hydroelectricity. For this purpose the developed countries must help countries like India, with funds and technology for developing new technology based on the traditional tribal knowledge already available. They should provide such countries with the medium to harness such energy.

➤ CONCLUSION

Many international conventions, summits has been organised to finance, mitigate and adapt climatic and environmental changes, but unfortunately these have not been properly implemented. The apathy of the greatest polluters of the world towards this growing concern is palpable.

It is the moral and ethical responsibility of the people to protect their planet from all life threatening substances. Not only is it the question of the healthy livelihood of our present generations, it is also one of the most important factors of our coming generations, and for them to lead healthier and greener lives and for a pollution free world which is disease free.

Governmental Colonialism has ended but the shadows of it still persists in the present world. In order to keep themselves as superpowers the developed countries is toying with the conditions of less fortunate countries to maintain their superiority at the cost of environment and climate. Though the developed countries are showing that they seem to be concerned about the deterioration in environment, but in actuality they seem to be far bothered about the growth of their own. This can be understood from the increasing number of patents which they are applying for the clean technologies at the cost of depriving the same towards the countries that cannot afford to.

Green Economy can improve health, poverty conditions, employment along with no harmful side effects on the environment. Therefore it is a moral obligation of the government of these far advanced countries to make policies for preventing environmental pollution, which not only

will help them live a cleaner and better life but will also be like a beacon of light for the rest of the world, who would follow such an example and move towards a greener tomorrow.

