I

GREEN ECONOMY ACROSS THE COUNTRIES IN THE WORLD IN RESOURCE EFFICIENCY PERSPECTIVE

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Abstract: The concept of green economy is being discussed in recent decade for achieving sustainability in inclusive growth and development of respective area or countries of the World. A key moment of green economy and green growth was published in a report of 'Limits to Growth' by the Club of Rome in 1972. In the recent years, discussion around sustainability has become a key element of the global agenda and plan. This is because the newest and current scientific studies with our direct experiences of environmental damage and climate change are making it clear the present economic development model needs to change. Therefore, UN General Assembly decided to hold a summit in Rio de Janeiro in 2012 to celebrate the 20th anniversary of the first Rio Earth Summit in 1992. The main theme of this conference was "Green economy in the context of Sustainable Development and Poverty Eradication". But after introducing the concept of green economy at the national level to accounting of green growth for sustainable development then we need to find out the actual performance of particular country for the comparative and analytical study of green economy across the countries in the world. Theretofore, we should study the state of the green economy across the countries of the World for better understanding the results of implementation of the green economy model for sustainable development of the economy. UNEP (United Nations Environment Program) defines a green economy as one that results in "Improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities" (UNEP, 2011, p. 16). In its simplest saying, a green economy is low-carbon, resource efficient and socially inclusive economy. The key aim for a transition to a green economy is to enable economic growth and investment while increasing environmental quality and social inclusiveness. The linkages between the concept of green economy and sustainable development are; in 2009, the UN General Assembly decided to hold a summit in Rio de Janeiro in 2012 to celebrate the 20th anniversary of the first Rio Earth Summit in 1992. Two of the agenda items for Rio+20 are, "Green Economy in the context of Sustainable Development and Poverty Eradication," and "International Framework for Sustainable Development". The study concludes that on the front of export of agricultural raw materials both the developed and developing countries have failed with a few exceptions in resource efficiency as well as realizing green economy. Developed countries have succeeded a lot in enhancing energy consumption and resource use which will enable them to move towards green economy than the developing countries.

Key Words: Green Economy, Sustainable Development, Indicators, Economic,Transformation, Resource Efficiency, Improvement in Human Wellbeing.

I) Introduction: The concept of green economy is being discussed in recent decade for achieving sustainability in inclusive growth and development of respective area or countries of the World. Therefore, the idea of a more sustainable economy has been talked about in recent years. A key moment of green economy and green growth was published in a report of 'Limits to Growth' by the Club of Rome in 1972. In the recent years, discussion around sustainability has become a key element of the global agenda and plan. This is because the newest and current scientific studies with our direct experiences of environmental damage and climate change are making it clear the present economic development model needs to change. Therefore, UN General Assembly decided to hold a summit in Rio de Janeiro in 2012 to celebrate the 20th anniversary of the first Rio Earth Summit in 1992. The main theme of this conference was "Green economy in the context of Sustainable Development and Poverty Eradication**".** But after introducing the concept of green economy at the national level to accounting of green growth for sustainable development then we need to find out the actual performance of particular country for the comparative and analytical study of green economy across the countries in the world. Theretofore, we should study the state of the green economy across the countries of the World for better understanding the results of implementation of the green economy model for sustainable development of the economy. UNEP (United Nations Environment Program) defines a green economy as one that results in "Improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities" (UNEP, 2011, p. 16). In its simplest saying, a green economy is low-carbon, resource efficient and socially inclusive economy. In a green economy, growth in income and employment are driven by public and private investment that reduce carbon emission and pollution, enhance energy and resource efficiency and prevent the loss of biodiversity and ecosystem services. These investments need to be catalyzed and supported by targeted public expenditure, policy reforms and regulation changes; the development path should maintain, enhance and wherever necessary, rebuild natural capital as a critical economic asset and as a source of public benefits. This is especially important for the poor people whose livelihoods and security depends on the nature. The key aim for a transition to a green economy is to enable economic growth and investment while increasing environmental quality and social inclusiveness. Critical to attaining such an objective is to create the conditions for public and private investment to incorporate broader environmental and social criteria. In addition, the main indicators of economic performance, such as growth in Gross Domestic Product (GDP) need to be adjusted to account for pollution, resource depletion, decline in ecosystem services, and the distributional consequences of natural capital loss to the poor.

The linkages between the concept of green economy and sustainable development are; in 2009, the UN General Assembly decided to hold a summit in Rio de Janeiro in 2012 to celebrate the 20th anniversary of the first Rio Earth Summit in 1992. Two of the agenda items for Rio+20 are, "Green Economy in the context of Sustainable Development and Poverty Eradication," and "International Framework for Sustainable Development". With the green economy firmly established on the international policy agenda, it is useful to review and clarify the linkages between a green economy and sustainable development (Drexhage, John and Murphy, Deborah,

2010, P.17). Most interpretations of sustainability take as their starting point of the consensus reached by the World Commission on Environment and Development (WCED) in 1987, which defined sustainable development as "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987). In 2009, the United Nations General Assembly decided to hold a summit in Rio de Janeiro in 2012 to celebrate the twenty anniversary of the 1st Rio Earth Summit in 1992. Two of the agenda items for Rio+20 are, "Green Economy in the Context of Sustainable Development and Poverty Eradication", and "International Framework for Sustainable Development". With the green economy now firmly established on the international policy agenda, it is useful to review and clarify the linkages between a green economy and sustainable development. Most interpretations of sustainability take as their starting point of the consensus reached by the World Commission on Environment and Development (WCED) in 1987, which defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). Economists are generally comfortable with this broad interpretation of sustainability, as it is easily translatable into economic terms: an increase in well-being today should not result in reducing well-being tomorrow. That is, future generations should be entitled to at least the same level of economic opportunities – and thus at least the same level of economic welfare – as is available to current generations. As a result, economic development today must ensure that future generations are left no worse off than current generations. According to this view, it is the total stock of capital employed by the economic system, including natural capital, which determines the full range of economic opportunities, and thus well-being, available to both current and future generations. Society must decide how best to use its total capital stock today to increase current economic activities and welfare. Society must also decide how much it needs to save or accumulate for tomorrow, and ultimately, for the well-being of future generations (UNEP, 2011. p.17). It is against this over all background, the present research study intends to examine the nature and extent of green economy attempted and realized by the selected developed and developing countries of the World in resource efficiency perspective, coupled with emphasis on India for the latest study period.

II) REVIEW OF RESEARCH STUDIES:

A review of some of the important research studies relating to the present topic of the research is as follows.

Alfsen, Knut. H. and Greaker, Mads (2007) in their study talk about Norwegian experiences of exploitation of forests and fish has been important sources of income, petroleum resource has contributed significantly to the industrialization of Norway. Pollution levels in the air, water and soil became steadily rising. This study summarises the information contained in natural resources and environmental accounts into a single aggregate measure like "green GDP." The conclusion of the study is , need of that type of development which supports to the green growth. Henderson, Hazel (2007) in his research study has addressed the current economic models, driving today's unsustainable forms of globalization. Also, he exhibits need of technological

innovation to shift from fossil fuels to renewable energy, recycling and redesign industrial processes. In this study, he has discussed about important of MDG (Millennium Development Goals) for easily accessing sustainable development. Temper, Leah and Alier, Joan Martinez (2007) in their study have described the global environmental problem and related Environmental Kuznets Curve (EKC). According to this study, at early stages of economic growth and industrialization, environmental degradation gets worse, but after a certain level of income per capita is reached, the economy reaches a magical point where the trend reverses and environmental quality improves. Also, they have been discussing about the mining Industries occupation in Orissa. Goossens, Yanne (2008) in his policy research study endeavor to calculate the economic performance through gross domestic product, a variable that has conjointly become the offender universal metric for 'standards of living'. However, gross domestic product doesn't properly account for social and environmental prices and advantages. This study highlights the benefits and some of the shortcomings of GDP. It can continue to be used for reform assessments and particular questions of economic policy. Muradov, Nazim. Z and Veziroglu, Nejat. T (2008) in their study emphasize the role of carbon-neutral technologies and fuels during the transition period. The authors analyse a scenario for the transition from current fossil-based hydrogen economy that includes two key elements 1) Changing the fossil decarbonization strategy from one based on CO2 Sequestration to one that involves sequestration or utilization of solid carbon and 2) producing carbon-neutral synthetic fuels from bio-carbon and hydrogen generated from water using carbon free sources like nuclear, solar, wind and geothermal. Kelkar, Vijay (2009) in his study had depicted the importance of new natural gas policy for India. He told that India wants to introduce a long term energy policy for accelerating growth as well as for promoting economic security. Also, gives the deserves of gas, compared to rock oil product, gas burns cleanly and with efficiency in any fuel application. This can be amply borne out by the very fact that once the metros started victimization compressed gas in office of gasoline or diesel in transport vehicles, there was a big reduction in pollution. Little, Angela. W and Green, Andy (2009) in their study examine the role of education in 'Successful Globalization' and how this links to agendas for sustainable development. The study is divided in two parts. First, they present the essence of their argument about successful globalization through a brief conceptual analysis on globalization, development and education followed by case study of countries and regions of Japan, South Korea, Taiwan, China, India, Kenya and Srilanka. Second, they address the parallel discourse on sustainable development and education for sustainable development. Bhattachary, Prodyut; Pradhan, Lolita and Yadav, Ganesh (2010) in their study depicted the history and importance of joint forest management. The study results show that, 20-54% household income of local communities is derived from gathering forest products and wage income. The study concludes that JFM is a positive step towards decentralized government and forest management, with the potential of empowering the community and increasing the livelihood security of the impoverished forest dependent communities. Habert, G; Bouzidi, Y; Chen, C and Jullien, A (2010) in their study discuss about sustainability of buildings and construction sector, which represents a large part of human industrial activities, because a

concrete is the main manufactured product sold world-wide. The authors argue that indicators commonly used to assess resource consumption in the life cycle impact assessment (LCIA) are not fully adapted to the particular sector of the concrete industry. The writers propose a new method to calculate resource consumption impacts that uses a new assessment of the stock of resources. Mallah, Subhash and Bansal, N. K (2010) in their research study present the trends of electrical energy supply and demand are not sustainable because of the huge gap between demand and supply in the foreseeable future in India. According to this study, the path towards sustainability is exploitation of energy conservation and aggressive use of renewable energy systems. Potential of renewable energy technologies which will be effectively controlled would rely upon future technology developments and breakthrough in value reduction.

The foregoing review of some of the research studies relating to research topic reveals that, there are some researches studies on the present research topic have been carried out. But these are very small so far as their scope is concerned. Hence there is an urgent need to undertake a large and depth in scope research study on the topic green economy for sustainable development. We did not find a single study that examines the strategy of the green economy within the framework of its areas and indicators. Such type of study is totally lacking in the context of the developed and developing countries and the country like India. Besides this, it is also exclusively missing the international comparison relating to green economy for realising sustainable development. It is therefore the present research topic has been selected for the present research study. It will be a unique and important contribution to the research in environmental economics and will be helpful for policy formulation and implementation as well.

III) RESEARCH METHODOLOGY:

The major objectives of the present research study are;

To study the theoretical issues relating to a green economy and sustainable development;

To examine the state of green economy in the developed and developing countries of the world in resource efficiency approach;

To examine the nature and extent of green economy achieved by India;

To carry out a comparative analysis of the green economy attained by the developed countries and developing countries of the world;

The hypothesis of the present research study is as follows:

1) Developed countries are not rigorous and sincere in attaining green economy than the developing countries of the World.

The present research is analytical in nature and a comparative type of research study. It depends on the time series secondary data provided by the World Bank (National Development Indicators). It also considers the appropriate indicators of environmental, human well-being and social equity relating to a green economy of India. These indicators also bring about a comparative analysis with reference to the selected five developed and five developing countries of the world. This research study examines the international strategy / concept of "Green Economy" useful for attaining sustainable development. For this, it has selected ten countries by adopting purposive sampling method from the World for the comparative analysis of a green

economy within selected appropriate green economy indicators considering the availability of the statistical data. There are two groups of the selected countries, namely developing and developed. First five countries from developed group of countries have been selected for the study, these are; Australia (AUS), Germany (DEU), Netherland (NLD), Norway (NOR) and United States (USA). Five countries from the developing group of countries have been selected for the study, are; Bangladesh (BGD), China (CHN), Mexico (MEX), Pakistan (PAK) and South Africa (ZAF). Besides these, the thorough study of India also has been undertaken as our home country. Thus, our total sample size of the study comprises of in all eleven countries from the World.

This research study considers three principal areas of a green economy with focus on one i.e. resource efficiency, for sustainable development and their indicators and the key challenges to developing a framework for metrics for a green economy. The metrics framework of a green economy given by the UNEP with identified one of the three principal areas and the number of indicators of a green economy, within the area is given below. A green economy is first and foremost about transforming the way economies grow currently. Growth is typically generated from investments in high emission, heavily polluting, waste generating, resource intensive and ecosystem damaging activities. A green economy requires investment to shift towards low carbon, clean energy, waste minimizing, resource efficient and ecosystem enhancing activities. The key **Indicators of economic transformation, Resource Efficiency, Progress and Well-being** have been analysed by this study to realize green economy and thereby sustainable development.

This analytical research study wholly depends on the secondary data. The necessary and essential secondary data have been collected from World Bank Reports, Government Publications, Reputed Journals and Various Reports, Research papers and articles. The major sources of secondary data are the World Bank, Ministry of Environment and Forest Reports and Websites, UNEP Reports about Green Economy; also the their data sources are OECD, UNDP, and SEEA etc. The secondary data has been collected for the period from 2000 to 2015 relating to developed countries, developing countries and India as well. The important and suitable statistical software's have been used for the data processing and analysis purpose, namely SPSS, Excel, etc. The necessary and appropriate tools have been used for the data analysis, which include, Coefficient of Variation, Simple and Compound Growth Rate, Ratio Analysis, etc. Along with these techniques, for the hypothesis testing purpose the researcher has used "t" test as per the needs requirements and suitability of the method. The period of the present research study is from 2000 to 2015. The data relating to the areas and indicators of a green economy have given by UNEP. In the case of non-availability and inadequate availability of the necessary data, the data relating to nearer and dummy variables as indicators of green economy also have been used. The actual indicators of green economy useful for the present study are;

A) Economic Transformation: Improved Sanitation Facility (% of population with access) , Adjusted savings: natural resources depletion (% of GNI), Total renewable electricity generation (In billion kilowatt hours), Total Co2 emissions from consumption of energy (In million metric

tons), Improved water source (% of population with access). **B) Resource Efficiency:** Agricultural raw materials exports (% of merchandise exports), Electric power consumption (kWh Per capita), Forest rents (% of GDP), Energy use (kg of oil equivalent per capita), Total natural resources rents (% of GDP). **C) Human Well-being:** GNI per capita growth (annual %), Health expenditure, total (private + public) (% of GDP), The employment to population ratio, 15+, total (%) modeled ILO estimation, Life expectancy at birth, total (years), Household final consumption expenditure per capita growth (Annual %).

IV) RESULTS AND DISCUSSION:

This section of the research study provides the comparative analysis of the data results and discussion relating to the green economy of developing, developed countries and India.

A) INDICATORS OF RESOURCE EFFICIENCY:

Table No.1: Agricultural Raw Materials Exports

Agricultural Raw Materials Exports (% of merchandise exports)												
Sr. No	**YEAR**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
		IND	**Developed Countries**					**Developing Countries**				
			AUS	**DEU**	**NLD**	**NOR**	**USA**	**BGD**	**CHN**	**MEX**	**PAK**	**ZAF**
1	**2000**	1.26	5.65	0.89	2.73	0.69	2.30	1.45	1.09	0.55	2.95	3.38
2	**2001**	1.14	5.89	0.86	2.63	0.71	2.31	0.99	0.86	0.54	1.71	2.63
3	**2002**	1.06	5.36	0.90	2.90	0.76	2.40	1.03	0.78	0.53	1.47	3.01
4	**2003**	1.08	3.66	0.80	3.15	0.71	2.62	0.94	0.64	0.51	1.59	2.73
5	**2004**	1.20	4.32	0.77	3.01	0.61	2.65	1.26	0.54	0.53	1.91	2.22
6	**2005**	1.27	3.46	0.84	2.77	0.49	2.53	1.72	0.52	0.50	1.49	1.98
7	**2006**	1.72	3.06	0.85	2.65	0.48	2.46	1.64	0.48	0.40	1.24	1.76
8	**2007**	1.98	3.05	0.81	2.66	0.48	2.41	3.12	0.46	0.36	1.22	1.71
9	**2008**	1.74	2.06	0.78	2.51	0.42	2.29	1.53	0.43	0.36	1.21	1.75
10	**2009**	1.16	2.00	0.77	2.86	0.51	2.31	1.54	0.45	0.35	1.72	1.92
11	**2010**	2.01	2.24	0.81	2.66	0.51	2.63	1.95	0.46	0.36	1.80	1.77
12	**2011**	1.83	2.88	0.89	3.28	0.51	2.80	1.75	0.53	0.38	2.28	1.91
13	**2012**	1.95	2.92	0.82	2.90	0.52	2.45	2.12	0.46	0.39	2.47	1.77
14	**2013**	2.06	2.90	0.83	2.89	0.60	2.42	2.21	0.44	0.36	1.82	1.90
15	**2014**	1.57	2.58	0.81	2.97	0.70	2.30	2.29	0.45	0.33	1.67	2.03
16	**2015**	2.03	1.61	0.80	2.92	0.50	2.49	2.37	0.30	0.29	1.76	1.46
C.G.R		**4.00**	**-6.00**	**-0.37**	**0.35**	**-2.00**	**0.14**	**5.00**	**-5.00**	**-4.00**	**0.21**	**-4.00**
MEAN		**1.57**	**3.35**	**0.83**	**2.84**	**0.58**	**2.46**	**1.74**	**0.56**	**0.42**	**1.77**	**2.12**
C.V		**25**	**39**	**5.00**	**7.00**	**19**	**6.00**	**34**	**36**	**21**	**26**	**25**

(Source: World Bank staff estimates from the Comtrade database maintained by the United Nations Statistics Division and World development Indicators-last updated: 19/07/2016)

Agriculture sector plays a strategic role in the process of economic development of a

country. It's already done a major contribution to the economic prosperity of advanced countries and its role in the economic development of less developed countries is of greater importance. In India, about 70.6 percent of total labour force depends upon the agriculture. In such a way, agricultural progress is important to supply food for growing non-agricultural labour force, raw materials for industrial production and saving and tax income to support the development of the rest of the economy, to earn foreign exchange and to provide a growing market for domestic manufactures (Economics Discussion, 2016).

Export of agricultural raw materials indicates efficient use of agriculture as a natural resource and helps in materializing green economy. The comparative study of exports of agricultural raw material reveals that the developed countries selected for study, except South Africa the export of agricultural raw materials was lesser and insignificant in smaller proportion only. Australia is dominant developed country exporting in significant quantum (3.35%), which is followed by Netherland (2.84%) and USA (2.46%), South Africa exported agricultural raw materials at the average share of 2.12 percent, followed by Pakistan (1.77%) and India (1.7%). On the front of export of agricultural raw materials both the developed and developing countries have failed with a few exceptions in resource efficiency as well as realizing green economy for sustainable development.

Table No.2: Electric Power Consumption

Electric Power Consumption (kWh per capita)												
S. N	**YEAR**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
		IND	**Developed Countries**					**Developing Countries**				
			AUS	**DEU**	**NLD**	**NOR**	**USA**	**BGD**	**CHN**	**MEX**	**PAK**	**ZAF**
1	**2000**	399 (2%)	10194 (41%)	6635 (27%)	6560 (26%)	24994 (100%)	13671 (55%)	101 (0.4%)	993 (4%)	1700 (7%)	359 (1%)	4681 (19%)
2	**2001**	400 (2%)	10636 (42%)	6763 (26%)	6653 (26%)	25591 (100%)	13047 (51%)	111 (0.4%)	1077 (4%)	1726 (7%)	365 (1%)	4365 (17%)
3	**2002**	417 (2%)	10813 (44%)	6901 (28%)	6694 (27%)	24620 (100%)	13296 (54%)	119 (0.5%)	1195 (5%)	1735 (7%)	372 (2%)	4589 (19%)
4	**2003**	437 (2%)	10435 (45%)	7010 (30%)	6751 (29%)	23201 (100%)	13307 (57%)	125 (0.5%)	1380 (6%)	1701 (7%)	397 (2%)	4618 (20%)
5	**2004**	459	10555	7109	7017	24214	1338	160	1587	1799	417	4645

		(2%)	(44%)	(29%)	(29%)	(100%)	9 (55%)	(0.7%)	(7%)	(7%)	(2%)	(19%)
6	**2005**	477 (2%)	10458 (42%)	7138 (28%)	6988 (28%)	25083 (100%)	13705 (55%)	171 (0.7%)	1784 (7%)	1853 (7%)	451 (2%)	4689 (19%)
7	**2006**	519 (2%)	10490 (44%)	7212 (30%)	7055 (29%)	24100 (100%)	13583 (56%)	192 (0.8%)	2042 (8%)	1865 (8%)	475 (2%)	4771 (20%)
8	**2007**	553 (2%)	10973 (44%)	7229 (29%)	7210 (29%)	24855 (100%)	13657 (55%)	201 (0.8%)	2330 (9%)	1899 (8%)	470 (2%)	4898 (20%)
9	**2008**	574 (2%)	10749 (43%)	7188 (29%)	7226 (29%)	24866 (100%)	13663 (55%)	203 (0.8%)	2458 (10%)	1908 (8%)	434 (2%)	4706 (19%)
10	**2009**	614 (3%)	10792 (45%)	6817 (29%)	6896 (29%)	23860 (100%)	12914 (54%)	221 (0.9%)	2633 (11%)	1870 (8%)	451 (2%)	4465 (19%)
11	**2010**	657 (3%)	10740 (43%)	7264 (29%)	7010 (28%)	24891 (100%)	13394 (54%)	248 (1.0%)	2944 (12%)	1916 (8%)	458 (2%)	4581 (18%)
12	**2011**	713 (3%)	10712 (46%)	7146 (30%)	7036 (30%)	23510 (100%)	13240 (56%)	259 (1.1%)	3298 (14%)	2092 (9%)	450 (2%)	4606 (20%)
13	**2012**	760 (3%)	10398 (44%)	7270 (31%)	6871 (29%)	23658 (100%)	12954 (55%)	280 (1.2%)	3475 (15%)	2032 (9%)	447 (2%)	4405 (19%)
14	**2013**	750 (3%)	10738 (45%)	7316 (31%)	7156 (30%)	23869 (100%)	13232 (55%)	289 (1.2%)	3593 (15%)	2058 (9%)	485 (2%)	4593 (19%)
15	**2014**	780	10756	7354	7189	23791	1321	304	3808	2087	493	4590

		(3%)	(45%)	(31%)	(30%)	(100%)	2 (56%)	(1.3%)	(16%)	(9%)	(2%)	(19%)
16	**2015**	810 (3%)	10774 (45%)	7391 (31%)	7223 (30%)	23712 (100%)	13192 (56%)	319 (1.3%)	4022 (17%)	2116 (9%)	502 (2%)	4587 (19%)
C.G.R		**5.00**	**0.17**	**0.53**	**0.49**	**-0.32**	**-0.15**	**8.00**	**10**	**2.00**	**2.00**	**-0.07**
MEAN		**582**	**10638**	**7109**	**6971**	**24301**	**13341**	**206**	**2414**	**1897**	**439**	**4612**
C.V		**25**	**2.00**	**3.00**	**3.00**	**3.00**	**2.00**	**35**	**42**	**8.00**	**10**	**3.00**

(Source: International Energy Agency (IEA Statistics OECD/IEA, http://www.iea.org/stats/index.asp and World development Indicators-last updated: 19/07/2016)

Electricity is one among the foremost necessary blessings that science has given to human beings. It has also become a part of modern life and one cannot think about a world without it. Electricity has several uses in our day to day life. Modern equipment like computers and robots has also been developed because of electricity. Electricity plays an important role in the fields of medicines and surgery too — like X-ray, ECG. The utilization of electricity is increasing day by day (Lekshmi S, 2010).

Electric power consumption is an indicator of resource efficiency and thereby attaining green economy. The comparative study of electricity consumption reveals that all the developed countries are very much ahead in electricity consumption between 6971 KWh to 24301 KWh than all the developing countries except China, Mexico and South Africa. The electricity consumption in India is 582 KWh meager and lesser only. But it is of greater importance to consider also the type of energy the developed countries are consuming.

Table No.3: Energy Use

Energy Use (kg of oil equivalent per capita)												
S. N	**YEAR**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
		IND	**Developed Countries**					**Developing Countries**				
			AUS	**DEU**	**NLD**	**NOR**	**USA**	**BGD**	**CHN**	**MEX**	**PAK**	**ZAF**
1	**2000**	438 (5%)	5644 (70%)	4092 (51%)	4598 (57%)	5810 (72%)	8057 (100)	138 (2%)	920 (11%)	1394 (17%)	445 (6%)	2483 (31%)
2	**2001**	438 (6%)	5447 (70%)	4208 (54%)	4712 (60%)	5943 (76%)	7828 (100)	148 (2%)	933 (12%)	1409 (18%)	443 (6%)	2503 (32%)
3	**2002**	444 (6%)	5570 (71%)	4106 (52%)	4688 (60%)	5489 (70%)	7843 (100)	149 (2%)	979 (12%)	1398 (18%)	439 (6%)	2415 (31%)

4	**2003**	448 (6%)	5569 (71%)	4082 (52%)	4808 (62%)	5919 (76%)	7794 (100)	155 (2%)	1108 (14%)	1451 (19%)	451 (6%)	2546 (33%)
5	**2004**	466 (6%)	5598 (71%)	4112 (52%)	4857 (62%)	5756 (73%)	7882 (100)	155 (2%)	1265 (16%)	1470 (19%)	474 (6%)	2757 (35%)
6	**2005**	479 (6%)	5564 (71%)	4084 (52%)	4803 (61%)	5790 (745)	7846 (100)	159 (2%)	1362 (17%)	1523 (19%)	483 (6%)	2710 (35%)
7	**2006**	498 (6%)	5552 (72%)	4203 (55%)	4700 (61%)	5821 (76%)	7698 (100)	168 (2%)	1479 (19%)	1524 (20%)	493 (6%)	2655 (34%)
8	**2007**	521 (7%)	5693 (73%)	3984 (51%)	4844 (62%)	5850 (75%)	7758 (100)	174 (2%)	1551 (20%)	1546 (20%)	510 (7%)	2811 (36%)
9	**2008**	538 (7%)	5764 (77%)	4035 (54%)	4837 (65%)	6237 (83%)	7488 (100)	180 (2%)	1601 (21%)	1573 (21%)	492 (7%)	2981 (40%)
10	**2009**	585 (8%)	5628 (80%)	3789 (54%)	4729 (67%)	6171 (87%)	7057 (100)	188 (3%)	1717 (24%)	1505 (21%)	490 (7%)	2844 (40%)
11	**2010**	599 (8%)	5560 (78%)	4004 (56%)	5021 (70%)	6621 (92%)	7162 (100)	202 (3%)	1889 (26%)	1495 (21%)	487 (7%)	2809 (39%)
12	**2011**	616 (9%)	5500 (78%)	3801 (54%)	4638 (66%)	5652 (80%)	7029 (100)	207 (3%)	2044 (29%)	1538 (22%)	482 (7%)	2752 (39%)
13	**2012**	637 (9%)	5644 (83%)	3886 (57%)	4690 (69%)	5817 (85%)	6815 (100)	214 (3%)	2143 (31%)	1559 (23%)	479 (7%)	2675 (39%)
14	**2013**	643 (9%)	5592 (81%)	3874 (56%)	4594 (66%)	6487 (94%)	6909 (100)	216 (3%)	2200 (32%)	1492 (22%)	504 (7%)	2896 (42%)
15	**2014**	661 (10%)	5622 (83%)	3826 (56%)	4757 (70%)	6239 (92%)	6804 (100)	222 (3%)	2306 (34%)	1571 (23%)	508 (7%)	2926 (43%)
16	**2015**	679 (10%)	5626 (84%)	3801 (57%)	4758 (71%)	6277 (94%)	6709 (100)	228 (3%)	2411 (36%)	1582 (24%)	512 (8%)	2956 (44%)
C.G.R		**3.00**	**0.07**	**-1.00**	**0.02**	**1.00**	**-1.00**	**4.00**	**7.00**	**1.00**	**1.00**	**1.00**

MEAN	**543**	**5598**	**3993**	**4752**	**5992**	**7417**	**181**	**1619**	**1502**	**481**	**2732**
C.V	**16**	**1.00**	**4.00**	**2.00**	**5.00**	**6.00**	**16**	**31**	**4.00**	**5.00**	**6.00**

(Source: International Energy Agency (IEA Statistics ϑ OECD/IEA, http://www.iea.org/stats/index.asp and World development Indicators-last updated: 19/07/2016)

Governments in several countries are progressively responsive to the urgent need to make better use of the World's energy resources. Improved energy efficiency is often the foremost economic and promptly accessible means that of improving energy security and reducing gas emissions. To support better energy efficiency policy-making and evaluation, the International Energy Agency (IEA) is developing in-depth indicators of energy use, efficiency trends and carbon dioxide emissions (International Energy Agency, 2008. p.9). Energy growth is directly connected to well-being and prosperity across the World. Meeting the growing demand for energy during a safe and environmentally accountable manner is a key challenge. By 2040, population and economic process will drive demand higher; however the World will use energy more efficiently and shift toward lower-carbon fuels (Imperial, 2016). In developing countries, energy demand can grow near 60 percent as five-sixths of the World's population strives to boost their living standards. In developed economies, energy demand can remain basically flat (Imperial, 2016).

Energy is an input necessary for both the production as well as consumption activity. The comparative analysis reveals that developed countries selected for study are very much ahead in energy consumption than the developing countries. Their energy consumption stood between 3993 Kg oil equivalent per capita to 7417. South Africa, China and Mexico developing countries are in good position in energy consumption, but not the better. The position of India is not good at all, which has only 543 Kg oil equivalent per capita energy consumption. Thus developed countries have succeeded a lot in enhancing energy consumption and resource use which will enable them to move towards green economy than the developing countries.

Table No. 4 : Forest Rents

Forest Rents (% of GDP)												
Sr. No	**YEAR**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
		IND	**Developed Countries**					**Developing Countries**				
			AUS	**DEU**	**NLD**	**NOR**	**USA**	**BGD**	**CHN**	**MEX**	**PAK**	**ZAF**
1	**2000**	1.64	0.22	0.09	0.01	0.13	0.14	1.00	0.56	0.18	0.94	0.92
2	**2001**	1.58	0.23	0.07	0.01	0.13	0.12	0.99	0.51	0.17	1.02	0.97
3	**2002**	1.79	0.25	0.08	0.01	0.16	0.14	0.94	0.46	0.17	1.12	1.23
4	**2003**	1.64	0.25	0.08	0.01	0.12	0.14	0.95	0.56	0.18	1.05	1.00
5	**2004**	1.17	0.16	0.07	0.01	0.10	0.12	0.89	0.44	0.16	0.68	0.56
6	**2005**	1.01	0.15	0.07	0.01	0.10	0.12	0.80	0.34	0.14	0.61	0.63
7	**2006**	1.37	0.17	0.09	0.01	0.10	0.13	1.09	0.43	0.17	0.73	0.73
8	**2007**	1.45	0.19	0.11	0.01	0.12	0.14	1.63	0.40	0.18	1.05	0.64

9	**2008**	1.44	0.19	0.09	0.01	0.11	0.15	1.30	0.46	0.19	0.90	0.92
10	**2009**	1.20	0.17	0.07	0.01	0.10	0.11	1.10	0.35	0.20	0.85	0.75
11	**2010**	1.80	0.14	0.09	0.01	0.12	0.11	1.84	0.34	0.34	1.51	0.52
12	**2011**	1.65	0.12	0.08	0.01	0.10	0.11	1.67	0.31	0.24	1.25	0.45
13	**2012**	1.28	0.09	0.08	0.01	0.09	0.10	1.11	0.29	0.24	0.89	0.55
14	**2013**	1.36	0.09	0.08	0.01	0.10	0.10	1.10	0.27	0.23	0.89	0.60
15	**2014**	1.36	0.09	0.08	0.01	0.09	0.10	1.48	0.26	0.26	1.04	0.46
16	**2015**	1.35	0.08	0.08	0.01	0.09	0.10	1.52	0.24	0.27	1.05	0.42
C.G.R		**-1.00**	**-7.00**	**0.18**	**0.00**	**-3.00**	**-2.00**	**3.00**	**-5.00**	**4.00**	**1.00**	**-5.00**
MEAN		**1.44**	**0.16**	**0.08**	**0.01**	**0.11**	**0.12**	**1.21**	**0.39**	**0.21**	**0.97**	**0.71**
C.V		**16**	**36**	**13**	**0.00**	**17**	**14**	**26**	**27**	**25**	**23**	**33**

(Source: Estimates based on sources and methods described in "The Changing Wealth of Nations: Measuring Sustainable Development in the New Millennium"-World Bank, 2011 and World development Indicators-last updated: 19/07/2016)

Forest rent earn from economic activities by human depends upon forest sector. But there's no commonly agreed definition of the forestry sector. Ideally, the sector ought to include all economic activities that principally rely upon the production of goods and services from forests. It may even include economic activities associated with provision of forest services however, although it would be difficult to determine precisely that activities are really dependent on forest services (FAO, 2014. p.8). Estimates of the number of people account direct and indirect benefits from forests within the form of employment, forest products, and direct or indirect contributions to livelihoods and incomes range between 1 billion to 1.5 billion (Agrawal, Arun et al., 2013. p.4).

Forest is a very important natural resource, hence its efficient use enables in attaining green economy. The data results relating to forest rents reveal that all the developed and developing countries have failed in using efficiently forests as natural resources except a few countries like India (1.44%) and Bangladesh (1.21%), which are developing countries basically. This is due to lesser forest area and priority to industry and service sector development. But it is urgent need of the hour to increase forest area and also extract forest rents for efficient use of natural resource like forest and attaining green economy also.

Table No. 5 : Total Natural Resource Rents

Total Natural Resources Rents (% of GDP)												
Sr. No	**YEAR**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
		IND	**Developed Countries**					**Developing Countries**				
			AUS	**DEU**	**NLD**	**NOR**	**USA**	**BGD**	**CHN**	**MEX**	**PAK**	**ZAF**
1	**2000**	3.82	3.98	0.23	1.78	19	0.97	3.28	3.03	4.77	4.88	1.70
2	**2001**	3.89	3.90	0.20	1.74	16	0.80	3.31	2.56	3.90	5.02	2.38
3	**2002**	3.62	3.54	0.17	1.14	14	0.63	2.80	2.19	3.79	4.39	2.34
4	**2003**	3.79	3.70	0.20	1.50	15	0.91	3.86	2.58	5.18	6.42	2.16
5	**2004**	4.46	4.17	0.20	1.70	17	1.10	3.94	4.90	6.45	6.47	4.15

6	**2005**	4.88	5.61	0.25	2.36	21	1.47	5.61	5.26	8.58	8.99	3.64
7	**2006**	5.51	6.83	0.27	2.10	20	1.53	6.06	6.02	9.12	7.55	4.47
8	**2007**	6.15	9.15	0.28	1.81	17	1.61	6.38	7.04	8.75	7.41	5.94
9	**2008**	9.18	10.89	0.34	2.59	21	3	7.75	10.43	10	9.30	12
10	**2009**	4.61	6.47	0.17	1.12	13	0.98	4.04	4.20	6.86	4.76	5.72
11	**2010**	6.26	9.54	0.19	1.17	13	1.20	4.52	6.56	7.73	5.36	7.47
12	**2011**	6.67	10.19	0.23	1.10	14	1.56	4.38	7.74	9.13	4.94	8.69
13	**2012**	5.06	7.50	0.17	0.96	12	1.33	3.50	5.43	8.68	4.10	7.23
14	**2013**	4.85	7.16	0.15	1.02	11	1.25	3.41	4.46	7.68	3.86	6.77
15	**2014**	6.60	10.10	0.21	1.19	13	1.65	4.98	7.49	10	5.41	9.42
16	**2015**	6.79	10.57	0.20	1.14	12	1.70	5.05	7.80	10	5.33	10
C.G.R		**4.00**	**8.00**	**-1.00**	**-4.00**	**-3.00**	**4.00**	**2.00**	**7.00**	**6.00**	**-1.00**	**12**
MEAN		**5.38**	**7.08**	**0.22**	**1.53**	**16**	**1.36**	**4.55**	**5.48**	**7.54**	**5.89**	**5.88**
C.V		**28**	**38**	**23**	**33**	**21**	**40**	**30**	**42**	**29**	**28**	**53**

(Source: Estimates based on sources and methods described in "The Changing Wealth of Nations: Measuring Sustainable Development in the New Millennium"-World Bank, 2011 and World development Indicators-last updated: 19/07/2016)

Many countries within the world are rich in natural resources. And in most cases, those natural resources represent a vital engine for the country's economy. Most recent data shows that these numbers are still on the rise, with natural resource rents worth 3.7 trillion US-Dollar and there with 5.1 percent of worldwide GDP in 2012. Similarly various resources were gradually contributing in total global natural resources rents such as 63 percent of oil, 15 percent by minerals, 8 percent by natural gas, 8 percent coal and 6 percent by forestry (Sustainable Natural Resource Management, 2014).

Natural resources are very precious and important resources hence their efficient use is of crucial importance for attaining green economy. It is found that, the developing countries are efficiently using natural resources than the developed countries. The performance of India is also good, in this regard. All the selected developing countries have derived natural resources rent in considerable extent, which was between 4.55 percent to 7.54 percent of GDP. India extracted natural resource rent worth of 5.38 percent of GDP, is also good. This adequately reveals that, developed countries are not using the natural resources efficiently, rationally, which needs attention and sincerity.

HYPOTHESIS TESTING:

The hypothesis of the present research study is tested as follows.

- **H_0-**Developed countries are not rigorous and sincere in attaining green economy than the developing countries of the World.
- **H_a-**Developed countries are rigorous and sincere in attaining green economy than the developing countries of the World.

The researcher has used the independent sample (Two tailed) t-test for testing this hypothesis. This test has been applied to each indicator of different principal area of green economy for evaluating the role of a particular parameter in attaining the green economy in selected areas along with finding out whether they are successful or not the developed countries than developing.

Table no.6: Hypothesis Testing Results

Independent sample t-test (Two tailed test) at 95 Percent Confidence Interval							
Sr. No	**Sub-Hypothesis**	**Degree of Freedom**	**T-Calculated Value**	**T-Table Value**	**P-Value**	**Mean Difference**	**Decision (Accept or Reject)**
			Equal variances assumed				
1	**H_0**-There is no significant export of agricultural raw materials from developed countries than developing.	9	1.097	2.262	.301 (P>0.05)	.64867	**H_0-Accept**
	H_a- There is significant export of agricultural raw materials from developed countries than developing.						H_a-Reject
2	**H_0**-Developed countries have not significantly consumed the electric power than developing countries	9	3.624	2.262	.006 (P<0.05)	10780.33	H_0-Reject
	H_a- Developed countries have significantly consumed the electric power than developing countries						**H_a-Accept**
3	**H_0**-Energy use in developed countries is not significantly efficient than developing countries	9	6.435	2.262	.00012 (P<0.05)	4374.06	H_0-Reject

	H_a- Energy use in developed countries is significantly efficient than developing countries.						**H_a- Accept**
4	**H_0-**Forest rents in developed countries are not significantly efficient than the developing countries.	9	-3.366	2.262	.008 (P<0.05)	-.72567	H_0- Reject
	H_a- Forest rents in developed countries are significantly higher than developing countries.						**H_a- Accept**
5	**H_0-**Total natural resource rents are not significantly higher in developed countries than developing.	9	-.204	2.262	.843 (P>0.05)	-.54867	**H_0- Accept**
	H_a- Total natural resource rents are significantly higher in developed countries than developing.						H_a- Reject
The results are significant at 0.05 percent significant levels for 09 degrees of freedom							

The study has used independent sample t-test to all indicators of one principal area of the green economy, at 0.05 percent significance level at 9 degrees of freedom (d.f). Above results show that out of five selected indicators of the green economy in resource efficiency perspective, 4 indicators significantly contributed in achievement of green growth in developed countries compared to developing countries. Because hypothesis probability values as well as table-values are less than the 0.05 percent significance level and calculated t-value.

We conclude based on statistical hypothesis test results that with reference to the green economy in resource efficiency perspective except the hypothesis relating to first and fifth indicator of resource efficiency all other i.e. three indicators reveal that the alternative hypotheses have been accepted and null hypotheses have been rejected. They indicate that the developed countries have significantly efficiently consumed electric power, energy, forest rent with exception of agricultural exports and natural resource rents. The developing countries are efficiently using natural resources than the developed countries. The performance of India is also good, in this regard.

This reveals that the developed countries have partially succeeded in achieving green economy and thereby sustainable development of their economies, and more or less the same is the situation of developing countries. This poses the need for further policy and planned efforts to realize green economy as well as sustainable development.

V) MAJOR FINDINGS AND POLICY FORWARD:

The major findings of the present research study are as follows; On the front of export of agricultural raw materials both the developed and developing countries have failed with a few exceptions in resource efficiency as well as realizing green economy. All the developed countries are very much ahead in electricity consumption than all the developing countries except China, Mexico and South Africa. The electricity consumption in India is meager and lesser only. Developed countries selected for study are very much ahead in energy consumption than the developing countries. And the position of India in this regard is not good at all. All the developed and developing countries have failed in using efficiently forests as natural resources except a few countries like India (1.44%) and Bangladesh (1.21%), which are developing countries basically. The developing countries are efficiently using natural resources than the developed countries. The performance of India is also good, in their regard. This reveals that the developed countries have partially succeeded in achieving green economy and thereby sustainable development of their economies, and more or less the same is the situation of developing countries.

The policy suggestions of the present study are; International mechanism should be developed to renewable natural resource utilization and depletion by the developing as well as developed countries. It is urgent need of the hour to formulate and implement a forest policy at international level by the agency like world resource institute for both developing as well as developed countries because area under forest is inadequate and unsatisfactory. Governments of all the countries both developed and developing should be more active and dynamic in realizing their green economy. Participation and involvement of people should be obligatory and enhanced in undertaking various activities useful for attaining the green economy. A separate budget namely green budget or an important part of public budget of all the developing, developed countries should be prepared and implemented to undertake green economy created activities.

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II

GLOBAL WARMING: CAUSES AND REMEDIES

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Abstract: Now a day's global warming is a big issue in front of whole world. The average temperature of earth's atmosphere rises due to climate change green house gases and other reasons is called as global warming whole world is facing this problem. So it is necessary to study this issue and to make a research on this. Researcher examines causes, consequents of global warming and finally they conclude remedies about global warming. This paper is based on secondary data. Researchers concluded that Global warming is a major and important environmental problem at global level in general and national level. It is of interdisciplinary in nature. Hence, it's important to research is necessary and try to control global warming situation. If we ignore for this serious problem we will be face very horror situation in our life. Therefore we have needs to take steps forward to stop damage of environment.

Introduction: Climate change is any substantial change in Earth's climate that lasts for an extended period of time. Global warming refers to climate change that causes increase in the average temp of the lower atmosphere. Global warming can have many different causes but it is most commonly associated with human interference, specially the release of excessive amounts of greenhouse gases. Greenhouse gases, such as carbon dioxide (Co_2), Methane (CH_4), water vapour and fluorinated gases, act like a greenhouse around the earth. This means that they let the heat from the sun into the atmosphere, but do not allow the heat to escape back into space. The more greenhouse gases there are the larger the percentage of heat that is trapped inside the earth's atmosphere. The earth could not exist in its present state without the presence of some naturally occurring greenhouse gases, such as CO_2, CH_4 and water vapour without any greenhouse gases no heat would be trapped in atmosphere, so the earth would be extremely cold. Naturally occurring greenhouse gases are good in naturally occurring amounts, it's when people short contributing excessive amounts of them that greenhouse gases become a problem. With excessive greenhouse gas build up, the earth's atmosphere warms to unnatural temperatures which causes, among other things, sea level to rice. Global warming also causes sea surface temperature to raise, precipitation pattern to change etc.

What is Global Warming?: Global warming is the process of a gradual increase in the Earth's atmospheric and ground temperatures throughout the entire planet.

Global warming is most commonly referred to as the rise in temperature that is occurring everywhere around us and it is drastically causing changes in the climatic conditions. Almost every organism on the earth is affected by the abnormal weather conditions.

A) Natural Causes of global warming:

Primary natural causes of global warming are volcanic eruptions, sunspots, and the wobbly earth.

1) Volcanic eruptions

Large volcanic eruptions can throw so much dust into the sky that the dust acts as a shield to solar radiation and causes a cooling trend in the atmosphere. A single volcanic eruption tends to releases copious amount of carbon dioxide and ash in the atmosphere. The increase in amount of co_2 in the atmosphere eventually contributes to a rise in near surface temperature as green house cover traps the solar radiations in the earth's atmosphere.

2) Sunspots

Changes in the earth's solar radiation levels can have some impact on the earth's climate. Increased solar activity can cause short term warming cycles on the earth.

3) The Wobbly Earth

As the earth spins, it does not achieve perfect rotation. It actually wobbles slightly, thus alternately exposing the northern and southern latitudes to more and less solar radiation. This wobble in the Earth's rotation has been causing changes in the temperature of the atmosphere for many millions of years.

4) Oceans

Oceans are also significant contributors to global warming as it naturally contains much polluting carbon due to the ecosystems they support. The top layer of oceans contains more pollution than the earth's atmosphere and much of the pollution rises. The amount of pollution and number of pollutants are also worsened by man, making oceans even greater contributors to global warming.

5) North and South Poles

North and South poles also contribute a lot to global warming. It is in those areas where permafrost contains large amounts of carbon that have frozen over time. Disturbances to these areas cause the permafrost to melt and release the pollutants in the atmosphere.

Carbons held within these lands have been out of the carbon cycle for thousands of years and so releasing them would cause an imbalance to natural processes. Gases including carbon dioxide and methane are suddenly released at volumes nature isn't prepared for.

B) Manmade Cause or Anthropogenic Causes of Global Warming:

1) Pollution

Pollution is one of the biggest manmade problems. Pollution comes in many shapes and sizes. Burning fossil fuels is one thing that causes pollution. Fossil fuels are fuels made of organic matter such as coal, or oil. When fossil fuels are burned they give off a green house gases called co2. Also mining coal and oil allows methane to escape. How does it escape? Methane is naturally in the ground. When coal or oil is mined you have to dig up the earth a little. When you dig up the fossil fuels you dig up the methane as well.

2) Population

More people mean more food and more methods of transportation right? That means more methane because there will be more burning of fossil fuels and more agriculture, Now your probably thinking, "Wait a minute, you said agriculture is going to be damaged by gabble warming, but now you're saying agriculture is going to help cause global warming? well, have you ever been in a barn filled with animals and you smell something terrible? you're smelling

methane. Another source of methane is manure. Because more food is needed we have to raise food. Animals like cows are a source of food which means more manure and methane. Another problem with the increasing population is transportation. More people means, more cars and more cars mean more pollution. Also, many people have more than one car.

Since, Co_2 contributes to global warming; the increase in population makes the problem worse because we breathe out Co_2.

3) Deforestation

Plant uses Co_2 for photosynthesis,. Now a day due to urbanization man has cut down the forest as per need. As a result of which Co_2 level increases enormously in atmosphere. Increased level of Co_2 causes the green house effect.

4) Burning of Fossil Fuels

Since, the start of industrial revolution, human kind has been burning all kinds of hydrocarbons, beginning with coal and followed by liquid and gaseous fuels like oil and natural gas, for obtaining energy for transportation electricity and all other activates. The burning of fossil fuels, which produces the GHG such as Co_2, No_2, sulphur dioxide, is the main cause of global warming.

Consequences of Global Warming:

1. Weather patterns:

Apart from the wildfires caused by scorching hot and dry weather which burns millions of acres of land worldwide, the main cause for concern is drought, which also increases the risk of wildfires. Drought causes crops to fail, causing starvation and diseases in less developed countries where agriculture is the main source of food and income. Conversely, warm temperatures can also cause heavier rainfall and floods. More energy in the climatic system causes hurricanes and tsunamis. Balance of ecology is disturbed.

2. Health:

Smog in certain parts of the world is causing allergies and asthmatic conditions to worsen. The poor air quality also results in weakened respiratory system. Droughts and other eco disruptions lead to the rapid spread of infectious diseases and food and waterborne illnesses such as malaria, cholera and dengue fever.

3. Reduction of Agricultural Productivity:

Global warming a decline in agriculture due to the rise in temperature. The agriculture will also decline due to the role of carbon dioxide in photosynthesis. Carbon dioxide prevent photorespiration and therefore is the cause of the damage of many crops. Global warming also results in increased number and longer droughts. This will results in a increase in the ozon gas at the ground level. The increase of the ozone at the ground level will result in a substantial depletion of crops.

4. Rising Sea Level:

As the atmosphere warms, the surface layer of the oceans warns as well expanding in volume and thus raising sea level, warming will also much glacier ice, specially around Greenland, further swelling the sea. Sea levels worldwide rose 10 to 25 cm (4 to 10in) during the 20^{th}

century and IPCC scientists predict a further rise to 9 to 88cm in the sea-level changes will complicate life in many coastal regions. As the sea invades the mouths of rivers, flodding from runoff will also increase upstream.

5. Wildlife:

With ecosystems unable to adapt to the pace of climatic changes, several species are reaching near extinction. From decreasing numbers of polar bears to the danger of extinction of penguins in the Antarctic, this threat has roots in the vast reductions of their natural habitats.

Remedies about Global Warming:

1. Make it YOUR problem:

Energy conservation should be addressed in a right way. Reduce your energy bills by opting for little changes such as fluorescent lights and environmentally friendly refrigerators. Make an effort in every little way you can to sustain the planet for future generations. Let us embrace sustainable development.

a. Energy Conservation

With no time to lose, we really have to start where we are, and not dream that some technological innovation will do it all for us. Where we can begin is to embark urgently to improve energy efficiencies in homes, commercial buildings and all new construction. Designs for heavy industries ought to major on energy economies.

b. Power Generation

We have to use natural gas for our electricity purposes. Now coal is using in traditionally style. It is also toxic to everyone's health, because of methyl mercury emissions. The problem is that so many coal fired plants are slated to be built to meet anticipated demand — 800 in the US, and 1000s in China and India and around the world. The latest coal gasification technologies would help efficiency, and, to capture the emissions and put them underground would be even better. The real problems are that nations want to play catch up and there is a lack of political will and a world forum to address the issue.

Biofuels require extensive crop lands which would worsen emissions by reducing forested areas still further instead of the tree replanting that is needed. Ethanols should be avoided where transportation GHG emissions largely negate any net benefit. Alternative sources of renewable energy such as wind and solar, could make an impact to reduce the adverse effects of using coal.

Nuclear power generation remains an altogether cleaner method. It does, however, suffer risk of some nations misusing the technology for threat purposes. Perhaps the altruism attending saving the planet in face of unrestrained global warming may offer better image to the world at large, and allow authoritative inspections to verify that nations do keep their word.

c. Transportation

Something just has to be done to reduce the emissions from passenger vehicles and light trucks. Especially as their numbers seem to explode every year in different parts of the world. It seems to be a question of engine cost/efficiency, and political will in face of the gasoline industry. Even

more intractable problems encumber air, sea and long distance trucking because of the need to carry fuel along for the ride.

Perhaps we have to reconsider the role of the internal combustion engine. Electric/gasoline hybrids are showing some improvement but not yet achieving in real terms the 60 mpg we need to see to make an impact upon emissions. Plug-in electric/gasoline hybrid traction for our local runs or regular commutes may make more sense than using our gas guzzlers and leaving them idle for best part of the day. But here, an attitude of mind has to change and the awareness of the emissions problem is not yet there to encourage the change to take place.

2. Stop Pollution:

Cutting down pollution from car emissions and power plants will decrease the rate of global warming to a great extent. Varied technologies for use of alternative energy have already been developed. And, more technology is being developed regularly. We need to continue to make use of current alternative energy resources like wind power and solar power, and we can adopt new technologies as they are developed.

3. Changes to the Legal System:

With public support on the rise, laws must be imposed worldwide to cap emissions of carbon dioxide and other green house gasses from industrial and power plants. Tighter standards for appliances such as air conditioners and heat pumps will also strengthen the efforts to reduce emissions.

4. Changing Land Uses

The relentless processes of industrialization and urbanization across the whole world changes the face of the planet. Increasing apparent wealth and fostering competition for scarce resources, are both prime reasons for suicidal abandonment of land resources instead of husbanding them.

Logging for building materials and fuel suffers from the fact that devastating whole tracts is quick indeed, compared to the time taken for replanting to regenerate the devastated areas, and allow natural processes of absorbing greenhouse gases at twice the rate of their respiration to be resumed.

- **Conclusions:**

No prize in guessing that global warming is occurring it has become much more evident over the last century with a rise of 1.8 degree Celsius in the near surface temperature of the planet. A look at the current rates suggests that the problem is worsening with time, and if it is not curbed now it will only spell doom for various life forms on the planet including us human beings. The need of the hour is to find different ways to stop global warming and implement them in our day to day life. We don't have to wait for laws committees and bodies to prevent global warming. As individuals, we can take certain actions to stop global warming on our own. This is a union effort and so all the hands have to join together with force to push the effects of global warming back beyond sight. Global warming is a major and important environmental problem at global level in general and national level. It is of interdisciplinary in nature. Hence, it's important to research is necessary and try to control global warming situation. If we ignore for this serious problem we

will be face very horror situation in our life. Therefore we have needs to take steps forward to stop damage of environment.

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III
CURRENT SCENARIO OF INDIA IN RENEWABLE ENERGY AND SUSTAINABLE DEVELOPMENT

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Abstract: In recent years the increasing prices of fissile fuels and increase of greenhouse gas emission scientist have increase their interest in development of alternative renewable energy sources. The main objective of installing renewable energy in India is to improve energy security, improve access to energy, improve economical development and minimize climate change. Sustainable development is possible only with the use of renewable and sustainable energy sources they are affordable to use. In these days we are facing many environmental changes and that requires long term potential actions and sustainable development. For that renewable energy is the most effective and efficient solutions. Therefore there is big linkage between sustainable development and renewable energy. In this paper scenario of renewable energy use and environmental impacts is discussed.

1. Introduction: Without electricity or energy the whole system of world will collapse. 24 Hr cutoff of electricity will show us how we are dependent on particular form of energy i.e. electricity. Computers lifts will stop their working, Operation theaters, Industries will stop. As population grows the need of energy more and more will increase. Better lifestyle and energy demand increases simultaneously wealthy industrialized economies contains worlds 25% population and consumes worlds 75% of energy.[1] Coal, oil, natural gas are the sources of electricity production and they have contributed one third of world green house gas emission. Any country has increasing demand to their economical and industrial growth. The National Electricity Plan NEP[2] developed by Ministry of Power. This is 10 year action plan to provide electricity across the country efficiently and in reasonable cost. According to Worlds institute report india is at 4^{th} rank of total global carbon emission next to china.[3] India is one of the largest coal consumer country in the world and imports fissile fuel.[4] Near to 74% of energy demand is of country is fulfilled by coal and oil. According to Centre for monitoring Indian economy the country imported 213 million ton coal in 2017-2018.[5] therefore there is huge and urgent need to search alternative sources for electricity generation. The country will have rapid transitions to renewable energy technologies for achieving sustainable growth and avoiding environmental changes. It is accepted that renewable energy will efficiently cover energy demand sand reduce carbon emission significantly. India has developed new paths and policies for its energy supply and awareness for saving of energy. They have started promotion of renewable energies among Indian citizens to use solar energy, wind energy, biomass energy. This renewable energys are clean and less harm full to society. The estimation of consumption of global energy demonstrate that energy consumption of India is continuously increasing and it

will retain its position even in 2040.[6] The increased energy consumption of India will push the share of global energy demand to 11% in 2040 from 5% in 2016.[7]

2. Environment related problems

Since last two decades risk of degradation of environment is increased rapidly. The major areas of environmental issues may be classified as:

- Acid rain
- Green house effect (global warming)
- Water pollution
- Air Pollution
- Depletion of Ozone layer

3. Solutions to Environmental Problems

- Use of Renewable energy
- Energy conservation
- Energy storage technology
- Switching of energy sources from fossil fuels to environment friendly alternative energy sources.
- Use of Public transport
- Making Policies to use of fossil fuels
- Public awareness

  We will discuss the most important solution, Renewable Energy Sources, Types and current scenario.

4. Renewable Energy Resources

Since early 1970 oil crises, from then there is active and continuous research and development in renewable energy resources and technologies. In recent times peoples has been realized that renewable energy resources have most positive impact on environmental, political, economical issues of the world. During the past two decades research and development on renewable energy resources is significantly expanded because:

- Maintenance cost is lowered
- Reliability and applicability is increased
- Public awareness

5. Scenario of Renewable Energy in India

By report of Ministry of New and Renewable energy of India, India achieves target of 40% installed electricity capacity from non-fossil fuel energy sources. Total installed non-fossil fuel based capacity stands at 156.83GW. India rank in fourth position on overall renewable energy production.

Solar Energy: Among the various renewable energy resources, solar energy is the highest in the country. In India clear sunny weather is experienced 250 to 300 days a year. The total solar energy potential is about 6000Million GWh of energy per year. The National Action Plan on Climate change points out that "India is a tropical country, where sunshine is available for longer hours per day in great intensity. Therefore solar energy has great potential as future energy

source. It also has the advantage of permitting the decentralized distribution of energy at the grassroots level". With the objective to establish India as global leader in solar energy, by creating the policy conditions for its diffusion across the country as quickly as possible Government of India launched National Solar Mission. In 2021 the installed solar energy capacity is 47.7GW. The Government had an initial target of 20GW capacity for year 2022. Only 4% of countries power consumption filled by solar energy. Rajasthan is at top in installed capacity of solar energy by MNRE. India rank in fifth solar power generation, China is leader in solar power.

Wind Energy: India is blessed with a coastline of about 7600Km surrounded by water on their sides and has good prospects of harnessing offshore wind energy. Considering this Government of India notified the "National offshore wind energy policy" . MNRE will act as the nodal ministry for development of offshore wind energy in India. Ministry sets the target of 5.0 GW of offshore installations by 2022 and 30 GW by 2030. In recent years wind power generation in India is significantly increased. as of 2021 the total installed wind power capacity was 38.789 GW, the fourth largest installed wind power capacity in the world. Wind power capacity is mainly spread across the southern, Western, and Northern regions of India. Tamilnadu is the largest wind energy producer in India.

Biomass: In India plants like Jatropa, Mahua and neem and some wild plants are identified as the sources of biodiesel. Chattisgarh, Madhy Pradesh, Gujrat, Rajsthan, TamilNadu are the leading states for the biomass power projects. In India total installed capacity of Biomass gasifiers is about 0.17 GW.

Tidal Energy: In India tidal energy is in still R&D phase, commercial scale implementation has not been done. The Gujarat government is set to develop first tidal plant in India.

6. Sustainable Development

Sustainable development means the sustainable supply of energy resources , at long term in low cost and can be used for any application without any hazardous impact on society. Fossil fuels, coal, oil, natural gas they are finite in nature one day the will vanish. Other resources such as solar power means sunlight it is abundant in nature and that will never vanish, wind power, hydro power they are considered renewable energy resources and sustainable resources. Environmental issues are the important while using these sustainabkle energy resources. There are some activities that degrade environment that are no longer sustainable sources.

Importance of renewable energy for sustainable development:

There are different significant reasons to prove renewable for sustainable development

1. This sources have no impact on environment. They are freely available in nature only cost is required to harness them.

2. This renewable energy resources will not vanish unlike fossil fuels. Fossil fuels and natural gas will vanish after consumption of finite reserves.

Important Factors for Sustainable development

There are various factors described as follows:

1. Information: government should provide necessary information of impacts of fossil fuels, renewable energy
2. Awareness in Public: This is first step to make sustainable program successful.
3. Training: Training facilities to be made available for public.
4. Promotions: Renewable energy sources must be promoted by government .
5. Finance: This is the main and important factor to achieve the goal of implementation of renewable energy. India gives subsidy to every rooftop solar systems for domestic and commercial applications.

6. Conclusions: There are many environmental problems we face today. These all problems will be overcome by the use of renewable energy resources.

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IV

SUSTAINABLE AGRICULTURE, FOOD SECURITY AND NUTRITION IN INDIA

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Abstract: Zero hunger, good health, and well-being goals are the important indicators of Sustainable Development Goals. These goals will be achieve when we able to provide food security to every household and individual. The present study analyse the sustainable agriculture, food security and nutritional status in India. Food and nutrition security are the main indicators of a healthy, secure & prosperous human life. Availability of cereals, pulses and food grains were increased 0.32 percent, 3.08 percent and 0.60 percent respectively during 2000 to 2018 in India. NFHS-4 has estimated 38.4 percent of children under age five years as stunted which signify chronic under-nutrition. The decreasing trends found in prevalence of stunting from 48.0 percent in 2005-06 to 38.4 percent in 2015-16. Similarly, prevalence of underweight was reduced by 0.68 percentage points from 2005-06 to 2015-16. The prevalence of obesity was higher among women than men. The decline trend of anaemia among women of reproductive age (15-49 years) from 53.3 percent to 51.4 percent between 2000 and 2016 respectively. The share of undernourished people in India decreased from 18.2 percent (191.2 million) in 2001 to 14.5 percent (194.4 million) in 2018. It means that, 1 in every 7 people in India still insufficient food for conducting an active and healthy life. Therefore, it is necessary to study the current status of agriculture production, food security and nutrition in India.

Key Words: Sustainable Development, Food Security, Nutrition, Zero Hunger

I. Introduction: Food security means access the adequate quantity and quality food to individuals and or households for meet their daily energy requirement. Nutrition security shows the economic, physical, and social access of nutrient diet to household and individual. The second goal of sustainable development goals is 'zero hunger- pledges to end hunger, achieve food security, improve nutrition and promote sustainable agriculture'. The major objective of this goal is to improve food access to all, end malnutrition with childhood stunting and wasting and improve agricultural sustainability.

Agriculture sector is the main pillar of food security and nutrition. In 2018-19, total food production of India was estimated at 284.95 million tonnes which is than the previous record of food grain production in 2012-13 (GoI, 2019). The growth rate of the agriculture & allied sectors were fluctuated at - 0.2 percent in 2014-15, 0.7 percent in 2015-16, 4.9 percent in 2016-17, 3 percent in 2017-18 and 2.9 percent in 2018-19. About 70 percent of the rural population still directly depends on agriculture & allied activities and it accounts for around 15.87 percent of total India's Gross Value Added (GVA) at current prices during 2018-19 (GoI, 2018). In the world, India is first rank in largest producer in milk, pulses & jute, and second rank in the largest producer of rice, groundnut, wheat, sugarcane, fruit, cotton and vegetables in 2017-18. It is also one of the leading producers of spices, fish and livestock. India contributed nearly 25 percent in

food production, 27 percent in consumption and 14 percent importer of pulses in the world (FAO, 2019). However, India is facing malnutrition among children (below 5 years age). India has the highest number of stunted and wasted children with 46.6 million and 25.5 million respectively in the world and nearly a third and half of all stunting and wasting children worldwide during 2018 (Claydon, 2018). Food and nutrition security is not only static analysis of availability, access, utilization and stability of food but also includes risk and vulnerability analysis. The present study focuses on the status of food security and nutritional level in the India.

II Objectives of the Research Study:

1. To explain the per capita net availability of food grains in India
2. To study the trends of food security and nutrition in India.

III. Research Methodology and Data Base:

The present study is based on secondary data. Secondary data is collected from reports of food and agriculture organization, global nutritional reports, global hunger reports, national family health survey reports, economic survey of India, and annual reports of ministry of agriculture and farmers welfare.

VI. Results and Discussion:

1. Per Capita Net Availability of Foodgrains in India:

Net availability of food grains is estimated as total production (-) seed, feed & wastage (-) exports (+) imports (+/-) change in stocks. Table 1 indicate that, per capita net availability of food grain was 165.9 kg per annum and 454.4 gram per day in India during 2000. This availability increases from the previous number of 180.3 kg per annum and 494.1 gram per day in 2018. The data of per capita net availability of cereals data was reported at 154.3 kg/annum and 422.7 g/day in 2000 and it was increased up to 160 kg/annum and 438.2 g/per day in 2018. Similarly, per capita net availability of pulses was increased from 11.6 kg/annum and 31.8 g/day in 2000 to 20.4 kg/annum and 55.9 g/day in 2018. Availability of cereals, pulses and food grains were increased 0.32 percent, 3.08 percent and 0.60 percent respectively during 2000 to 2018 in India.

Table 1: Per capita net availability of food grains in India

Year	Cereals		Pulses		Food Grains	
	Per Annum (kg)	Per Day (g)	Per Annum (kg)	Per Day (g)	Per Annum (kg)	Per Day (g)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2000	154.3	422.7	11.6	31.8	165.9	454.4
2001	141.0	386.2	10.9	30	151.9	416.2
2002	167.4	458.7	12.9	35.4	180.4	494.1
2003	149.1	408.5	10.6	29.1	159.7	437.6
2004	155.8	426.9	13.1	35.8	168.9	462.7

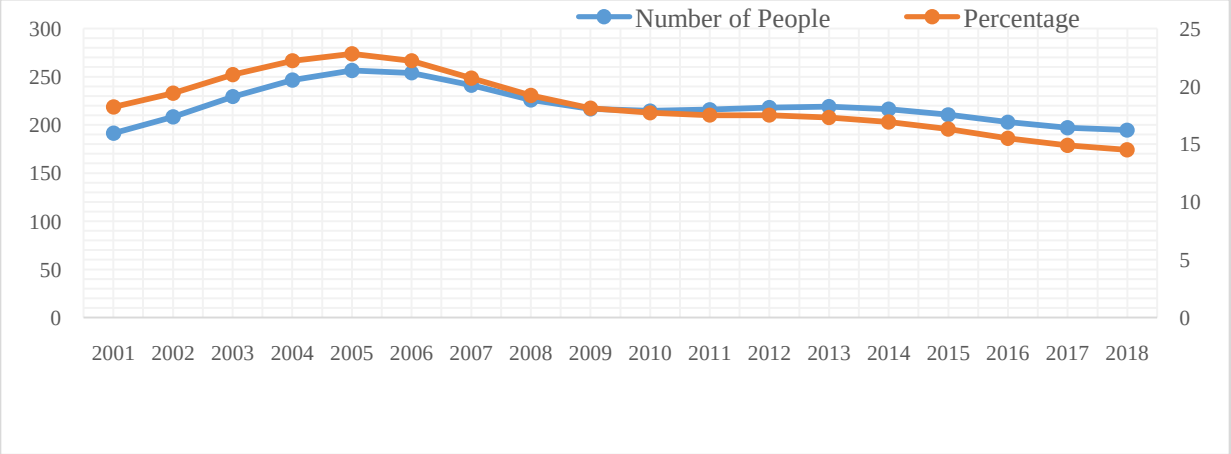
2005	142.7	390.9	11.5	31.5	154.2	422.4
2006	150.7	412.8	11.8	32.5	162.5	445.3
2007	148.7	407.4	12.9	35.5	161.6	442.8
2008	143.9	394.2	15.3	41.8	159.2	436.0
2009	148.6	407.0	13.5	37.0	162.1	444.0
2010	146.6	401.7	12.9	35.4	159.5	437.1
2011	149.9	410.6	15.7	43.0	170.9	468.2
2012	149.1	408.6	15.2	41.7	169.3	463.8
2013	158.1	433.2	15.8	43.3	179.5	491.9
2014	161.6	442.9	16.9	46.4	178.6	489.3
2015	153.8	421.4	16.0	43.8	169.8	465.1
2016	162.0	443.7	15.7	43.0	177.7	486.8
2017	158.4	434.0	20.0	54.7	178.4	488.7
2018	160.0	438.2	20.4	55.9	180.3	494.1
CGR	**0.32**	**0.32**	**3.08**	**3.07**	**0.60**	**0.60**
CV	**4.71**	**4.72**	**19.56**	**19.46**	**5.52**	**5.52**

Source: Directorate of Economics and Statistics, 2019

2. Prevalence of Undernourishment:

The prevalence of undernourishment indicator shows the peoples' inability to obtain adequate food to meet nutritional requirements. Figure 1 show that, despite the share of undernourished people in India decreased from 18.2 percent (191.2 million) in 2001 to 14.5 percent (194.4 million) in 2018. It means that, 1 in every 7 people in India still insufficient food for conducting an active and healthy life. The undernourished rate of reduction has slowed significantly since 2004-05. The compound growth rate of undernourished people in India was -0.73 percent and coefficient of variation was 8.81 percent during 2001-2018. The undernourished rate of India (14.5) was higher than world's undernourished rate (10.8) during 2018.

Figure 1: Trends of prevalence of undernourished people in India

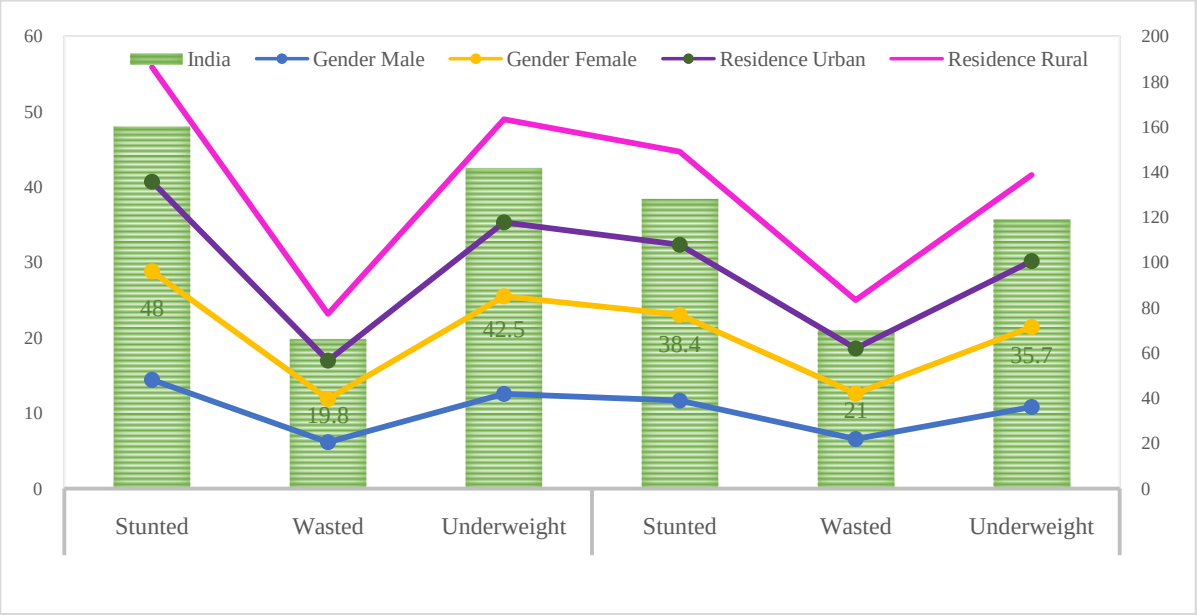


3. Nutritional Status of Children in India:

The nutritional status of children were classified as malnourished according to three indices stunted, wasted and underweight.

Figure 2: Trend in Nutritional Status of Children in India

(Percentage of children age 0-59 months)



Source: National Family Health Survey-4 Report, 2018

Figure 2 indicate that, decrease in stunting has been from 48 percent to 38.4 percent. Similarly, prevalence of underweight was reduced by 0.68 percentage points from 2005-06 to 2015-16. NFHS-4 has estimated 38.4 percent of children under age five years as stunted which signify chronic under-nutrition. The decreasing trends found in prevalence of stunting from 48.0 percent in 2005-06 to 38.4 percent in 2015-16. Stunting was observed to be higher among children in rural areas (41.2 percent) than urban areas (31 percent) during the period 2015-16. There were 21 percent of children (under age five years) in 2015-16 and 19.8 percent children in 2005-06 were wasted (too thin for their height), which signify acute under-nutrition. In India, 35.7 percent and 42.5 percent of children under age five years are underweight during 2015-16 and 2005-06 respectively.

4. State/UT-wise Nutritional Status of Children in India:

Table 2: Nutritional status of children (< 5 year) by state in India (in percent)

Sr. No	State/UT	Stunted		Wasted		Underweight	
		NFHS-3	NFHS-4	NFHS-3	NFHS-4	NFHS-3	NFHS-4
1	Andaman & Nicobar	N.A	23	N.A	18.9	N.A	21.5
2	Andhra Pradesh	42.7	31	12.2	17.2	32.5	31.9
3	Arunachal Pradesh	43.3	29	15.3	17.3	32.5	19.4
4	Assam	46.5	36	13.7	17	36.4	29.8
5	Bihar	55.6	48	27.1	20.8	55.9	43.9

6	Chadigarh	N.A	29	N.A	10.9	N.A	24.5
7	Chhattisgarh	52.9	38	19.5	23.1	47.1	37.7
8	Dadra & N. Haveli	N.A	42	N.A	27.6	N.A	38.8
9	Daman & Diu	N.A	23	N.A	24.1	N.A	26.7
10	Delhi	42.2	32	15.4	15.9	26.1	27
11	Goa	25.6	20	14.1	21.9	25.0	23.8
12	Gujarat	51.7	39	18.7	26.4	44.6	39.3
13	Haryana	45.7	34	19.1	21.2	39.6	29.4
14	Himachal Pradesh	38.6	26	19.3	13.7	36.5	21.2
15	Jammu & Kashmir	35	27	14.8	12.1	25.6	16.6
16	Jharkhand	49.8	45	32.3	29	56.5	47.8
17	Karnataka	43.7	36	17.6	26.1	37.6	35.2
18	Kerala	24.5	20	15.9	15.7	22.9	16.1
19	Lakshadweep	N.A	27	N.A	13.7	N.A	23.6
20	Madhya Pradesh	50	42	35.0	25.8	60.0	42.8
21	Maharashtra	46.3	34	16.5	25.6	37.0	36
22	Manipur	35.6	29	9.0	6.8	22.1	13.8
23	Meghalaya	55.1	44	30.7	15.3	48.8	28.9
24	Mizoram	39.8	28	9.0	6.1	19.9	12
25	Nagaland	38.8	29	13.3	11.3	25.2	16.7
26	Odisha	45	34	19.5	20.4	40.7	34.4
27	Puducherry	N.A	24	N.A	23.6	N.A	22
28	Punjab	36.7	26	9.2	15.6	24.9	21.6
29	Rajasthan	43.7	39	20.4	23	39.9	36.7
30	Sikkim	38.3	30	9.7	14.2	19.7	14.2
31	Tamil Nadu	30.9	27	22.2	19.7	29.8	23.8
32	Telangana	N.A	28	N.A	18	N.A	28.3
33	Tripura	35.7	24	24.6	16.8	39.6	24.1
34	Uttar Pradesh	56.8	46	14.8	17.9	42.4	39.5
35	Uttarakhand	44.4	34	18.8	19.5	38.0	26.6
36	West Bengal	44.6	33	16.9	20.3	38.7	31.5
37	**India**	**48.0**	**38.4**	**19.8**	**21.0**	**42.5**	**35.7**

Source: National Family Health Survey-4 Report, 2018

The prevalence of stunting among children (under age five year) was highest in Bihar (48 percent), followed by Uttar Pradesh (46 percent), Jharkhand (45 percent) and lowest in Kerala and Goa state (20 percent each). Jharkhand state was highest in prevalence of wasting (29 percent), followed by Dadra & Nagar Haveli (27.6 percent) and Gujarat (26.4 percent) in India during the period 2015-16. The lowest levels of wasting were observed in Mizoram (6.1 percent) and Manipur (6.8 percent). The prevalence of underweight was high in Jharkhand with 48

percent. The lowest level of underweight is observed in Mizoram (12 percent) and Manipur (14 percent). It was observed that, prevalence of wasting in children was increased from 19.8 percent in 2005-06 to 21.0 percent 2015-16 in India (table 2).

5. Prevalence of Anaemia in Children:

Anemia is a situation that marked by low levels of hemoglobin in the blood. The prevalence of anemia among children age (6-59 months) declined from 69.5 percent to 58.4 percent in 2005-06 and 2015-16 respectively in India (table 6). The prevalence of anaemia in children was the highest in Dadra and Nagar Haveli (84.6 percent), followed by Daman and Diu (73.8 percent), Chandigarh (73.1 percent) and Haryana (71.7 percent) in 2015-16. The lowest level of anaemia in children was found in Mizoram (17.7 percent) in same period. The prevalence of anaemia in children was increased in Goa and Delhi with 10.1 and 5.6 percent respectively during previous NFHS-3 to NFHS-4 survey. In Assam state, the percentage of anemic children was rapidly decreased from 69.7 percent in 2005-06 to 35.7 percent in 2015-16. It was found that, several union territories have even higher prevalence of anaemia in India during 2016-16 (table 3).

Table 3: Prevalence of anaemia in children by state/ut in India (in percent)

Sr. No	**State/UT**	**Anemia in children (6-59 months age)**		**Variation**
		NFHS-3	**NFHS-4**	
1	Andaman and Nicobar	N.A	49	-
2	Andhra Pradesh	N.A	58.6	-
3	Arunachal Pradesh	56.9	50.7	6.2
4	Assam	69.4	35.7	33.7
5	Bihar	78	63.5	14.5
6	Chandigarh	N.A	73.1	-
7	Chhattisgarh	71.2	41.6	29.6
8	Dadra and Nagar Haveli	N.A	84.6	-
9	Daman and Diu	N.A	73.8	-
10	Delhi	57	62.6	-5.6
11	Goa	38.2	48.3	-10.1
12	Gujarat	69.7	62.6	7.1
13	Haryana	72.3	71.7	0.6
14	Himachal Pradesh	54.4	53.7	0.7
15	Jammu & Kashmir	58.5	43.3	15.2
16	Jharkhand	70.3	69.9	0.4
17	Karnataka	70.3	60.9	9.4
18	Kerala	44.5	35.6	8.9
19	Lakshadweep	N.A	51.9	-
20	Madhya Pradesh	74	68.9	5.1
21	Maharashtra	63.4	53.8	9.6
22	Manipur	41.1	23.9	17.2

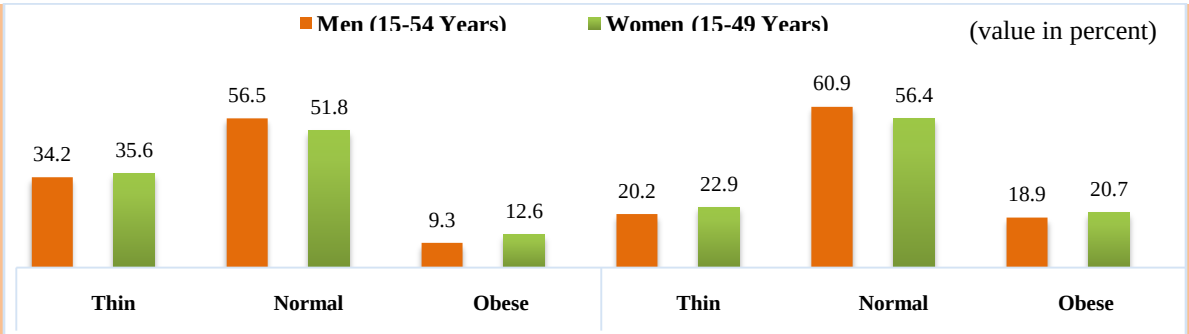
23	Meghalaya	63.8	48	15.8
24	Mizoram	43.8	17.7	26.1
25	Nagaland	N.A	21.6	-
26	Odisha	65	44.6	20.4
27	Puducherry	N.A	44.9	-
28	Punjab	66.4	56.6	9.8
29	Rajasthan	69.6	60.3	9.3
30	Sikkim	58.1	55.1	3
31	Tamil Nadu	64.2	50.7	13.5
32	Telangana	N.A	60.7	-
33	Tripura	62.9	48.3	14.6
34	Uttar Pradesh	73.9	63.2	10.7
35	Uttarakhand	60.7	59.8	0.9
36	West Bengal	61	54.2	6.8
	India	**69.5**	**58.4**	**11.1**

Source: National Family Health Survey-4 Report, 2018

6. Nutritional Status of Adults in India:

The nutritional indicators were used to estimate several measures of nutritional status of women (15-49 years) and men (15-54 years) with height and body mass index (BMI). There were 34.2 percent of men was thin in 2005-06; which was decreased to 20.2 percent in 2015-16. Total 56.5 percent of men in 2005-06 and 60.9 percent in 2015-16 was normal BMI level. There were 9.3 percent and 18.9 percent of men suffering to prevalence of overweigh in 2005-06 and 2015-16 respectively. The percentage of thin men decreases with age, whereas the proportion of overweight or obese men increases in India since 2005-06. The proportion of thin women age 15-49 declined from 35.6 percent in 2005-06 to 22.9 percent in 2015-16; at the same time the proportion of overweight or obese women increased from 12.6 percent to 20.7 percent. Overall, there has been an increase in the mean BMI from 20.5 in 2005-06 to 21.9 in 2015-16. It was found that, increasing trends in prevalence of overweight among both men and female in India.

Figure 3: Trends of adult's nutritional status in India



Source: National Family Health Survey-4 Report, 2018

7. State/UT wise Nutritional Status of Adults in India:

Table 4: Nutritional status of adults by state/ut in India-2015-16 (percent)

Sr. No	State/ Union Territory	Thin (BMI <18.5)		Normal (BMI 18.5-24.9)		Obese (BMI ≥25.0)	
		Men	Women	Men	Women	Men	Women
1	Andaman & Nicobar	8.8	53	55.1	13.1	38.2	31.8
2	Andhra Pradesh	14.8	51.7	49.2	17.6	33.5	33.2
3	Arunachal Pradesh	8.3	71.1	72.7	8.5	20.6	18.8
4	Assam	20.7	66.4	61.1	25.7	12.9	13.2
5	Bihar	25.5	62	57.8	30.5	12.6	11.7
6	Chandigarh	21.7	46.3	45.2	13.3	32	41.4
7	Chhattisgarh	24.2	65.7	61.4	26.7	10.2	11.9
8	Dadra & Nagar Haveli	19.7	57.3	52.2	28.7	22.9	19.2
9	Daman & Diu	12	57.4	55.4	12.9	30.7	31.7
10	Delhi	17.7	57.7	51.7	14.8	24.6	33.5
11	Goa	10.8	56.5	51.9	14.7	32.7	33.5
12	Gujarat	24.7	55.5	49	27.2	19.7	23.8
13	Haryana	11.3	68.7	63.2	15.8	20	21
14	Himachal Pradesh	18	60	55.2	16.2	22	28.7
15	Jammu & Kashmir	11.5	68	58.8	12.1	20.5	29.1
16	Jharkhand	23.8	65.1	58.1	31.6	11.1	10.3
17	Karnataka	16.5	61.3	56	20.8	22.1	23.3
18	Kerala	8.5	63	57.9	9.7	28.5	32.4
19	Lakshadweep	8.2	67.7	45.9	13.5	24.1	40.6
20	Madhya Pradesh	28.4	60.7	58	28.4	10.9	13.6
21	Maharashtra	19.1	57.1	53.1	23.5	23.8	23.4
22	Manipur	11.1	69.1	65.2	8.8	19.8	26
23	Meghalaya	11.6	78.4	75.7	12.1	10	12.2
24	Mizoram	7.3	71.9	70.6	8.4	20.9	21.1
25	Nagaland	11.4	74.7	71.6	12.3	13.9	16.2
26	Odisha	19.5	63.2	57	26.5	17.3	16.5
27	Puducherry	10.2	52.7	52	11.3	37.1	36.7
28	Punjab	10.9	61.2	57	11.7	27.8	31.3
29	Rajasthan	22.7	64.1	58.9	27	13.2	14.1
30	Sikkim	2.4	62.9	66.9	6.4	34.8	26.7
31	Tamil Nadu	12.4	59.3	54.4	14.6	28.2	30.9
32	Telangana	21.5	54.3	48.4	22.9	24.2	28.7
33	Tripura	15.7	68.4	65	19	15.9	16
34	Uttar Pradesh	25.9	61.5	58.2	25.3	12.5	16.5

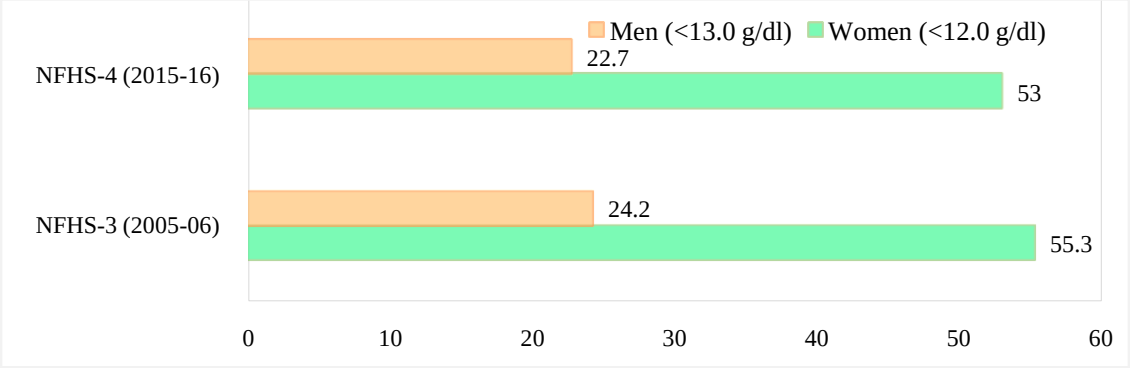
35	Uttarakhand	16.1	66.2	61.1	18.4	17.7	20.5
36	West Bengal	19.9	65.9	58.9	21.3	14.2	19.9
	India	**20.2**	**60.9**	**56.4**	**22.9**	**18.9**	**20.7**

Source: National Family Health Survey-4 Report, 2018

Table 4 shows the state differentials in nutritional status for men and women in India during 2015-16. The percentage of thin men was highest in Madhya Pradesh with 28.4 percent, followed by Uttar Pradesh 25.9 percent and Bihar 25.5 percent in 2015-16. Sikkim (34.8 percent), Andhra Pradesh (33.5 percent), Tamil Nadu (28.2 percent) and Kerala (28.5 percent) were the states with the highest level of obesity. The proportion of men who are thin varies substantially among the states. The proportion of women who are thin was particularly high in Jharkhand (31.6 percent), followed by Bihar (30.5 percent) and Dadra & Nagar Haveli (28.7 percent). The percentage of women who are obese was highest Goa with 33.5 percent, 33.2 percent in Andhra Pradesh, 32.4 percent in Kerala, and 30.9 percent in Tamil Nadu. The highest number of men and women who have normal BMI (18.5- 24.9) found in Meghalaya with 78.4 percent and 75.7 percent respectively during the period 2015-16.

8. Prevalence of Anemia in Adults (15-49 years):

Figure 4: Trends of adult's anaemia status in India (percent)



The minimum levels of haemoglobin for women is 12 grams per decilitre and men is 13 grams per decilitre (g/dl). The prevalence of anaemia was barely changed in last decade between NFHS-3 and NFHS-4, decreasing from 55.3 percent in 2005-06 to 53.0 percent in 2015-16 among women and from 24.2 percent in 2005-06 to 22.7 percent in 2015-16 among men (figure 6). Accounting NFHS-4, total 40 percent of women were mildly anaemic, 12 percent were moderately anaemic, and 1 percent were severely anaemic. Similarly, 12 percent of men were classified as mildly anaemic, 10 percent as moderately anaemic, and 1 percent as severely anaemic during 2015-16 in India. It was observed that, the prevalence of anaemia was high in women than men in both urban area and rural area of India since last two decade.

Conclusions:

Food and nutrition security in India has been achieving self-sufficiency in the food grain production after independence and in setting in the public distribution system. However, India still has high rates of malnutrition and starvation. In present situation, major challenge is not

improve the productivity of agriculture sector, but also making food grains accessible to poor and needy. The government needs to pay special attention to agriculture in order to provide qualify of food as to make food security scheme a success. There are need to increase in irrigation facilities, supply affordable agriculture inputs, uninterrupted supply of electricity, high yielding seeds, per capita availability of food grains, fair prices for agriculture commodities, enhanced efficient monitoring system, optimum warehouses for food storages, efficient public distribution system, control on manmade inflection and reduction of regional disparities in food grain. In addition there is a need for such number of studies in different views and areas because it has the vast scope and very significant from the measurement of sustainable agriculture development.

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V
GREEN MARKETING

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Abstract: Marketing is a very wider term and vast concept to understand. Green Marketing is a part of the Marketing which is very important from the social, economical and ethical point of view as it has motive of spreading awareness among people about environmental issues. This is helping to maintain the environment clean and green by producing eco-friendly products.

Green marketing refers to the practice of developing and advertising products based on their real or perceived environmental sustainability .Here, term 'green' is indicative of purity. Green means pure in quality and fair or just in dealing. For example, green advertising means advertising without adverse impact on society. Green message means matured and neutral facts, free from exaggeration or ambiguity. Green marketing is highly debated topic for lay people to highly professional groups.

Keywords: Green Marketing, Green economy, development, ecological environment

Introduction: Concept of green marketing concerns with protection of ecological environment. Modern marketing has created a lot of problems. Growth in marketing activities resulted into rapid economic growth, mass production with the use of advanced technology, comfortable and luxurious life, style, severe competition, use of unhealthy marketing tactics and techniques to attract customers, exaggeration in advertising, liberalization and globalization, creation of multinational companies, retailing and distribution by giant MNCs, etc., created many problems. Departmental stores, specialty stores, and shopping malls are flooded with useful as well as useless products. These all factors have threatened welfare of people and ecological balance as well. Particularly, giant factories have become the source of different pollutions. Production, consumption and disposal of many products affect environment adversely.

Excessive pollution has provoked the Nature and the Nature starts behaving in unnatural waves (in form of global warming v s global cooling, heavy rains v s draught, and other natural calamities like frequent earthquakes and tsunami, cyclones, epidemics, and so forth). Economic growth via production and consumption threatens peaceful like of human being on the earth. Thus, green marketing is an attempt to protect consumer welfare and environment (the nature) through production consumption, and disposal of eco-friendly products.

Importance of Green Marketing: Green marketing affects positively the health of people and the ecological environment. People are aware of pure products and pure methods of producing, using, and disposing the products. It encourages integrated efforts for purity in production and consumption as well.

1. Now, people are insisting pure products – edible items, fruits, and vegetables based on organic farming. The number of people seeking vegetarian food is on rise.

2. Reducing use of plastics and plastic-based products.
3. Increased consumption of herbal products instead of processed products.
4. Recommending use of leaves instead of plastic pieces; jute and cloth bags instead of plastic carrying bags.
5. Increasing use of bio-fertilizers (made of agro-wastes and wormy-composed) instead of chemical fertilizers (i.e. organic farming), and minimum use of pesticides.
6. Worldwide efforts to recycle wastes of consumer and industrial products.
7. Increased use of herbal medicines, natural therapy, and Yoga.
8. Strict provisions to protect forests, flora and fauna, protection of the rivers, lakes and seas from pollutions.
9. Global restrictions on production and use of harmful weapons, atomic tests, etc. Various organisations of several countries have formulated provisions for protecting ecological balance.
10. More emphasis on social and environmental accountability of producers.

Objectives of Green Marketing

- To adhere to corporate social responsibility.
- To reduce expenses.
- To showcase how environment-friendly the company's offerings are.
- To communicate the brand message
- To implement sustainable and socially accountable business practices.

Example

1. **Whole Foods**: An American supermarket chain, owned by Amazon, known for selling organic products, which does not contain hydrogenated fats, flavours, preservatives, sweeteners, flavours and artificial colours.

2. **Starbucks**: Starbucks is the largest coffeehouse chain in the world with a presence in more than 70 countries. It promotes sustainable practices to grow coffee.

3. **The Body Shop**: A British cosmetic and skincare giant, which offers products which are cruelty-free, and use natural ingredients.

What is Green Marketing Mix?

Similar to traditional marketing, firms use green marketing mix, to use the marketing variables and get the intended response from the target audience. The four P's of the green marketing mix are:
1) Product Mix
2) Price Mix
3) Promotion Mix
4) Place Mix

- **Product**: The products should be designed and developed in such a manner that they use fewer resources and are pollution-free, plus they do not contain any toxic substance, whose use can be harmful. Moreover, the product must increase the conservation of scarce resources.

- **Price**: In green marketing, price plays a prominent role, as the customers are going to pay the additional price, only when there are of the view that they will be getting the premium quality products, in terms of design, performance, appeal, taste, or anything else.

- **Promotion**: Green advertising can be done in three ways, i.e. there can be ads which display the connection amidst the product and the environment, or ads which promote a green and organic lifestyle, or ads that showcase a corporate image of environmental responsibility.

- **Place**: Place defines the availability of the products and so the marketers should opt an ideal way to make such products available as it will have a great impact on the customers.

It is a well-known fact that any sort of production consumes energy and also produces waste. So, green marketing could be a great marketing initiative, taken by the firm.

Green Marketing Practices: Green Marketing Practices involves a wide spectrum of activities, to create an eco-friendly image of the company, to its target audience, such as:

1. Using recycled and renewable material for production.
2. Use of green energy to produce products, such as solar energy, geothermal energy and wind energy.
3. Reduce product packaging or use ecofriendly packaging.
4. Not using toxic materials, which are harmful to the environment.
5. Making products which are reusable as well as recyclable.

So, basically, green marketing is all about developing and promoting products and services that fulfil customer requirements, in terms of quality, performance, affordability, availability and safety, but without causing any damage to the environment.

Principles of Green Marketing

1) Consumer-Oriented Matketing
2) Customer Value Marketing
3) Innovative Marketing
4) Mission Marketing
5) Societal Matketing

- **Consumer-Oriented Marketing**: The notion says that the firm should perceive the marketing activities from the consumer's viewpoint, so as to develop a lasting and profitable relationship with them.
- **Customer Value Marketing**: As per this notion, the company should allot its resources that add value to the product or service they offer, rather than simply changing the product packaging or

making a huge investment on the advertisement. this is because, when the value is added to the product, they will be valued by the customers also.

- **Innovative Marketing**: To strive for real product and marketing improvements, says the third principle, i.e. innovative marketing. We all know that the world is ever-changing and so does the tastes and preferences of the customers. therefore, the company should always look for new and improved methods, to not lose customers easily.
- **Mission Marketing**: The company's mission should be broadly defined, in social terms and not in the product. This is due to the fact that if a company states the mission that has some social welfare hidden in it, the employees feel proud to work for a good cause and work in the right direction.
- **Societal Marketing**: As per this principle, the marketing decisions made by the company must take into account the wants and interest of the consumers, company's requirements and the social welfare.

Therefore, green marketing demands products and services which are not only eco-friendly but also beneficial for society.

Referecnces-–

Bedi Raman ," Green Marketing"
Ramesh Vaibhav,Vaibhav Bhalerao, Anand Deshmukh, "Green Marketing"
Younus M.umair, "Green Marketing"

VI
POVERTY AND UNEMPLOYMENT ARE BARRIERS TO A GREEN ECONOMY

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Abstract: When 2008-09 began to promote green growth through economic reform packages, some governments looked to short-term growth - the opportunity to create jobs and other revenue-generating investments in green technologies. Green development can help address poverty and other important development issues. India's record-keeping population increased from 359.0 million in 1950 to 1238.9 million in 2014, an increase of 245 per cent over the last 50 years. As the population grows, other problems such as poverty, illiteracy, unemployment and inflation will also increase. Poverty alleviation is a long-term goal in India.

Crowding is the main problem in the country. Availability of natural resources such as petrol, , minerals, land, water and personal income are limited and their uses are infinite. This is impossible for nature to fulfill increased demand due to population explosion and hence All the basis requirements of living being were injured. These needs consist of bunch of basic things like shelter, food, employment and education, health care, sanitation and basic services. All these unlimited want of humans contributed to problems such as rising birth rate, low mortality rate and so on. Congestion is an obstacle to India's economic growth.

Keywords: Green economy, Green development, Poverty, Illiteracy, Unemployment, Inflation

1 – Introduction: Crowding is the main problem in the country. Availability of natural resources such as petrol, , minerals, land, water and personal income are limited and their uses are infinite. This is impossible for nature to fulfill increased demand due to population explosion and hence All the basis requirements of living being were injured. These needs consist of bunch of basic things like shelter, food, employment and education, health care, sanitation and basic services. All these unlimited want of humans contributed to problems such as rising birth rate, low mortality rate and so on. Congestion is an obstacle to India's economic growth.

2 - Green Economy: The Green Economy is defined as, resource efficient, social inclusive and low carbon. An eco-friendly economy is featured by job growth and income are driven by public and private investment in economic activities, low carbon emission in infrastructure and assets, renewable energy and optimum utilization of resources, pollution free processes that protect the biodiversity and ecosystem.

The fundamental theme of 2012's United nations Conference in Rio The Janeiro was the 'idea of transition to green economy', where the final document indicated that each country could determine its transition according to its national plans, strategies and priorities for sustainable development. The 2012 United Nations Conference on Sustainable Development (Leggett & Carter, 2012) has also promoted the "Green Economy in the Context of Sustainable Development and Poverty Alleviation" since 2008 as Green Economic Initiatives as a Pathto Recovery. Thus the key to environment friendly and resource efficient technologies for reducing emission and alleviating adverse effects of climate change is given by green economy.

Key Sectors of the Green Economy Include:

- Agriculture
- Fisheries
- Water
- Forests
- Energy
- Manufacturing
- Buildings
- Tourism
- Water Management
- Transports

Primarily investing in natural capital

Primarily investing in energy and resources efficiency

Also working with nature can lead to cost effective solution and multiple benefits

Source: United Nations Environment Programme(UNEP) Green Economy Report (2011).

The Green Economy led by the United Nations Environment Program, is an economy that leads to better human well-being and social equality with environmental risk and environmental mitigation (UNEP, 2011). It seeks to improve ways to achieve sustainable development in times of great socio-economic and environmental change.

3 - Poverty and Poverty Line in India:

Poverty can define a social phenomenon. There are two types of poverty: absolute poverty and relative poverty.

Absolute poverty Absolute poverty means inability of individual or family to access basic necessities like food, shelter, safe drinking water, education and health care .

Relative poverty

This poverty is comparative concept. The relative poverty and standard of living are two parameters that estimate the income distribution of population in different broken groups. This means that it is dynamic and changing with the pace of development of the global economy. Although it appears to be much less than total poverty; this is an area that will continue forever.

Poverty Line: -

Is divided by countries and no two countries have the same line. The last few lines of poverty:

Poverty line in India

1990 -> $ 1

2008 -> $ 1.25

2015 -> $ 1.90

Source : World Bank

The Planning Commission Past and Now the NITI Commission is an important center for measuring the poverty line in India.

According to Suresh Tendulkar Committee's Recommendations 2011-12, people who are below Poverty Line means they are earning less than Rs. 27 for rural area and Rs. 33.3 for urban area.

4 - Determine employment and unemployment:

Workers are an 'economically active' population, which refers to those who provide or want to provide productive work. The Employee Participation Rate (LFPR) is defined as the number of people in a position of responsibility. Similarly, the total number of people working in the general population is called the Work-Force Participation Rate (WFPR) or Worker-Population Ratio (WPR).Unemployed, which means they do not have a job but want it.

Unemployment Rate (%)

Year	2020	2019	2018	2017
Unemployment Rate (%)	7.11	5.27	5.33	5.41
Unemployment rate increase/decline	1.84	0.06	0.08	-

Source:National Sample Survey Office 2020-21

With the growing population, all kinds of resources are limited, even employment, especially in India. As a developing country, a limited number of jobs are available in India. In India, some highly educated people with bachelor's and master's degrees stay at home without finding jobs.

How is it calculated?

Employee participation rate is a metaphor for determining the number of people of working age in a country.

Formula = employees / total eligible persons

Level of labor relations in India

In the 2017-18 financial year India's labor force participation rate was 49.80 per cent According to the National Sample Survey Office (NSSO) Periodic Labor Force Survey (PLFS) report,

5 - Conclusions:

As population grows, the work forces increases Growing population is one of the major reasons of unemployment. But without efficient resources and enough employment opportunities, it is impossible to increase jobs. A rapidly growing population reduces savings, investment and income. It is hindrance in process of capital formation. In addition, as the number of employees increases in relation to land, money and other resources, the facilities available to each employee decrease. Unemployment is rising as a result.

It can be concluded that population growth is a very important factor affecting poverty and unemployment. Inclusive and sustainable development can be achieved through green economy. A green economy is reducing poverty levels as well as creates more jobs and income, as they are the way to attract government attention for further implementation. Give good opportunities.

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VII
GLOBAL WARMING AND CLIMATE CHANGE

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Abstract: According to NASA and IPCC, Global temperature has increased by 1.4 o F since 1880, CO2 levels has reached 400.71 parts per billion, loss of world's forest cover between the period 2000 and 2012 is 1.5 million square km, reduction of land ice 287 billion metric ton per year, sea level rise is 3.2 mm per year and loss of arctic ice cover at the rate of 13.3% per decade. Increasing risk of irreversible changes due to large scale shift in the climate system such as several sensitive species such as ocean corals, aquatic birds, reptiles such as sea turtles and amphibians are facing extinction, failing of crops cause famine in many East African countries, decrease in potable water in Mediterranean and Southern Africa and increasing intensity of extreme events such as forest fires (Australia and Indonesia), flooding(Bangladesh) , storm events (tornadoes and hurricanes in USA), droughts (Sahal region) and deadly heat waves (in India 2015) recorded in many parts of the world. Climate change issue can be handled either adapting to the change or disaster risk reduction. UNDP has suggested a three step method to work on Carbon finance consist of removal of barriers to climate friendly technologies, establishing efficient host country procedures for clean development mechanism (CDM) and develop projects via millennium development goal (MDG) carbon facility. An Integrated Territorial Climate Plan (ITCP) was designed for regional governments to plan their activities including financing climate change mitigation process. This paper briefly evaluates anthropocene global climate change and its human solutions.

Key words: Climate change, global warming, climate change mitigation, carbon capture, sequestration of carbon,

I. Introduction: The continuous rise in temperature of the planet is really upsetting. The root cause for this is global warming. Global warming begins when sunlight reaches the Earth. The clouds, atmospheric particles, reflective ground surfaces and surface of oceans then sends back about 30 % of sunlight back into the space, whilst the remaining is absorbed by oceans, air and land. This consequently heats up the surface of the planet and atmosphere, making life feasible. As the Earth warms up, this solar energy is radiated by thermal radiation and infrared rays, propagating directly out to space thereby cooling the Earth. However, some of the outgoing radiation is re-absorbed by carbon dioxide, water vapors', ozone, methane and other gases in the atmosphere and is radiated back to the surface of Earth. These gases are commonly known as greenhouse gases due to their heat-trapping capacity. It must be noted that this re-absorption process is actually good as the Earth's average surface temperature would be very cold if there was no existence of greenhouse gases. The dilemma began when the concentration of greenhouse gases in the atmosphere was artificially increased by humankind at an alarming rate since the

past two centuries. As of 2004, over 8 billion tons of carbon dioxide was pumped thermal radiation is further hindered by increased levels of greenhouse gases resulting in a phenomenon known as human enhanced global warming effect. Recent observations regarding global warming have substantiated the theory that it is indeed a human enhanced greenhouse effect that is causing the planet to heat up.

II. Greenhouse Effect: While other planets in the solar system of the Earth are either roasting hot or bitterly cold, Earth's surface has relatively mild, steady temperatures. Earth enjoys these temperatures because of its atmosphere, which is the thin layer of gases that cover and protect the planet. However, 97 % of climate scientists and researchers agree that humans have changed the Earth's atmosphere in dramatic ways over the past two centuries, resulting in global warming. To understand global warming, it is first necessary to become familiar with the greenhouse effect. The natural greenhouse effect normally traps some portion of heat in such a way that our planet is safe from reaching freezing temperatures while human enhanced greenhouse effect leads to global warming. This is due to burning of fossil fuels which increase the amount of greenhouse gases (carbon dioxide, methane and oxides of nitrogen) present in the atmosphere.

The trade of incoming and outgoing radiation that heats up the Earth is often referred to as the greenhouse effect because a greenhouse works in a similar way . Incoming ultraviolet radiation easily passes through the glass walls of a greenhouse and is absorbed by the plants and hard surfaces inside. Weaker infrared radiation, however, has difficulty passing through the glass walls and is trapped inside, therefore, warming the greenhouse. This effect lets tropical plants prosper inside a greenhouse, even during a cold season.

III. Greenhouse Gases: A Hazard There are many greenhouse gases which are mainly emitted by human activity. The first and foremost in the list is carbon dioxide. Excessive burning of fossil fuels like coal and oil is the major factor for producing this gas. Moreover, deforestation i.e. removal of trees for acquiring lands also causes large amount of carbon dioxide in the atmosphere. Cement manufacture also contributes carbon dioxide to atmosphere when calcium carbonate is heated generating lime and carbon dioxide. The second culprit gas is methane, commonly known as natural gas. It is produced as a result of agricultural activities such as livestock digestion, paddy rice farming and use of manure. Methane is also produced due to improper management of waste. Nitrous oxides are generated mainly by fertilizers. Moreover, fluorinated gases such as chlorofluorocarbons (CFCs) are chiefly a result of various industrial processes and refrigeration. These gases are playing their negative part in increasing the havoc of global warming. They are continuously causing an increase in the earth’s temperature.

IV. Causes of Global warming: The major cause of global warming is the greenhouse gases. They include carbon dioxide, methane, nitrous oxides and in some cases chlorine and bromine containing compounds. The build-up of these gases in the atmosphere changes the radioactive equilibrium in the atmosphere. Their overall effect is to warm the Earth’s surface and the lower atmosphere because greenhouse gases absorb some of the outgoing radiation of Earth and re-radiate it back towards the surface. The net warming from 1850 to the end of the 20th century was equivalent to nearly 2.5 W/m2 with carbon dioxide contribution about 60 % to this figure,

methane about 25 per cent, with nitrous oxides and halocarbons providing the remainder. In 1985, Joe Farman, of the British Antarctic Survey, published an article showing the decrease in ozone levels over Antarctica during the early 1980s. The response was striking: large scale international scientific programmes were mounted to prove that CFCs (used as aerosol propellants in industrial cleaning fluids and in refrigeration tools) were the cause of the problem. Even more important was abrupt international action to curb the emissions of CFCs.The second major cause of global warming is the depletion of ozone layer. This happens mainly due to the presence of chlorine containing source gases. When ultraviolet light is present, these gases dissociate releasing chlorine atoms which then catalyses ozone destruction. Aerosols present in the atmosphere are also causing global warming by changing the climate in two different ways. Firstly, they scatter and absorb solar and infrared radiation and secondly, they may alter the microphysical and chemical properties of clouds and perhaps affect their lifetime and extent. The scattering of solar radiation acts to cool the planet, while absorption of solar radiation by aerosols warms the air directly instead of permitting sunlight to be absorbed by the surface of the Earth. The human contribution to the amount of aerosols in the atmosphere is of various forms. For instance, dust is a by-product of agriculture. Biomass burning generates a mixture of organic droplets and soot particles. Many industrial processes produce a wide diversity of aerosols depending on what is being burned or generated in the manufacturing process. Moreover, exhaust emissions from various sorts of transport produce a rich mixture of pollutants that are either aerosols from the outset or are transformed by chemical reactions in the atmosphere to form aerosols.

V. Global Warming: The Effects predicting the consequences of global warming is one of the most difficult tasks faced by the climate researchers. This is due to the fact that natural processes that cause rain, snowfall, hailstorms, rise in sea levels is reliant on many diverse factors. Moreover, it is very hard to predict the size of emissions of greenhouse gases in the future years as this is determined majorly through technological advancements and political decisions. Global warming produces many negative effects some of which are described here. Firstly, extra water vapors which is present in the atmosphere falls again as rain which leads to floods in various regions of the world. When the weather turns warmer, evaporation process from both land and sea rises. This leads to drought in the regions where increased evaporation process is not compensated by increased precipitation. In some areas of the world, this will result in crop failure and famine particularly in areas where the temperatures are already high. The extra water vapors content in the atmosphere will fall again as extra rain hence causing flood. Towns and villages which are dependent on the melting water from snowy mountains may suffer drought and scarcity of water supply. It is because the glaciers all over the world are shrinking at a very rapid rate and melting of ice appears to be faster than previously projected. According to Intergovernmental Panel on Climate Change (IPCC), about one-sixth of the total population of the world lives in the regions which shall be affected by a decrease in melting water. The warmer climate will likely cause more heat waves, more violent rainfall and also amplification in the severity of hailstorms and thunderstorms. Rising of sea levels is the most deadly affect of global

warming, the rise in temperature is causing the ice and glaciers to melt rapidly. This will lead to rise of water levels in oceans, rivers and lakes that can pilot devastation in the form of floods.

VI. Effects on Living Beings: Global warming can severely affect the health of living beings. Excess heat can cause stress which may lead to blood pressure and heart diseases. Crop failures and famines, which are a direct consequence of heating up of earth, can cause a decline in human body resistance to viruses and infections. Global warming may also transfer various diseases to other regions as people will shift from regions of higher temperatures to regions of comparatively lower temperatures. Warmer oceans and other surface waters may lead to severe cholera outbreaks and harmful infections in some types of sea food . Moreover, it is an established fact that warmer temperatures lead to dehydration which is a major cause of kidney stones. A medical team from The Children's Hospital of Philadelphia examined the health proceedings of more than 60,000 Americans alongside weather records. They discovered that individuals were most likely to be hospitalized with kidney stones three days after a temperature rise. Since 1994, kidney stone incidence has risen from about one in 20 people to one in 11. This trend is likely to increase as the globe gets hotter. According to Luis Ostrosky, M.D. of the Division of Infectious Diseases at The University of Texas Health Science Centre at Houston Medical School and medical director for epidemiology at Memorial Hermann-Texas Medical Centre: "One infection that is definitely making a weird pattern is valley fever". In his words, "This is a fungal infection we used to see only in California, Arizona, New Mexico and a little in Texas, but last year we found it for the first time in Washington State."This potentially deadly condition caused apprehension in California when the number of cases increased drastically during 2010 and 2011. Valley fever infections have been on the rise, probably because of warming climates and drought causing dust storms. Dry soil and wind can carry spores that spread the virus. Hotter and drier climates are projected to increase the amount of dusting carrying this disease. Researchers have already noticed rise in mosquito-borne disease like dengue fever and malaria due to warmer and longer summers. Perhaps the most prominent mosquito-borne disease.

Global warming is also affecting animals. They need to move to cooler places in order to survive. This process has been observed in various places, for instance, in the Alps, in mountainous Queensland in Australia, and in the misty forests of Costa Rica. Fish in the North Sea have been reported to move northwards too .The impacts on species are becoming noteworthy to such an extent that their movements can be used as a sign of a warming world. They are the silent witnesses of the swift changes being inflicted on the Earth. Scientists and researchers predict that global warming is gradually damaging the ecosystems of various species and is playing a very unconstructive role in making them extinct.

VII. Alternative Energy Sources: The hazards caused by global warming are tremendous. Excessive use of fossil fuels such as coal, natural gas and oil play a part in it too. The usage of fossil fuels should be discontinued immediately. The most significant solution to put an end to this disaster is the use of alternative energy sources. They include wind, solar, bio mass, geothermal and hydro. The most noteworthy point in using these sources is their clean nature.

They do not produce any sort of pollution or toxic gases that can lead to global warming. They are environmentally friendly and pose no threat to ecological balance. However, their high installation and setup costs may drive energy companies away from them at first but in the long run they are surely beneficial for everyone. Most importantly, fossil fuels will deplete one day and sooner or later, we have to turn to renewable energy sources for energy production. Thus, the eventual solution to end global warming is to use alternative energy sources. Fig. 9 depicts in a pictorial way that earth can be saved from the hazards of global warming if we utilise renewable energy sources.

VIII. Other Solutions: As elaborated earlier, toxic emissions are a major cause of global warming, A likely solution to reduce harmful emissions is to cut the usage of vehicles which produce them. This has not been met with much success as many people refuse to cut down their practice of using cars. No doubt, some people have started to use bicycles and public transport, whereas some other prefer to walk but these numbers are relatively small. It should be noted that fuel economy and emission rates are chief factors to consider regarding the car choice. Hybrid cars have higher efficiency and lower emission rates. Keeping the tires inflated will help improve mileage and air filters should be frequently replaced to cut down harmful emissions. People should share the ride with friends or co-workers to reduce the total number of vehicles on the road. Print and social media can play an effective role in curbing the problem. It should use the philosophy of automobile advertisements to encourage drivers to conserve energy and reduce pollution. Awareness campaigns can be started using placards, posters and logos.

IX. Conclusions: The scientific and environmental community is on the same page regarding the bitter reality of global warming and the involvement of human factor in it. The paper discussed here has only dented the surface of what is a very intricate line of scientific and engineering exploration. Global warming is a big hazard and appropriate measures must be taken to tackle this serious problem. This problem is not only causing trouble to the human beings but also to animals and plants. Melting of polar ice caps will lead to floods which can cause mayhem everywhere. Rise of sea levels will devastate agricultural and fishing activities. To embark upon these problems, some remedial steps must be timely taken which include but are not limited to the use of renewable sources of energy and stopping deforestation. Innovative solutions must be brought forward to end this hazard once and forever.

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VIII
SUSTAINABLE DEVELOPMENT AND GREEN ECONOMY

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Abstract: The "green economy" has become a topic of growing discussion in light of the environmental crisis. It is for example the subject of a major initiative by UNEP, which launched its Green Economy report in February. It has also become a rather controversial term, perhaps because it has become the subject of a multilateral negotiating process, within the Rio-Plus-20 framework. The "green economy" is not a concept that has yet to enjoy widespread agreement (among economists or environmentalists) or an international consensus. It is an extremely complex concept and it is unlikely there can be a consensus on its meaning, use and usefulness and policy implications, in the short term.

A "green economy" gives the impression of an economy that is environmentally-friendly, sensitive to the need to conserve natural resources, minimise pollution and emissions that damage the environment in the production process, and produces products and services the existence and consumption of which do not harm the environment. Among the difficult questions are whether the attainment of such an economy constrains other aspects (including economic growth of poor countries, and social development goals such as poverty eradication and job creation); how to identify and deal with the trade-offs; what are the appropriate combinations between these aspects and at different stages of development as well as stages in the state of the environment; what is the role of the state in regulation and investments and defining frameworks; how compatible is a green economy with the free market and what is the appropriate way to address the role of the private sector; how to build an economy that is more environmentally-friendly, and how to handle the transition from the present to the greener economy?

Introduction: The Green Economy issue being discussed in the Rio Plus 20 process must also be context specific, or specific to the framework in which it is being discussed. This context is the Rio Plus 20 conference, which is a follow up to Rio 1992. This is explicit in the mandate of the 2012 Conference that refers to "a green economy in the context of sustainable development and poverty eradication". For this purpose, the green economy is thus not an academic idea for free brainstorming. It must be derived from and rooted in the spirit, objectives, principles and operationalising of UNCED 1992, and especially the Rio Principles and Agenda This should be supplemented by the Rio Plus 10 conference outcomes and commitments.

The main framework of UNCED 1992, its related agreements (UN Framework Convention on Climate Change, UN Convention on Biological Diversity and UN Convention to Combat Desertification) and its follow-up processes is to place the environment together with

development in a single context. This is a unique achievement which has to be preserved and advanced, and not detracted from or diverted from.

Environmental standards: Another potential problem is the adoption of environmental standards for products; developing countries that are unable to meet the standards face the prospect of losing their exports. The approach towards developing countries should be to provide resources and technology for upgrading their environmental technology and standards, and not to penalise them. The full and effective participation of developing countries in setting international standards is also needed as many important standards are currently "globalised" from those of developed countries without the concomitant support to developing countries to assist them to comply with such standards

Recognizing economic and social value of environmental resources: It is crucial for policy makers and the public to recognise the economic and social value of the environment that conserving resources such as clean air, water, forests, mangroves etc have positive externalities which are valuable for meeting basic and human needs besides having their intrinsic environmental worth. Conservation should thus be promoted, and there should be investments on rehabilitation of damaged natural resources. Recent studies have compared the benefits of conserving or sustainable using natural resources, with the benefits such as revenues from using or exploiting the resources in a way that maximises short-term profits at the expense of the environment.

The critical role of the public sector: Besides its regulatory function, the state has also an important role in strategic policy-making in re-orienting various economic and social sectors towards a sustainable development pathway. As argued by UNDESA, developing countries face a vastly more daunting challenge than developed countries and in a far more constrained environment, since much of the atmospheric space has been used up already (and mostly by developed countries). Can high growth in developing countries be combined with lowering the emissions trajectory? UNDESA argues it is feasible because the technologies exist but such a switch entails unprecedented and potentially very costly socio-economic adjustments in developing countries. This switch will require a high level of international support to boost finance, technology and institutional capacity in developing countries, capable of raising investment levels and channelling resources towards lowering the carbon content of economic activity and building resilience to unavoidable climate changes. The mix of market and non-market measures may be different for developed countries (which may give a greater role to market mechanisms, taxes and regulations) and developing countries, which should emphasise public investment and industrial policies, managed by a developmental State.

Regulating the Market: Another major issue of the "green economy" is the need for regulating markets and corporations. Although the private sector has an important role to play in the shift to sustainable development and to a green economy, they should operate within the framework of government regulation and policies. Markets and companies left to them have been unable to

take a sustainable development pathway. Indeed, much of the pollution, extraction and depletion of resources in the world have been the result of activities of companies, especially the big companies.Companies have to operate in an intensely competitive environment, with imperatives to minimise costs and maximise profits, with the short-term being the critical horizon. Governments have to establish the frameworks of regulation, incentives and disincentives, so that corporate practices are aligned to environmental, social and developmental objectives. The Stern Report termed the climate change crisis as "the greatest market failure the world has ever seen.

The issue of financing sustainable development and the transition to a green economy is not restricted to ODA or the transfer of funds through various Conventions. It is also linked to other issues in the global economy which greatly influence the amount and volatility of the flow of financial resources to developing countries. These issues include external debt, the terms of trade, trade policies and performance, commodity prices, volatility in the international flows of funds, and reform of the international monetary and financial system.

Conclusions: There are many challenges and obstacles facing developing countries in moving their economies to more environmentally friendly paths. On one hand this should not prevent the attempt to urgently incorporate environmental elements into economic development. On the other hand, the various obstacles should be identified and recognised and international cooperation measures should be taken to enable and support the sustainable development efforts. The conditions must be established that make it possible for countries, especially developing countries, to move towards a "green economy." The main conditions and dimensions have been recognised in the negotiations that led to Rio 1992, and are well established in the Rio Principles and in Agenda The treatment of the "green economy" in Rio Plus 20 should be consistent with the sustainable development concept, principles and framework, and care should be taken that it does not detract or distract from "sustainable development". Thus the "value added" to the Green Economy as contrasted to sustainable development should be identified. Care has to be taken to ensure that the "green economy" term and concept is also understood to include the social, equity and development dimensions, including the need for internationalprovision of finance and technology and accompanying global economic reforms and that the risks of the misuse of the term are adequately addressed.

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IX

शेती क्षेत्रातील हरीत तंत्रज्ञान

डॉ.यशवंत धनाप्पा हरताळे

विवेकानंद कॉलेज, कोल्हापूर

गोषवारा : आजच्या परिस्थितीमध्ये जगभरातील अनेक देश हायटेक तंत्रज्ञानाचा वापर करुन शेती आणि उत्पादकाच्या हिताला प्राधान्य देण्याचा प्रयत्न केला आहे. शेती विकासाच्या दृष्टीने हवामानाच्या बदलाला सामोरे जाण्यासाठी आधुनिक तंत्राचा अवलंब करावा लागेल. संशोधन आणि त्याची अंमलबजावणी हे भारतामध्ये खुप वर्षाचे आहे हे सर्व प्रयोग शेतकऱ्यांपर्यंत पोहचतील याची शाश्वती नसते. पण कृषि क्षेत्रातील व्यवहाराच्या दृष्टीने तंत्रज्ञान खूप व्यापक आहे.पण योग्य पाऊल उचलल्यास भविष्यकाळ उज्वल आहे म्हणून शेती विकास कार्यक्षम करण्यासाठी जी.एम.पिकाला आणि तंत्रज्ञानाला योग्य न्याय दिल्यास शेती विकसीत झाल्याशिवाय राहणार नाही.

कि-नोट :- कृषि तंत्रज्ञानातील बदलता दृष्टीकोन, हायटेक तंत्रज्ञान, शेती

प्रस्तावना : भारत स्वातंत्र्य झाल्यानंतर शेती व्यवसायात मोठ्या प्रमाणात बदल झाल्याचे दिसून येत आहे.या शेती व्यवसायात अनेक लोकांची रोजीरोटी व रोजगार, बेरोजगार याच शेती क्षेत्राने सामावून घेतला आहे. म्हून अलीकडच्या काळात शेती क्षेत्रात बऱ्याच मोठ्या प्रमाणात हायटेक तंत्रज्ञानाचा आविष्कार झाल्याने शेती व्यवसायात हरीत क्रांती, नील क्रांती, श्वेत क्रांती, घडून आल्याचे दिसून येत आहे. शेती क्षेत्रामधून आर्थिक, सामाजिक, भौगोलिक क्षेत्राचे विकास साध्य करण्यासाठी शेती पायाभूत व्यवसाय मानून प्रथम शेतीचा मोठ्या प्रमाणात विकास करण्यासाठी आधुनिक शेती कसण्याच्या पध्दती, शेतीला पाणी पुरवठ्याच्या आधुनिक सुविधा, उत्पादनाच्या आधुनिक पध्दती, किटकनाशके व पेस्टीसाईडस् यांच्या माध्यमातून शेती उत्पादन मोठ्या प्रमाणात घेतले जात आहे. या पध्दतीने शेती विकास सांधण्यासाठी सरकारने अनेक योजनांचा शुभारंभ सुध्दा केला आहे.या योजना मनरेगा, राष्ट्रीय कृषि विकास योजनाच्या माध्यमातून उत्पादकाच्या पर्यंत पोहचविल्या जात आहे.

आजच्या काळात आधुनिक शेतीचा पाया भक्कम करण्यासाठी ग्रामीण भागापर्यंत आर्थिक सुविधा उपलब्ध होण्यासाठी बँकींग सुविधा या 'ई' बँकींग योजनेच्या माध्यमातून उत्पादकाच्या पर्यंत पोहचविल्या आहेत. तसेच अनेक सरकारी योजना 'ई' गर्व्हनंन्सच्या माध्यमातून पुरविल्या आहेत. या 'ई' गर्व्हनन्सच्या माध्यमातून आधुनिक शेतीचे संदेश हवामान विषयक माहिती, किड रोग नियंत्रण व

प्रतिबंधक उपाययोजना केल्या आहेत, इत्यादी माहिती उत्पादकाना वेबपोर्टल, मोबाईल ॲप्लीकेशन, ब्लॉगस्पॉट (Blogspot), फेसबुक, यू-ट्युब, टोल फ्री क्रमांक देवून इंटरनेट सुविधा सायबर सिक्युरिटी तसेच सॅटेलाईट व ड्रोनच्या तंत्रज्ञानाचा कृषि क्षेत्रात 100% वापर करणे हे शेती प्रगतीचे लक्षण समजले जाते.

आधुनिक काळात कृषि विभागाने पोर्टलच्या साहाय्याने शेतकऱ्यांना एकाच संकेत स्थळावरुन सर्व आधुनिक माहिती उपलब्ध करुन देण्याचे धोरण आखले आहे.त्यामुळे जगातील अनेक देशांनी शेती क्षेत्रामध्ये प्रगती करण्याच्या दृष्टीने हायटेक तंत्रज्ञानाचा वापर करीत आहेत. बी.टी.कापसा बरोबर जी.एम.पिकाची वाढ मोठ्या प्रमाणात करीत आहेत. भारत त्याला अपवाद आहे.विकसीत देशांनी अनेक जी.एम.पिकांची लागवड मोठ्या प्रमाणात केली.भारताने फक्त दोनच जी.एम.पिकांची लागवड करण्यास सुरवात केली आहे.जी.एम.पिकाच्यामुळे देशात मोठ्या प्रमाणात वाढ होत आहे.जी.एम.पिकाच्या उत्पादनामुळे शाश्वत विकास मोठ्या प्रमाणात दिसून येत आहे.

भारतासारख्या विकसनशील राष्ट्रात शेती विकास ही शाश्वत स्वरुपाचा दिसून येत आहे.शेतीवर मोठ्या प्रमाणात लोकसंख्येचा ताण असून सुध्दा शेती विकसीत करण्याचे धोरण योग्य असून त्याचा अवलंब शेती क्षेत्रात केला जात नाही.म्हणून आधुनिक काळात शेती विकासासाठी त्याची व्याप्ती पाहून या शेतीवर हरीत क्रांतीचे प्रयोग केले तर शेती विकास मोठ्या प्रमाणावर घडून येईल.पारंपारीक शेती सोडून अलीकडच्या काळात म्हणजे दोन-चार दशकामध्ये शेती तंत्रज्ञानात खूपच वाढ झाली आहे.तंत्रज्ञानाचा वापर आणि त्याचा थेट शेतीवर वापर यामुळे पर्यावरण आणि मानवाच्या गरजा याचा योग्य मेळ घालणे हिताचे असते.त्यासाठी शेती व्यवसायात डिजीटल मॉडेलिंग, इलेक्ट्रॉनिक तंत्रज्ञान, जी.एम.ओ.क्रिस्पर कॅश-9, नॅनो तंत्रज्ञान, ड्रोन व रोबो यांचा अचूक निदानासाठी ग्रीन अकौउनटींग पध्दत अत्यंत महत्वाची आहे.ती समजावून घेण्यासाठी पुढील काही महत्वाच्या बाबी विचारात घेणे योग्य ठरेल.

1) शेतकऱ्याचे स्वरुप :- भारतीय शेती योग्य प्रमाणात कार्यक्षम ठऱण्यासाठी उत्पादकानी नियोजनबध्द व अचूक शेती व्यवसाय करणे योग्य ठरतो. त्यासाठी ॲग्रीप्रिन्यूअर हा तज्ञ व ज्ञानी असावा लागतो.शेतमाल उत्पादनापासून ते प्रक्रिया होवून ग्राहकांपर्यंत पोहचेपर्यंत त्याचे योग्य ते नियोजन करता आले पाहिजे.

2) नैसर्गिक संसाधनांचा वापर :- शेती उत्पादन आधिक प्रमाणात वाढविण्यासाठी उपलब्ध नैसर्गिक साधन संपत्तीचा वापर करुन शेती विकासीत करण्याचा प्रयत्न केला पाहिजे. यामध्ये पाणी, जमीन,

सिंचन पध्दती, एच.वाय.व्ही.पी.बियाणाचा वापर शेती उत्पादनात वाढ करण्याचा मानस वाढविला पाहिजे.उदा.2011-12 मध्ये सिंचन क्षेत्रामध्ये वाढ झाल्यास क्रॉप इंटेन्सिटी (Crop Intensity) 123.1 वरुन 143.3% पर्यंत वाढ झाल्याचे दिसून येते.त्याचप्रमाणे व्यापारी पिकामध्ये 38% वरुन 69% पर्यंत वाढ झाल्याचे दिसून येते.

3) ऊस शेतीतील नवे तंत्रज्ञान :- शुगर केन इन फॉरमेशन आणि मॅनेजमेंट सिस्टम (SIMS) भू वैज्ञानिक माहिती तंत्राने ऊसपिकाचे नियोजन केले जाते. कृषि तंत्रज्ञानाची गरज भविष्यकाळात वाढणार आहे.त्यामध्ये जैन तंत्रज्ञान, नॅनो तंत्रज्ञान, जी.एम.ओ.चे तंत्रज्ञान, शेतकऱ्यांपर्यंत पोहचतील अशा पध्दतीने नियोजन करावे. शेतकरी हा ॲग्रीप्रिन्यूअर बनवून रिमोट सेन्सिंग, रोबोट सेन्सॉर व्दारे पिकाचे अचूक निदान करण्यासाठी बौध्दीक क्षमतेचे प्रशिक्षण केंद्र स्थापन करुन त्याव्दारे मेकॉटॉनिक्स, सिंथेटीक, जीवशास्त्र, बायोनॉमिक्स, हरीत अर्थशास्त्र (ग्रीन इकॉनॉमिक्स) यासारखे नवे विषय उत्पादकाना अभ्यासावे लागतील.

अलीकडे रोबोट मल्टिसेन्सॉर यंत्रणेने पाणी, हवा, खनिजे, खताच्या मात्रा, किड व रोगाचे निदान यावरील उपाय सहज उपलब्ध होते. यासंबंधीचे संशोधन 2025 पर्यंत पूर्ण होवून त्याची वाणिज्य पणन प्रक्रिया शेतकऱ्यांना उपलब्ध करावी त्यामुळे हवेतील मुळाव्दारे उपलब्ध होणाऱ्या कार्बनची माहिती मिळते. म्हणून मायक्रो क्लाईमेंट चेंज डिरेक्टराव्दारा हवामानातील बदलाची नोंद करुन त्या आधारे पिक संरक्षण करणे हिताचे ठरते.

4) 2030 पर्यंत कृषि तंत्रज्ञान :- आधुनिक काळातील शेती तंत्रज्ञान अधिक विकसित होत असल्याचे दिसून येत आहे. त्यामध्ये जैव तंत्रज्ञान वयंत्रज्ञान, सिंचन तंत्रज्ञान, जी.एम.ओ., क्रिस्पर कॅश-9 व 12, अचुक निदानाची शेती तंत्रज्ञान, इलेक्ट्रीक कृषि तंत्रज्ञान, सुटूर संवेदन तंत्रज्ञान, जैवशाश्वत तंत्रज्ञान, पोषणक्षम शेती तंत्रज्ञान, ॲग्रिहॉर्टलिव्ह स्टॉक तंत्रज्ञान, वायरलेस ॲग्रीकल्चर व सिंथेटिक बायोलॉजीचे नवे तंत्रज्ञान अशा बौध्दिक भांडवली तंत्रज्ञानाची शेती क्षेत्रात पदार्पण होत आहे. अशा तंत्राने शेती विकासाच्या दृष्टीने या तंत्राच्या साहाय्याने शेती क्षेत्रात चौथी क्रांती घडून चिन्हे दिसून येत आहेत. त्याचे प्रमाण 2030 पर्यंत म्युटेशन बायोलॉजी आणि D.N.A. व R.N.A. तंत्रज्ञानाचा झपाट्याने विकास होत आहे.

5) कृषि तंत्रज्ञानाची वर्गवारी :- पिक उत्पादनापासून ते उपभोक्त्याच्या हातात मिळेपर्यंत म्हणजे कच्या मालापासून ते पक्या मालामध्ये रुपांतर होण्यासाठी पिकाची अनेक प्रकारात वर्गवारी करावी

लागते. व एकच प्रकारच्या उत्पादनापासून अनेक उपउत्पादने निर्माण करण्याची प्रक्रिया उद्योगामध्ये करुन त्याचे अनेक विभाग करावे लागतात. ते आज आधुनिक पध्दतीने यंत्राच्या साहाय्याने करणे हिताचे ठरते.

6) जीवशास्त्रीय तंत्रज्ञान :- शेतीशासाचा जीवशास्त्र हा एक व्यापक विषय आहे. यामध्ये आधुनिक बियाणे, किडनाशके, कलम, हायब्रीड तंत्रज्ञान, अलीकडची कार्बन शेती, ह्युमस टिकविणे, मल्चिंग व वाईल्ड व्हरायटीचे संशोधन यांचा यामध्ये समावेश होतो.तसेच सुक्ष्म जिवाणूच्या जेनेटिक ट्रान्समिशन टेक्नॉलॉजी ही अलीकडची क्रांती आहे. दुष्काळी भागामध्ये उष्ण हवा, सहन पिके व कमी पाण्यावर जगणारी पिके या D.N.A. व R.N.A. या प्रक्रियेमधून उत्पादीत केली जात आहेत. अलीकडच्या सेंद्रीय शेतीला मोठ्या प्रमाणात स्थान दिले आहे. म्हणून 2023 हे वर्ष आंतरराष्ट्रीय मिलव्हॅट (भरड धान्य) वर्ष म्हणून साजरे होणार आहे.

7) यांत्रिक कृषि तंत्रज्ञान :- आधुनिक काळात विकसीत देशातील शेती ही विकसीत तंत्राने मोठ्या प्रमाणात केली जात आहे. U.S.A. कॅलिफोर्निया देशामध्ये 500 ते 700 हेक्टर आधुनिक पिके यांत्रिकीकरणाच्या साहाय्याने केली जाते. यामध्ये कटिंग प्रुनिंग, प्लॉटिंग, विडींग, टाईमर लावून सिंचन संयंत्र स्प्रिंकलर, हार्वेस्टींग व मार्केटींग साठीची पॅकिंग ही सर्व कामे यंत्राच्या साहाय्याने केली जातात. हे मोठे उत्पादन ड्रोन व रोबोटच्या साहाय्याने पीक संरक्षण व पाहणी केली जाते. व त्याचे विश्लेषण ऑनलाईन इन्फॉरर्मेशन घेवून किट व्दारे त्वरीत माहिती घेवून उपाय केले जातात. त्या माहिती नुसार लागलीच त्या पिकावर योग्य ती फवारणी केली जाते.

जेनेटिकली डिझाइन्ड फुड मालेतील अभियांत्रिकी तंत्रज्ञानाने जैविक आणि शारीरिक लुक स्ट्रेस व थकवा घालविण्यासाठी अन्नघटक निर्माण करता येतो.यासाठीचे यंत्र 2022 नंतर बाजारात येईल.त्याचप्रमाणे 2027 नंतर इनविंट्री मटन प्रणाली ट्यूबस्टिकच्या मांसाच्या स्वरुपात आणतायेते का?याचे संशोधन सुरु आहे.तसेच 2026 पर्यंत शेतीची मशागत मानवाऐंवजी रोबोट करेल अशाप्रकारचे संयंत्र 2026 नंतर बाजारपेठेत येईल असा अंदाज आहे.अशी यांत्रिक शेती हरीत अर्थशास्त्राच्या कक्षेत येईल असे वाटते.

8) पर्यावरण संरक्षण आणि जैव तंत्रज्ञान :- जी.एम. तंत्रज्ञानामुळे पर्यावरणास धोका होतो.तसेच आधुनिक पिकावर जैवतंत्रज्ञानाव्दारे जी.एम.पिकाची वाढ विषारी औषधे फवारुन केली जाते ती पिके विषारी बनतील म्हणून जी.एम.तंत्रज्ञानामुळे एका बाजूला पर्यावरण व दुसऱ्या बाजूला मानवी संस्कृती

नष्ट होत असेल तर अशी पिके घेण्यास विरोध होत आहे.म्हणजे यामुळे प्रगती तितकी अधोगती दिसून येत आहे.

9) सौरशेती (Sun Farming) :- सौर उर्जा ही नष्ट न होणारी एक शक्ती मानली जाते. आधुनिक काळात शेतीला पाणी पुरवठ्यासाठी विद्युत पंपाची गरज असते.अशी गरज पूर्ण करण्यासाठी विद्युतशक्ती ऐंवजी सौर उर्जेचा वापर केला तर उत्पादकाना अधिक नफा मिळेल म्हणून अलीकडच्या काळात सौर शेतीला महत्व प्राप्त झाले आहे. आज भारतातील सुमारे 5,069 खेडेगावाना वीजपुरवठा होत नाही तेथे सौर उर्जेचा वापर केला तर अधिक फायदा होवू शकेल. भारतात मार्च 2017 पर्यंत 7,771 सौर मोटार पंप बसविण्यात आले आहेत. अशा तंत्राला शासनाने 2.70 लाखाची सबसिडी दिली आहे.

10) कार्बनची शेती :- जैव तंत्रज्ञाना बरोबरच इतर घटक म्हणून कार्बनची शेती अग्रहक्काने येते. फक्त बायोटेक्नॉलॉजी पध्दतीने सर्व काही विकसीत होईल असे नाही.त्यासाठी मातीतील मायक्रोन्स आणि जलयुक्तता निर्माण करावी लागते. यामध्ये मातीतील ह्यूमस निर्माण करणे म्हणजे कार्बन निर्माण करणे होय. जमिनीतील मातीची श्रीमंती ह्यूमसमुळे व घनकचऱ्यामुळे निर्माण होते म्हणून अलीकडे गवताळ प्रदेशामध्ये हवेत कार्बन निर्माण करण्यापेक्षा मातीत कार्बन निर्माण केला तर जमिन अधिक पिकाऊ व सुपीक बनते.

11) कृषि जैवतंत्रज्ञानाने उत्पादीत पिकांची पणन व्यवस्था :- कृषि जैव तंत्रज्ञानाचा विस्तार इतर तंत्रज्ञानाच्या तुलनेत खूप झपाट्याने होत आहे. त्यामुळे वेगळी पिक संस्कृती व कृषि संस्कृती निर्माण होत आहे.या तंत्रज्ञानाने दुष्काळी परिस्थिती पूर्णपणे घालविली जात आहे.समाजातील लोकांची अन्न व्यवस्था निर्माण करण्याचे सामर्थ्य या पणन व्यवस्थेमध्ये आहे.म्हणून शेतकरी व ग्राहक यांच्या हिताचे हे तंत्रज्ञान असल्यामुळे याचा विस्तार अधिक लाभदायक होणे गरजेचे आहे.

12) वैज्ञानिक शेती :- भारतात अलीकडच्या काळात शेती क्षेत्रामध्ये आधुनिक यंत्रे, तंत्रे, बि-बियाणे, यामध्ये HYVP Seeds याचा वापर करुन शेती मोठ्या प्रमाणात विकसीत करण्याचा प्रयत्न केला जात आहे. शेती कसण्याच्या पध्दतीमधील आधुनिकता व शेतमाल विकण्याचे आधुनिक तंत्र म्हणजे 'ई' कॉमर्स आणि शेतकऱ्यांना सबसिडी देणे इ. पध्दती आधुनिक शेती तंत्रामध्ये वापरले जाते.

13) ऑटोमायझेशन :- स्मार्ट शेती व शेतीचे यांत्रिकीकरण केले जात आहे. त्यातून मोठ्या प्रमाणात उत्पादन घेतले जाते व शेतीची सर्व कामे रोबोटच्या माध्यमातून अनेक कामे केली जातात. चालक विरहीत प्रोग्रॅम करुन शेतकरी आपली कामे करुन घेतात.

या पध्दतीने भारतीय अर्थव्यवस्थेत हरीत विकास साध्य करावयाचा असेल तर वरील बाबींचा कार्यक्षम वापर करुन शेती क्षेत्रामध्ये हरीत विकास घडवून आणणे हे भविष्याच्या दृष्टीने उज्वल ठरणार आहे.

सारांश : शेती क्षेत्रातील हरीत तंत्रज्ञान साध्य करण्यासाठी हरीत अर्थव्यवस्थेमध्ये नियोजन व कार्यक्षमता, 'ई' पिक पाहणी (ई) कागदपत्रे, ई गर्व्हनंनस, 'ई' कॉमर्स, इलेक्ट्रॉनिक सिस्टीम मोठ्या प्रमाणात राबवून विकासाला योग्य ती साथ मिळाली तर शेती क्षेत्रात हरीत क्रांती झाल्याशिवाय राहणार नाही. यासाठी सरकारच्या योजना छोट्या व मोठ्या शेतकऱ्यांना वेगवेगळ्या करुन त्याची पाहणी 'ई' गर्व्हनन्सच्या माध्यमातून एकसंघरित्या राबविणे अत्यंत महत्वाचे ठरेल. यासाठी 'ई' व्यवस्थापन रचना, संगणकिय दृष्टीकोन, शेती तंत्रातील बदलता दृष्टीकोन यासाठी योग्य ठरेल. या सर्व गोष्टी ई मार्केटींग पध्दती बरोबर कार्यक्षम केल्या तर शेती क्षेत्राचा भविष्यकाळ उज्वल आहे हे निश्चित. हा सर्व चांगला परिणाम युवा पिढीवर सोपविणे व त्यांनी या सर्व बाबींसाठी लक्ष केंद्रीत करणे महत्वाचे आहे.

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X

IMPACT OF INDUSTRIALIZATION ON ENVIRONMENT IN INDIA

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Abstract: Industrialization brought economic prosperity; furthermore, it has led to an increase in population, urbanization, obvious stress on basic survival systems, pushing the environmental impacts closer to the limits of the tolerance threshold. With booming industrial growth and a relatively low landmass, environmental sustainability is now becoming an important deciding factor in the industrial development process. The accumulation of evidence consistently indicates that the transition of existing industries into the eco-industrial network through the effective implementation of ecological approaches provides a viable solution to preserve the region's natural resources while improving the regional economy on a lasting basis. After a rigorous assessment of previous and current situations, it necessitates proper planning and an integrated framework that is in harmony with the environment.
Empirical knowledge about the affected area helps to understand the local context and to develop other action plans based on the realities on the ground. To this end, a study was carried out on industrial pollution and the current environmental context of India.

Air pollution, poor waste management, increasing water scarcity, declining groundwater, water pollution, forest conservation and quality, biodiversity loss, and land degradation. Soils and soils are some of the major environmental issues facing India today.

Keywords: Earth, Environment, Global, Impact, Industrialization, Pollution.

Introduction:

Since the days of the industrial and technological revolution, economic growth has been considered the most important foundation of global growth. Industrial growth has begun with serious downside problems affecting the entire environment. These industries include transport and production, which deplete the earth's resources but also place enormous strains on the environment and the ecosystem. The productivity of industries generally depends on the available natural resources.

The effects of industrialization on the environment have led the way with certain positive and large negative results, with progressive rates and inventions. There is a multitude of ingenious natural elements such as water, air, soil, and fishing that are considered positive and fertile goods. Water, soil, and air pollution are defined as a by-product of economic development in

industry and cities. The consequences are global warming and greenhouse effects, which are massive effects of industrialization on the environment. The deterioration of the whole environment and ecosystem tends to become permanent and have various negative effects on the economy, causing human loss, poor health of employees with high costs to governments, industry, and society.

The constant air and water pollution with its harmful pollutants affect people's quality of life. The rapid growth of the industry is causing harmful effects on human life and polluting water and air. Air and water pollution are therefore the main problems in the establishment of other industries increases the main difficulties of water and soil degradation.

I. Environmental Impacts

There are four main hit points when it comes to industrialization.

1. Air
2. Water
3. Soil
4. Habitat

Pollution of the Environment:

The introduction of hazardous chemicals, particulate matter, toxic substances, and biological organisms into the Earth's atmosphere is referred to as air pollution. Air pollution is caused by a variety of factors, but industry and factory emissions are frequently cited as major contributors.

(Fig. 1) [Source: http://environmentinsider.com/wp-content/uploads/2014/06/ase17.jpg]

Industrial air pollution has a slew of negative environmental consequences and health risks. Below, we go over a few of them in detail.

1. **Warming of the Planet**

Global warming is often recognized to be one of the most dangerous and serious consequences of air pollution created by industry and other stationary sources. The release of certain gases, such as methane (CH4) and carbon dioxide (CO2), which are collectively known as greenhouse gases, is frequently cited as one of the primary causes of global warming. As a result of these greenhouse gases, the temperature of the atmosphere rises, creating global warming. Global warming has numerous negative effects both on the ecological balance as well as human health. It frequently causes glaciers and snow-capped mountains to melt, causing higher water levels in oceans and rivers, increasing the risk of flooding. Apart from this, global warming also often has multiple major health concerns on humans such as an increase in diseases like Lyme, malaria, cholera, dengue, and plague, among others.

2. **Acid Rain**

Industries often generate enormous amounts of nitrogen and sulfur gases into the Earth's atmosphere. When these gases react with water vapors in the atmosphere, they generally transform into more aggressive gases, particularly nitric acid and sulphuric acid correspondingly. The rain containing considerable concentrations of these acids is known as acid rain. Acid rain has different health and natural dangers. It causes the erosion of monuments and buildings, makes the soil acidic in nature, resulting in diminution of plant and animal growth, among other concerns. Apart from this, acid rain causes major health diseases such as cancer, skin disorders, and even death.

Pollution in the Water:

The industry is a major source of water pollution, releasing pollutants that are exceedingly damaging to people and the environment, particularly in areas where factories are situated near natural water sources. Toxins can take a range of forms, including solid, liquid, and gaseous, and they can all contaminate local water supplies. Even landfills and other waste disposal places, like the River Ganga, can seep poisons into the surrounding water supply, causing pollution.

Among the pollutants emitted by industrial sources are:

1. **Sulfur -** is a mineral that is found in the soil. This is a non-metallic material that is toxic to marine life.
2. **Asbestos** – This contaminant is known to cause cancer. It can cause illnesses like asbestosis and several types of cancer when inhaled.
3. **Mercury and lead** – These are metallic elements that can harm humans and animals' health and the environment. It's also dangerously poisonous. Because it is non-

biodegradable, it is usually difficult to remove it from the environment once it has gotten into it.

Pollution caused by the oil industry:

Shipping, run-offs, and oil dumping on the ocean's surface occur on a daily basis. Oil spills account for around 12% of all oil entering the ocean. Oil spills are particularly dangerous to nearby marine animals such as fish, birds, and sea otters, as well as other aquatic life. Because oil does not disperse, it clings to the surface of the water, suffocating fish. Seabirds' feathers become entangled with oil, making it harder for them to fly. As a result, some animals perish.

Pollution of the Soil:

Another issue that arises as a result of industrialization is soil contamination. Although lead pollution is the most common, other heavy metals and harmful compounds can also leak into the soil and contaminate any crops that grow there. The presence of xenobiotics (human-made) chemicals or other modifications in the natural soil environment produce soil contamination or pollution as part of land degradation. Industrial activities, agricultural chemicals, and inappropriate waste disposal are the most common causes. Petroleum hydrocarbons, polynuclear aromatic hydrocarbon solvents, insecticides, lead, and other heavy metals are the most prevalent compounds involved.

The degree of industrialization and the intensity of chemical compounds are linked to contamination. Health concerns from direct contact with contaminated soil, fumes from toxins, or secondary pollution of water supplies inside and beneath the soil are the main reasons for concern about soil contamination. Contaminated soil mapping and cleanups are time-consuming and costly activities that necessitate considerable knowledge of geology, hydrology, chemistry, computer modeling, and GIS in Environmental Contamination, as well as an understanding of industrial chemistry's history.

Habitat:

industrialization has led to catastrophic habitat degradation. Forests are hacked down for their lumber, and ecosystems are destroyed to develop roads, strip mining, and gravel pits. Destroying these habitats disturbs local ecosystems and leads to plant and animal extinction if the species are unable to move or adapt to their new circumstances.

II. The Impact of Industrialization

The most serious issue is air pollution, which is caused by the smoke and fumes produced by the burning of fossil fuels. The Environmental Protection Agency (EPA) of the United States controls more than 80 different poisons found in industrial pollution, ranging from asbestos and

dioxin to lead and chromium. Despite these limitations, industries are among the world's most polluting sources of air pollution.

(Fig. 2) [Source: https://cff2.earth.com/uploads/2016/12/19122358/industrialization-stock.jpg]

Water pollution is an issue in these locations as well, particularly in areas where factories are located near natural water sources. Toxins can take a range of forms, including solid, liquid, and gaseous, and they can all contaminate local water supplies. Even landfills and other waste disposal places can seep poisons into surrounding water supplies, causing contamination such as that seen in the Nile River.

The Cycle of Carbon

Another issue that arises as a result of industrialization is soil contamination. Although lead pollution is the most common, other heavy metals and harmful compounds can also leak into the soil and contaminate any crops that grow there.

(Fig.3) [Source: https://suez.azureedge.net/-/media/suez-global/images/header/e-secteurs/power-industry.jpg?v=1&d=20180820T152259Z]

Finally, development has resulted in significant habitat loss. To build roads, strip mines, and gravel pits, forests are cut down for their lumber, and ecosystems are destroyed. Destruction of these habitats disrupts local ecosystems and may result in plant and animal extinction if species are unable to move or adapt to their new environment.

Conclusion: The problem of industrial pollution affects every country on the earth. With the growing threat of industrial pollution, many organizations and individuals are attempting to reduce carbon footprints and live and work in an environmentally responsible manner.

Industrial pollution, on the other hand, is still widespread, and proper management and regulation will require many years. There are numerous measures that can be performed to find long-term answers to the situation.

Controlling the source- Adopting new technology, providing effective employee training for safe use, developing better waste disposal equipment, and being more mindful about the use of raw materials can all assist to reduce industrial pollution at its source.

Reuse and recycle- To reduce industrial pollution, greater recycling efforts should be used to recycle as much dirty water as possible in industries.

Resource Decontamination- To clean the water and soil, organic methods should be used, such as employing bacteria that naturally feed on heavy metals and garbage. Cooling rooms or dumpsters must be built to allow enterprises to recycle the water they require rather than returning it to the natural water source from whence it originated.

Appropriate Treatment of Industrial Waste -Pollution can be reduced by creating and implementing adequate treatment facilities for handling industrial waste, as well as proper practices.

Habitat restoration and reforestation- Planting additional trees and plants in habitats can assist wildlife to reclaim their homes, while the trees can also help filter the air and function as a buffer against the environment.

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XI
Green Energy

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Abstract: Green energy is at the heart of all ecological strategies because it affects companies in three vital areas: environmental, economic, and social. Conventional energy sources based on oil, coal, and natural gas have proven to be highly effective drivers of economic progress, but at the same time damaging to the environment and to human health. The potential of renewable energy sources is enormous as they can in principle meet many times the world's energy demand. Renewable energy sources such as biomass, wind, solar, hydropower, and geothermal can provide sustainable energy services, based on the use of routinely available, indigenous resources. Renewable energy sources currently supply somewhere between 15 percent and 20 percent of world's total energy demand. The supply is dominated by traditional biomass, mostly fuel wood used for cooking and heating, especially in developing countries in Africa, Asia and Latin America. A major contribution is also obtained from the use of large hydropower; with nearly 20 percent of the global electricity supply being provided by this source. New renewable energy sources (solar energy, wind energy, modern bio-energy, geothermal energy, and small hydropower) are currently contributing about two percent. A number of scenario studies have investigated the potential contribution of renewables to global energy supplies, indicating that in the second half of the 21 st century their contribution might range from the present figure of nearly 20 percent to more than 50 percent with the right policies in place.

Key-words: Green Energy, renewable energy, indigenous resources, ecological strategies

Introduction: Green energy renewable energy sources although there are some differences between renew-Green energy is any energy type that is generated from natural resources, such as sunlight, wind or water. It often comes from able and green energy, which we will explore below. The key with these energy resources are that they don't harm the environment through factors such as releasing greenhouse gases into the atmosphere.

As a source of energy, green energy often comes from renewable energy technologies such as solar energy, wind power, geothermal energy, biomass and hydroelectric power. Each of these technologies works in different ways, whether that is by taking power from the sun, as with solar panels, or using wind turbines or the flow of water to generate energy.

In order to be deemed green energy, a resource cannot produce pollution, such as is found with fossil fuels. This means that not all sources used by the renewable energy industry are green. For example, power generation that burns organic material from sustainable forests may be renewable, but it is not necessarily green, due to the CO_2 produced by the burning process itself.

Green energy sources are usually naturally replenished, as opposed to fossil fuel sources like natural gas or coal, which can take millions of years to develop. Green sources also often avoid mining or drilling operations that can be damaging to eco-systems.

Types

The main sources are wind energy, solar power and hydroelectric power (including tidal energy, which uses ocean energy from the tides in the sea). Solar and wind power are able to be produced on a small scale at people's homes or alternatively, they can be generated on a larger, industrial scale.

1. Solar Power

This common renewable, green energy source is usually produced using photovoltaic cells that capture sunlight and turn it into electricity. Solar power is also used to heat buildings and for hot water as well as for cooking and lighting. Solar power has now become affordable enough to be used for domestic purposes including garden lighting, although it is also used on a larger scale to power entire neighborhoods.

2. Wind Power

Particularly suited to offshore and higher altitude sites, wind energy uses the power of the flow of air around the world to push turbines that then generate electricity.

3. Hydropower

Also known as hydroelectric power, this type of green energy uses the flow of water in rivers, streams, dams or elsewhere to produce energy. Hydropower can even work on a small scale using the flow of water through pipes in the home or can come from evaporation, rainfall or the tides in the oceans.

4. Geothermal Energy

This type of green power uses thermal energy that has been stored just under the earth's crust. While this resource requires drilling to access, thereby calling the environmental impact into question, it is a huge resource once tapped into. Geothermal energy has been used for bathing in hot springs for thousands of years and this same resource can be used for steam to turn turbines

and generate electricity. The energy stored under the United States alone is enough to produce 10 times as much electricity as coal currently can. While some nations, such as Iceland, have easy-to-access geothermal resources, it is a resource that is reliant on location for ease of use, and to be fully 'green' the drilling procedures need to be closely monitored.

5. Biomass

This renewable resource also needs to be carefully managed in order to be truly labelled as a 'green energy' source. Biomass power plants use wood waste, sawdust and combustible organic agricultural waste to create energy. While the burning of these materials releases greenhouse gas these emissions are still far lower than those from petroleum-based fuels.

6. Biofuels

Rather than burning biomass as mentioned above, these organic materials can be transformed into fuel such as ethanol and biodiesel. Having supplied just 2.7% of the world's fuel for transport in 2010, the biofuels are estimated to have the capacity to meet over 25% of global transportation fuel demand by 2050.

Importance of green energy:

Green energy is important for the environment as it replaces the negative effects of fossil fuels with more environmentally-friendly alternatives. Derived from natural resources, green energy is also often renewable and clean, meaning that they emit no or few greenhouse gases and are often readily available.

Even when the full life cycle of a green energy source is taken into consideration, they release far less greenhouse gases than fossil fuels, as well as few or low levels of air pollutants. This is not just good for the planet but is also better for the health of people and animals that have to breathe the air.

Green energy can also lead to stable energy prices as these sources are often produced locally and are not as affected by geopolitical crisis, price spikes or supply chain disruptions. The economic benefits also include job creation in building the facilities that often serve the communities where the workers are employed. Renewable energy saw the creation of 11 million jobs worldwide in 2018, with this number set to grow as we strive to meet targets such as net zero.

Due to the local nature of energy production through sources like solar and wind power, the energy infrastructure is more flexible and less dependent on centralised sources that can lead to disruption as well as being less resilient to weather related climate change.

Green energy also represents a low cost solution for the energy needs of many parts of the world. This will only improve as costs continue to fall, further increasing the accessibility of green energy, especially in the developing world.

Examples

There are plenty of examples of green energy in use today, from energy production through to thermal heating for buildings, off-highway and transport. Many industries are investigating green solutions and here are a few examples:

1. Heating and Cooling in Buildings

Green energy solutions are being used for buildings ranging from large office blocks to people's homes. These include solar water heaters, biomass fuelled boilers and direct heat from geothermal, as well as cooling systems powered by renewable sources.

2. Industrial Processes

Renewable heat for industrial processes can be run using biomass or renewable electricity. Hydrogen is now a large provider of renewable energy for the cement, iron, steel and chemical industries.

3. Transport

Sustainable biofuels and renewable electricity are growing in use for transportation across multiple industry sectors. Automotive is an obvious example as electrification advances to replace fossil fuels, but aerospace and construction are other areas that are actively investigating electrification.

Economically Viable

Understanding the economic viability of green energy requires a comparison with fossil fuels. The fact is that as easily-reached fossil resources begin to run out, the cost of this type of energy will only increase with scarcity.

At the same time as fossil fuels become more expensive, the cost of greener energy sources is falling. Other factors also work in favour of green energy, such as the ability to produce relatively inexpensive localised energy solutions, such as solar farms. The interest, investment

and development of green energy solutions is bringing costs down as we continue to build up our knowledge and are able to build on past breakthroughs.

As a result, green energy can not only become economically viable but also the preferred option.

The Most Efficient types

Efficiency in green energy is slightly dependent on location as, if you have the right conditions, such as frequent and strong sunlight, it is easy to create a fast and efficient energy solution.

Currently, wind farms are seen as the most efficient source of green energy as it requires less refining and processing than the production of, for example, solar panels. Advances in composites technology and testing has helped improve the life-span and therefore the LEC of wind turbines. However, the same can be said of solar panels, which are also seeing a great deal of development.

Green energy solutions also have the benefit of not needing much additional energy expenditure after they have been built, since they tend to use a readily renewable source of power, such as the wind. In fact, the total efficiency of usable energy for coal is just 29% of its original energy value, while wind power offers a 1164% return on its original energy input.

Renewable energy sources are currently ranked as follows in efficiency (although this may change as developments continue):

1. Wind Power
2. Geothermal
3. Hydropower
4. Nuclear
5. Solar Power

Green Energy Vs Clean Energy Vs Renewable Energy – Difference

As we touched upon earlier, there is a difference between green, clean and renewable energy. This is slightly confused by people often using these terms interchangeably, but while a resource can be all of these things at once, it may also be, for example, renewable but not green or clean (such as with some forms of biomass energy).

Green energy is that which comes from natural sources, such as the sun. Clean energy are those types which do not release pollutants into the air, and renewable energy comes from sources that are constantly being replenished, such as hydropower, wind power or solar energy.

Renewable energy is often seen as being the same, but there is still some debate around this. For example, can a hydroelectric dam which may divert waterways and impact the local environment really be called 'green?'

However, a source such as wind power is renewable, green and clean – since it comes from an environmentally-friendly, self-replenishing and non-polluting source.

Conclusions: Green energy looks set to be part of the future of the world, offering a cleaner alternative to many of today's energy sources. Readily replenished, these energy sources are not just good for the environment, but are also leading to job creation and look set to become

economically viable as developments continue. The fact is that fossil fuels need to become a thing of the past as they do not provide a sustainable solution to our energy needs. By developing a variety of green energy solutions we can create a totally sustainable future for our energy provision, without damaging the world we all live on.

TWI has been working on different green energy projects for decades and has built up expertise in these areas, finding solutions for our Industrial Members ranging from electrification for the automotive industry to the latest developments in renewable energy.

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XII
SUSTAINABLE DEVELOPMENT AND ENERGY POLICY IN INDIA'S COVID-19

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Abstract: India is the world's third-largest energy consuming country, thanks to rising incomes and improving standards of living. Energy use has doubled since 2000, with 80% of demand still being met by coal, oil and solid biomass. On a per capita basis, India's energy use and emissions are less than half the world average, as are other key indicators such as vehicle ownership steel and cement output. As India recovers from a Covid-19 induced slump in 2020, it is re-entering a very dynamic period in its energy development. Over the coming years, millions of Indian households are set to buy new appliances, air conditioning units and vehicles. India will soon become the world's most populous country, adding the equivalent of a city the size of Los Angeles to its urban population each year.

India Energy Outlook 2021 explores the opportunities and challenges ahead for India as it seeks to ensure reliable, affordable and sustainable energy to a growing population. The report examines pathways out of the crisis that emerged from the Covid-19 pandemic, as well as longer-term trends, exploring how India's energy sector might evolve to 2040 under a range of scenarios.

Keywards: CCUS- Carbon Capture,Usage and Storage

Introduction: The Covid-19 pandemic has highlighted an opportunity to maximise the impact of India's energy policies while reducing air pollution and greenhouse gas emissions. In recent years, India has made major progress in implementing energy policies that have set it on the path to achieving the UN Sustainable Development Goals. It has been successful in providing more of its citizens with electricity access, boosting energy efficiency and renewable, and taking steps to reduce air pollution. The road to achieving them could be challenging, however. Given that India's energy sector alone accounts for 74% of the country's greenhouse gas emissions, the need to reduce air pollution and emissions should be carefully considered and incorporated in India's energy policy framework to accomplish its clean energy transition.

In the context of the Covid-19 crisis, reducing pollution and emissions assumes even greater importance. Air pollution contributes to heart and lung diseases, including Covid-19.. Reducing air pollution and emissions by strengthening green stimulus policies – with a focus on energy efficiency and renewable energy – will aid economic recovery in the short-term by creating jobs.

A. Covid-19 will leave lasting scars:

Prior to the global pandemic, India's energy demand was projected to increase by almost 50% between 2019 and 2030, but growth over this period is now closer to 35% in the STEPS, and 25% in the Delayed Recovery Scenario. The latter would put some of India's hard-won gains in the fight against energy poverty at risk, as lower-income households are forced to fall back on

more polluting and inefficient sources of energy. It would also extend the slump in energy investment, which we estimate to have fallen by some 15% in India in 2020. Even though the pandemic and its aftermath could temporarily suppress emissions, as coal and oil bear the brunt of the reduction in demand, it does not move India any closer to its long-term sustainable development goals.

B. India's size and dynamism will keep it at the heart of the global energy system

An expanding economy, population, urbanisation and industrialisation mean that India sees the largest increase in energy demand of any country, across all of our scenarios to 2040**.** India's economic growth has historically been driven mainly by the services sector rather than the more energy-intensive industrial sector, and the rate at which India has urbanized has also been slower than in other comparable countries. But even at a relatively modest assumed urbanization rate, India's sheer size means that 270 million people are still set to be added to India's urban population over the next two decades. This leads to rapid growth in the building stock and other infrastructure.

C. India requires a massive increase in power system flexibility

The pace of change in the electricity sector puts a huge premium on robust grids and other sources of flexibility, with India becoming a global leader in battery storage. India has a higher requirement for flexibility in its power system operation than almost any other country in the world. In the near term, India's large grid and its coal-fired power fleet meet the bulk of India's flexibility needs, supported by hydropower and gas-fired capacity. Going forward, new power lines and demand-side options – such as improving the efficiency of air conditioners or shifting the operation of agricultural pumps to different parts of the day – will need to play a much greater role. But battery storage is particularly well suited to the short-run flexibility that India needs to align its solar-led generation peak in the middle of the day with the country's early evening peak in demand. By 2040, India has 140 GW of battery capacity in the steps, the largest of any country, and close to 200 GW in the Sustainable Development Scenario.

D. Booming industry and transport push up CO2 emissions and harm air quality

A 50% rise in India's CO2 emissions to 2040 is the largest of any country in the steps, even though India's per capita CO2 emissions remain well below the global average. The increase in India's emissions is enough to offset entirely the projected fall in emissions in Europe over the same period. The remarkable rise of renewables arrests the growth in India's power sector emissions in the steps, although this still leaves the coal-fired fleet – the fifth-largest single category of emissions worldwide today – as a major emitter of CO_2. Alongside the option of early retirement in some cases, this puts a strong premium on policy approaches that can retool this fleet for more limited and flexible operation and/or on technologies such as carbon capture, utilisation and storage (CCUS). But the main reasons for the increase in India's CO_2 emissions in the steps lie outside the power sector, in industry and transport (especially from trucks). These two sectors are also responsible for a much larger share of air pollutant emissions than the power sector in the steps, and a rising urban population means that more people are exposed to air

pollution and suffer its ill effects. Water stress is likewise an increasingly important factor for India's energy sector and its technology choices.

E. Efforts to ensure sustainable energy for all can have significant climate and air pollution benefits

Achieving universal household and rural energy access, including electricity and clean cooking – one of the targets under the seventh Sustainable Development Goal – has been a key priority for India for the past 15 years. In April 2018, the government announced that India had achieved its goal of providing electricity to every village in India. Just one year later, the government indicated that it had connected all households. This not only has important social development benefits, giving children light to study in the evenings and powering rural health and social facilities, but also improves indoor air quality, as kerosene is replaced with electricity. Electricity can also increase productivity in agriculture and rural small and medium enterprises.

Progress in access to clean cooking, however, has been much slower, but government programmes have helped half of the country's population use cleaner fuels, such as liquefied petroleum gas, for cooking.

F. Energy sector is key to tackling air quality and climate change issues

The Covid-19 pandemic has significantly lowered electricity and oil demand, as well as industrial production, reducing fossil fuel combustion. As a consequence, air quality has improved dramatically, providing Indians with a glimpse of what life without air pollution could be like. This will increase the pressure to solve the air pollution crisis in India. Sustainable energy policies will be key to reaching this goal. They can also help India to meet the objective in its nationally determined contribution (NDC) under the Paris Agreement of reducing its CO_2 emissions intensity by 33-35% from 2005 levels by 2030.

In the power sector, full implementation of stringent air pollution standards and decarbonisation of the power mix would reduce sulphur dioxide emissions from the sector by 90% between now and 2040. Ambitious renewable energy targets that reflect the extensive growth potential for modern renewables (which exclude traditional biomass) can also contribute to meeting air pollution objectives. The government of India has announced a renewable capacity target of 450 GW by 2030 (excluding large hydropower), a sharp increase from a total installed renewable electricity capacity of 80 GW in 2019. Ensuring that renewable electricity generation remains an integral part of the air pollution reduction strategy will also limit growth in CO_2 emissions.

One unexpected benefit of the Covid-19 pandemic was that the gap between the shares of renewables and coal-fired power in India's electricity generation narrowed more than ever before. Renewables rose from 17% just before the pandemic to almost 24% and coal-fired power declined from 76% to 66%. This reflects the government's commitment to decarbonise power generation through renewables, notably using priority dispatch schemes. A reduction in unabated coal-fired generation would reduce both air pollution and CO_2 emissions, improving the long-term health and well-being of Indian society.

G. Clean energy transition is good for both the economy and the environment

Implementation of energy efficiency measures, particularly in the industry, services and buildings sectors, has been key in helping India to decrease its energy intensity by 27% over the past ten years. Over the same period, India's primary energy demand nearly doubled, driven by strong economic growth averaging 6.8% a year. Improving efficiency not only benefits economic productivity but also reduces emissions. Efficiency improvements undertaken between 2000 and 2018 helped avoid 14% of CO_2 emissions, as well as more than 15% of SO_2 and NO_X air pollutant emissions.The government has introduced a range of new policy measures to further improve energy efficiency, which will create jobs as well as lower emissions. These policies could reduce energy intensity by over 30% by 2030 compared with 2018. They would improve energy efficiency by 3.3% a year, aligning India with target 7.3 of the Sustainable Development Goals. Air pollution reduction policies support clean energy technologies that also improve energy access and reduce CO_2 emissions. The synergies could be even stronger: It is now all the more important for the Indian government to carefully consider the impacts of its energy policies, which could bring lasting benefits for the health and well-being of its citizens. The Covid-19 pandemic should be used as an opportunity to fast-forward India's sustainable energy goals. These will help India not only in its fight against the pandemic, but also in reviving its economy by creating jobs in clean energy industries. There is much to gain in India from continuing to tackle these challenges through increasingly linked policy agendas. The path that India will take will provide many lessons for countries around the world.

Conclusions: India's future prosperity will hinge on affordable, clean and reliable energy.India has seen extraordinary successes in its recent energy development, but many challenges remain, and the Covid-19 pandemic has been a major disruption**.** In recent years, India has brought electricity connections to hundreds of millions of its citizens; promoted the adoption of highly-efficient LED lighting by most households; and prompted a massive expansion in renewable sources of energy, led by solar power. The gains for Indian citizens and their quality of life have been tangible. However, the Covid-19 crisis has complicated efforts to resolve other pressing problems. These include a lack of reliable electricity supply for many consumers; a continued reliance on solid biomass, mainly firewood, as a cooking fuel for some 660 million people; financially ailing electricity distribution companies, and air quality that has made Indian cities among the most polluted in the world.

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XIII
IMPACT OF NEW ECONOMIC POLICY ON LABOUR MARKET IN INDIA

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Abstract: In 1967-68 due to green revolution agriculture income has raised till 1977. India becomes strong in goods and export of goods. In 1980 foreign currency has decremented due to this economic problems are increased. In 1990-91 to get recovery from economic crisis, India has taken help of national institute and India get economic help from gold loan. In 1991 economic reforms and implementation of economic reform has started. India accepted mix economic scheme in starting of 1950-51 is nothing but labor intensive technique. In 1991 it was found that labor development happen in economic development. Following research paper gives idea of economic reforms labour market in India.

Introduction: Rural labor condition becomes critical as economic reforms or new economic policy has primarily accepted liberalization, privatization, globalization, capital intensive technique and labor intensive.

Objectives of the study:

1. To understand the meaning of economic reforms.
2. Explaining the nature of Indian labor market.
3. To arrange labor reforms in economic reforms.
4. To study the effect of economic reforms on rural labour market.
5. To give solution for various rural labor market in India.

Indian Labor Market-

There are two types of labour market India- organized and unorganized labour. While doing this structure of labor market has constructed. Secondary sector and third sector is surplus in organized labor and especially primary field and related field having more labor in unorganized field. Most of labor in unorganized field found especially in primary field and related field. In unorganized field labor supply demand was found more as compare to other field.

Table No-1

Economic activities and Labor Divisions

Labour Division	Rural	Urban	Total
Total Population	83.33	37.71	121.05
Total Labour	34.86	93.31	48.17
Marginal Labour	10.28	6.64	11.92
Main Labour	24.57	11.66	36.24
Cultivators	11.20	0.37	11.86
Non-Agriculture	13.70	0.73	14.43

Craft	1.97	0.64	2.61
Other Labour	8.47	11.57	20.02

Source: RudraDatta and K.P.M.Sundaram: Indian Economy – 2016

Above table shows that population of India was 121 cores in 2011. In this population labour was 48.70% in cores. It was 37.86% in rural area and 13.31% in India. Labor percentage in agriculture field was 14.43% and in that 13.70% was rural and 0.73% was urban.

Table No-2
Employment in India in Public and Private Sector

Sector	**Year**	**Year**	**Year**		
	2009	2010	2011	% In 2009-10	% In 2010-11
Public Sector	17795	17862	175.48	6.4	1.8
Private Sector	103.77	108.68	114.99	4.5	5.6
Total	281.72	287.18	287.99	11.9	7.4
Female	55.80	58.59	59.54	51	1.62

In above chart it can be clear that organized employment was less as compare to public and private sector.

New Economic policy and Labour:

Various agreements in economic reforms has been plant and started to implement. From 1950-51 to 1990-91 forest income was used capital intensive techniques instead of labor intensive techniques.Following are some improvements done on new economic policy:

1. **Higher & Fire policy-** Multinational company can easily take entry in India, as rules and regulation has been relaxed. Any labor can be higher and fired according to company rule because of relaxation of public rule.
2. **Free entry and free exit-** In liberalization permission of various companies has been canceled. Reserved firms and Industry reduced in number and private investment was increased. Various companies (national & multinational) has started in India because of investment or permission strategy. For this government of India applied free entry and free exit scheme for labor reform. According to this any labor can freely take entry into agriculture or industry and they can terminate labor.

1. **Labor termination-** Various silence companies get entry in India due to liberalization and globalization. In this era there was a big growth in number of national company

- **VRS scheme-**Various multinational and domestic companies through VRS and surplus amount terminate marginal labor. This is till happening somewhere.
- **Capital Intensive Technique-** At the starting of economic reforms labor intensive technique has converted into capital intensive technique. The use of capital and machine

increased in manufacturing hence the number of labour gets decreased. Because of computerized technology human power used less by the company. Due to above reasons labor gets less opportunity and less payment. As per above various labour intensive reforms are done. Along with this there is whole India level rural labor in various field participation can be studied as follow.

Table No-3

All India shares of all sectors in rural employment for male, female and persons (%)

Persons	1993-94	1999-2000	2004-05	2009-10
Share of agriculture in rural development	78.40	72.30	72.20	67.90
Share of manufacturing in rural development	7.00	7.40	8.10	7.20
Share of construction in rural development	2.40	3.30	4.90	9.40
Share of trade, hotel & restaurant in rural development	4.30	5.10	6.10	6.40
Share of transport in rural development	1.40	2.10	2.50	2.90
Share of other services in rural development	5.70	5.20	5.00	5.40
Share of mining and querying	0.60	0.50	0.50	0.60
Share of electricity	0.20	0.20	0.20	0.20
Total	100	100	100	100

Sources- Employment and unemployment situation in India report 65 round (2008-09).

Impact of New Economic Policy on Labour market in India:

- **Effect of new economy policy on Labour market-** Annual rate of rise in employment was 20.39% in 1983 to 1990-91 but unfortunately annual rate of rise was depends on

agriculture. Annual rate of rise in employment in 1983 to 1990-91 was 20.39% but unfortunately annual rate of rise in employment in 1990-91 to 1997-98 was 1%.

- **Effect on unorganized labour-** The rate of rise in rural employment was 0.60% in 1990-91 to 1997-98. As opposed to this rate before economic reform was 1.1% in 1983 to 1990-91 in 7 years. It was 2.41% in seven years in 1983- 91. It means that economical rise rate was near about 8%, till unemployment was increased due to effect of economic reform in rural labor and Indian labor.
- **Strike and Seal Increased-** It is observed that strike and seal before economic development, total waste days of human being was 46.2%. it is observed before economic reform, strike and seal was in force because the waste of human resource up to 46.2% and it raised up to 60.2% while the economic reform period. It means the interest of labor increased towards the strike and seal increased in the period of economic reform due to this labor employment gets unfavorable effect and employer closed their old business and started their business in different places. It clearly indicates that due to increase in mentality it effects on economy in the medal of economic reforms.
- **Priority of secondary and third sector-** There was monopoly of public sector before economic reform but due to liberalization andprivatization the value of public sector decreased and when the public sector, private companies started high ring labor on contract basis due that they can easily remove them from job any time. In the period of economic reform capital intensive technique was used instead of using labor intensive technique for export lead growth. Main drawback of economic reform is various scheme were implemented for secondary and third sector and its implementation is started. Investment of irrigation sector gets decreased due to negligence which is basis for agriculture. As the effect of above, investment of private sector and public sector in agriculture field has reduced and small farmer and marginal farmer get favorable effect. Business depends on agriculture also affected and it effect on labor also. Investment of agriculture field was 2.8% in 1999-00 in one annual year and it was 2.9% in 2010-11 considered above effect economic reform has good impact on rural labor in case of economic condition. To keep this continues we should take efforts continuously.

Measures for Improvement of Labour market:

1. Small scale business should be developed for rural labor so that employment will be more.
2. Agriculture field has neglected by economic reform planner.
3. To improve condition of rural labour we should concentrate on business depends on agriculture.
4. To improve labor commission labour scheme should reach to micro level with their pattern of research and instruction.
5. Due to green revolution has started the income of agriculture get increased.
6. Agriculture should implement national agriculture policy properly.

7. To improve the condition of rural labor cooperating and cooperating financial institute, economic institute should become strong.
8. New economic equality should be according to scheme with economic reforms. International business should be given special subsidy.
9. In rural area ability of labour should be implemented unorganized labour so that they will get benefit of this for employment.

Conclusions:

While doing this study of new economic reform policy non rural human capital it has found that female and children‘s are in big proportion .That‘s why rural labor condition becomes critical as economic reforms or new economic policy has primarily accepted liberalization , privatization , globalization, capital intensive technique and labor intensive. Rural labor condition becomes critical due to VRS and deduction. If we trace on various ability of employment business programmer will developed and this will help to improve the condition of rural labour hence it will help to complete the end of development of inclusive.

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XIV

STUDY OF IMPACT OF GLOBALIZATION ON INDIAN AGRICULTURE SECTOR

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Abstract: Globalization concept has become inextricably linked with the process of transformation, touching upon every aspect of social, political and economic development in the globe. In the social front, globalization signifies closer interaction of people and homogenization of culture and value and the world being transformed into a 'global village'. Globalization has to increases the movement of finance, inputs, outputs, information and science across vast geographic areas. In Indian context it implies opening up the economy to foreign direct investment and provide entry to Multinational corporations in India. The process of globalization has revolutionized World Agriculture and allied sectors directed to improve the efficiency productivity and cost competitiveness. Post liberalization, Indian farmers face new challenges in the form of competition from highly subsidized agriculture of developed nations. This prompts the need for making Indian agriculture successful and profitable by improving the conditions of small and marginal farmers, countering then negative effects of Green Revolution, developing and promoting organic farming, and diversifying cropping pattern from cereals to high value crops. Agriculture sector plays key role in economic development. Therefore present theoretical study analyzes the impact of globalization on Indian agriculture, the problems faced by the farmers, measures to be taken to overcome these problems and negative influence of globalization so as to improve the productivity, because 56% of the population still depends on agriculture in India, and the process of globalization cannot be reversed now. Hence, in present study attempt is made to highlight the positive and negative impacts of globalization on this important sector.

Key words: Globalization, Agriculture, liberalization, Green Revolution.

Introduction: Globalization is the process of integrating the domestic economy with world economy. Globalization is the process of integrates the domestic market with world market for international trade, finance, and goods and services. Globalization makes world as a small village. Globalization means an explanation of market from local level to worldwide level. Now the concept of a specific place for market is disappearing and the whole world is becoming a market the process of globalization is related to economical development (S. Goutam, 2014).

India opened up the economy in the early nineties following a major crisis that led by a foreign exchange crunch that dragged the economy close to defaulting on loans. The response was a slew of Domestic and external sector policy measures partly prompted by the immediate needs and partly by the demand of the multilateral organizations. The new policy regime radically pushed forward in favor of a more open and market oriented economy. Major measures initiated as a part of the liberalization and globalization strategy in the early nineties included scrapping of the industrial licensing regime, reduction in the number of areas reserved for the public sector, amendment of the monopolies and the restrictive trade practices act, start of the privatization program, reduction in tariff rates and change over to market determined exchange rates. Over the years there has been a steady liberalization of the current account transactions, more and more sectors opened up for foreign direct investments and portfolio investments facilitating entry of foreign investors in telecom, roads, ports, airports, insurance and other major sectors. (Jha S. & Yerneni V, 2012) Agricultural is the means of income of many people. 60% population of India depends upon agriculture. 27% of GDP of India gets from agriculture.65% of labor force, and 21% of total export. India is the second in the world about population. 17.5% of the world population lives in India. India exports agricultural products such as tea, coffee, rice, wheat, sugar, vegetables; fruits, cashew nut etc. and imports milk products, cashew nut, fruits, edible oil, chicken, seeds etc. To develop the Indian economy the govt. makes new policy for agriculture sectors. Agriculture plays very important role in GDP in India. More than 60 percent peoples in India involved directly or indirectly in agriculture. For improve the agriculture sectors, the govt. makes new policy for agriculture. Govt. gives some subsidies on the agriculture products like fertilizers, seeds, pesticides (From various websites). In 2007 the government passed the policies known as SEZ – Special Economic Zone and SAZ - Special Agriculture Zone. Before 1970 the crops were different and after the 1991 due to Globalization the crops were different. In SEZ – 267 Projects were put in by Government of Maharashtra and mainly in Western Maharashtra because lands in these regions were under continuous irrigation.

Methodology and Data Sources: The study is based on the secondary data. The data were collected from various secondary sources such as Books, Journals, Articles and various websites.

Technological & Cultural impact of globalization in India: Access to television grew from 20% of the urban population (1991) to 90% of the urban population (2009). Even in the rural areas satellite television has a grown up market. In the cities Internet facility is everywhere. Extensions of internet facilities are even to rural areas. Global food chain /restaurants have already found a huge market in the urban areas of India. Lavish Multiplex movie halls, big shopping malls and high rise residential are seen in every city. Telecommunication and Software Industries are booming in India. Entertainment sector in India has a worldwide market. Bollywood movies are distributed and accepted worldwide. Big international companies (Walt Disney, 20th Century Fox and Columbia Pictures) are investing on this sector. Famous International brands (Armani, Gucci, Nike, Omega etc.) are investing in the Indian market with the changing of fashion statement of Indians. Some section of people in India, basically poor and

very poor, tribal groups, they did not feel the heat of globalization at all. They remain poor & poorest as they were. Increased gap between rich and poor fuels potential terrorist reaction. Ethical responsibility of business has been diminished. Youth of India leaving their studies at early are joining Call-centers to earn easy money thereby losing their social life after getting habituated with monotonous work. Hence, there is high growth but problem of unemployment. Multi-party rule, hence political ideology intervenes globalization (reservation, labor law reforms). The pressure on agriculture is increasing because of the increasing population. Possession of land is small and so the production cost is higher. There is also the problem of standard etc. So there are unfavorable impact occur on Indian agriculture. Farmers are being bankrupt because of growing production expenditure, costly seeds, on the one side and reducing prices of goods on the other side. He doesn't let out of it and so he is committing suicide. This can be one of the impacts of agricultural agreement. The biggest problem Indian agriculture faces today, and the number one cause for farmers committing suicides is debt. Forcing farmers into a debt trap is soaring input costs, the plummeting price of produce, and a lack of proper credit facilities, which makes the farmers turn to private moneylenders who charge exorbitant rates of interest. In order to repay these debts, the farmers borrow again and get caught in a vicious debt trap. The need is to examine each of the causes which have led to the current crisis in Andhra Pradesh, Kerala and Maharashtra, and analyze the role that liberalization policies have played. One measure of the liberalization policy, which had an immediate adverse effect on farmers, was the devaluation of the Indian Rupee in 1991 by 25% (an explicit condition of the IMF loan). Indian crops became very cheap and attractive in the global market, and led to an export drive. Farmers were encouraged to shift from growing a mixture of traditional crops to export oriented 'cash crops' like chilli, cotton and tobacco. These need far more inputs of pesticides, fertilizers and water than the traditional crops require (B. V. Muralidhar, et al. 2011)

Conclusions:

1. Globalization aims at integrating our national economy with that of the world. It is to be realized within a certain time frame. It is based on the philosophy of free and open international trade.
2. In the changed scenario, we have to make a better use of our favorable climatic and soil conditions.
3. We have relatively inexpensive, abundant human labor. Every effort will have to be made to raise their efficiency and equip them with new and advanced tools.
4. Implements and machines to enable them to compete with their counterparts in the advanced countries of the world.
5. with globalization we now have a better access to reasonably and abundant capital from different parts of the world.
6. Thus to begin with we may have to face hardships and difficulties sometimes but it will pay us in the long run.

7. In order to stand in the global competition therefore India has to use its vast potential of agriculture in a systematic and planned manner.
8. We should develop some of the techniques which the developed countries have been using.
9. Use of the biotechnology may be one such step. Creation of an unrestricted unified national market for farm products within the country may be another step.

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XV
CONCEPTUAL ANALYSIS OF GREEN ECONOMY

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Abstract: A green economy, according to the UNEP (United Nations Environment Program), is one that "improves human well-being and social fairness while considerably lowering environmental dangers and ecological scarcities" (UNEP, 2011, p. 16). A green economy is a low-carbon, resource-efficient, and socially inclusive economy, to put it simply. In a green economy, public and private investment drive income and employment growth by reducing carbon emissions and pollution, improving energy and resource efficiency, and preventing the loss of biodiversity and ecosystem services.

There are numerous environmental difficulties and problems in India today. Pollution of the air, water, and waste, a loss in agricultural production, depletion of natural resources, and progressive deterioration of environmental quality. However, India still has a long way to go in addressing its environmental challenges and increasing its environmental quality to match that of developing nations. Pollution and depletion of natural resources are both a serious concern and an opportunity for India.

Key- words: green economy, sustainable development, ecosystem, economic transformation

I. Introduction and background: India is a South Asian republic, the world's seventh-largest country by area, the second-most populous country (with nearly 1.2 billion people), and the world's most populous democracy. Since 1991, the Indian economy has been the world's eleventh-largest nominal GDP and the third-largest in purchasing power parity (PPP). India embraced the LPG (Liberalization, Privatization, and Globalization) programme and emerged as one of the fastest-growing major economies; it is classified as a newly industrialised country. Between 1947 and 1995, the situation was far worse. According to data collected and environmental assessment assessments conducted by World Bank experts, India achieved one of the fastest improvements in the world between 1995 and 2010. India has produced some of the world's most rapid advancements.

Climatic change has also occurred due to climate sensitivity to a variety of events. As a result, assessments of the impact of climate change on various sectors of the economy, whether directly or indirectly, are required to develop methodologies, strategies, and action plans to address the changes. Changes in weather patterns are unavoidable as a result of climate change. Climate change can impair agricultural output, increase health risks, and induce land submergence owing to rising sea levels, to mention a few effects (Drexhage, J., & Murphy, D, 2010). Industrialization, which began in the late 17th century, has hastened climate change by releasing greenhouse gases (GHGs) into the atmosphere. The observed levels of GHGs in the atmosphere may have nearly crossed tolerance levels, putting the survival of many animal and human species in jeopardy, while developmental needs remain unmet.

The United Nations General Assembly resolved in 2009 to convene a summit in Rio de Janeiro in 2012 (Rio+20) to commemorate the twentieth anniversary of the 1992 Rio Earth Summit. "Green Economic in the Context of Sustainable Development and Poverty Eradication" and "International Framework for Sustainable Development" are two Rio+20 agenda issues. With the green economy firmly entrenched on the world policy agenda, it's time to revisit and explain the connections between a green economy and long-term development. However, there is a perceived lack of experience in designing, implementing, and reviewing the costs and benefits of green economy policies, as well as a lack of clarity about what green economy policy measures entail and how they integrate with national priorities and objectives relating to economic growth and poverty eradication.

2. Concept of A Green Economy:

Transitioning to a green economy must become a strategic economic policy priority for long-term development. A green economy acknowledges that sustainable development aims to improve human lives within environmental restrictions, such as addressing global climate change, energy insecurity, and ecological shortage. On the other hand, a green economy cannot be only focused on addressing environmental issues and resource constraints. It must also address the issues of intergenerational equity and poverty eradication in order to achieve sustainable development (WCED, 1987).

3. Statement of The Research Problem:

Today, we use traditional macroeconomic metrics like GDP to gauge a country's overall economic health, but GDP fails to account for social and environmental costs and benefits. It is also challenging to make decisions that will last. Sustainable development can be described as "development that meets current demands without jeopardising future generations' ability to satisfy their own needs" if welfare is only regarded from a financial perspective. As a result, clear and multidimensional indicators are required to demonstrate the link between a community's economics, ecology, and society.

4. Objectives of The Research Study:

The major objectives of the present research study are as follows.

1. To analyze the conceptual theory of the green economy.
2. To present the importance of a green economy.

5. Research Methodology:

The importance of the green economy in modernization was realised through the use of the analytical research approach by the researcher. The three main aspects of a green economy and their indicators are highlighted in this research paper, as are the major problems in building a framework for green economy metrics. While countries require flexibility to satisfy their diverse needs and pursue a green economy path, establishing and coordinating enabling conditions at the worldwide level necessitates some degree of uniformity and comparability (World Bank, 2013). The UNEP's metrics framework for a green economy identifies three main areas and several green economy indicators within each of these areas, as shown below.

Principal Areas Of A Green Economy:

With the help of the following principal areas, it is decided whether a country has achieved the goal of a green economy or not.

1.Economic Transformation

A green economy is primarily concerned with changing the current economic growth model. Investments in high-emission, heavily polluting, waste-generating, resource-intensive, and ecosystem-damaging activities are familiar sources of growth. A green economy necessitates a change in investment to low-carbon, clean-energy, waste-reduction, resource efficiency, and ecosystem-enhancing activities. The shift in investment over time, the subsequent expansion of environmentally friendly or ecologically beneficial goods and services, and related jobs are thus essential indications of economic transformation.

2.Resource Efficiency

The usage of materials, energy, water, land, ecological changes, waste generation, and hazardous substance emissions associated with the economic activity are all critical indicators in this domain.

3.Human Well-being

A green economy may contribute to societal progress and human well-being in two ways: first, by redirecting investments to green goods and services, and second, by redirecting investments to human and social capital strengthening. The extent to which basic human needs are met, the level of education achieved, population health status, and the availability of and access by the poor to social safety nets, traditional indicators of GDP, also covers calories per capita, population below poverty (USD day), Human Development Index (HDI), and employment generation from each sector, are some of the indicators of progress and wellbeing.

Concluding Remarks:

In this way, the concept of green economy is important for measuring sustainable development. In the present industrial age, the country's progress can be achieved by making the economy environmentally friendly. The above three key factors are used to measure the sustainable development.

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