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Application of Economic Tools in Environment: A Step towards Sustainable Development and Green Economy in India

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ABSTRACT

Over the past few years, every country is tackling environmental degradation, and India is one of the few countries in the World whose economic growth has tremendously increased. This economic growth has given rise to many employment opportunities, the establishment of industries, rapid urbanization, commercialization, etc. But India's remarkable economic growth has been recognized through degradation and pollution of the environment, ecological imbalance, water scarcity etc. Considering the size and diversity of its economic structure, environmental risks are far-reaching at its heights. The term 'Green Economy' has been capturing around the entire world where every country is now focusing on environmental issues, adopting a green economy as its fundamental economy, and working towards sustainable development. India so-far is facing the difficulty of co-existence of the conventional economic growth strategy and slow effort to mitigate and adapt to the climate change issues. In the present scenario, shutting down industries or reducing the production system will ripple the Indian economy for the sake of tackling climate change. Adopting the multi-disciplinary Green approach will have negative effects on employment, trade, agriculture activity, business pattern, which requires, new policies, fiscal reforms, international trade relations and trade patterns with the other countries, skill development program, extensive research, development of resource efficiency. Framing of policies of manageability factor into the continuous financial choices for boosting framework and assembling can set things moving for putting the Indian economy on the Green Economy way. This article will deal with how one can apply economic tools in the field of environment attaining sustainable development. Later, the author has given suggestions which can be adopted in India so that there is a check and balance on sustainable development and economic development. Lastly, the article will end with the conclusion.

Keywords: *Green Economy, Sustainable Development, Environment, climate, policy.*

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I. INTRODUCTION: WHAT IS GREEN ECONOMY

The UNEP defines a *green economy as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities*.² In simple words, a green economy is considered as a reduction of carbon emission, resource-efficient, and socially inclusive. After the Global Financial Crisis 2008, the world has decided to adopt the GLOBAL GREEN ECONOMY concept to revive the world economy, saving and creating jobs, protecting vulnerable groups, promoting sustainable and inclusive growth, reducing risks from carbon dependency and ecosystem degradation, and achieve the Millennium Development Goals (MDGs), 2000.³ However, the concept itself first emerged with Pearce et al.'s (1989) Blueprint for a green economy for the UK's Department for the Environment.⁴ There is no unique definition of the green economy, but the term itself underscores the *economic* dimensions of sustainability or, in terms of the recent UNEP report on the green economy, it responds to the "growing recognition that achieving sustainability rests almost entirely on getting the economy right".⁵ Green economy policy measures have also been discussed at length in international negotiations, including UNCED in Rio in 1992. For example, the Rio Declaration included principles promoting the internalization of environmental costs and the use of economic instruments (Principle 16) as well as eliminating unsustainable consumption and production (Principle 8).⁶

Hence, the Green economy strives to achieve growth in income and employment generation by providing public and private investments at the domestic level and international level through the reduction in carbon emission, enhance resource efficiency and avoid loss of biodiversity and ecological system. In contrast to the current economy where GDP growth is determined through the conventional way, in the green economy, the GDP growth will be determined taking into consideration the environmental impact of the productivity of the country. It will give us another perspective on GDP, one that can improve environmental protection and resource utilization rationally.⁷

² Doreen Fedrigo-Fazio and Patrick ten Brink, *Green Economy WHAT DO WE MEAN BY GREEN ECONOMY? UNEP*, (May 2012).

³ Satrajit Dutta, *Green Economy in the Context of Indian Economy*, International Review of Research in Emerging Markets and the Global Economy (IRREM), (2016 Vol: 2 Issue: 3).

⁴ Global green economy: *definitions & measurement*, Page 3, (2017 Vol 4 Issue 1).

⁵ Jose Antonio Ocampo, Aaron Cosbey and Martin Khor, *the Transition to a Green Economy: Benefits, Challenges and Risks from a Sustainable Development Perspective*, United Nations Conference on Trade and Development (UNCTAD), United Nations Environment Programme (UN Environment), United Nations Department of Economic and Social Affairs (UNDESA).

⁶ Cameron Allen & Stuart Clouth, *a guidebook to the green economy, un division for sustainable development*, (August 2012).

⁷ Surya bhakta Pokharel and Bishnu prasad Bhandari, *Green GDP: Sustainable Development*, (May 05, 2017)

II. PRINCIPLES OF GREEN ECONOMY

In 2012, Northern Alliance for Sustainability, an international non-profit organization representing a network of NGOs in the northern hemisphere published 8 principles for green economy which was discussed in the workshop held in 2011.⁸ These principles as evolved form the basis of the Green Economy. The identified principles are stated below⁹:

1. **The Earth Integrity Principle:** The Earth, her characteristic networks and environments, have the basic ideal to exist, prosper and develop, furthermore, to go ahead with the essential cycles, structures, capacities, and rules that continue all creatures. Each human must make sure and protect her.
2. **The Planetary Boundaries Principle:** This principle states that human needs are dependent on the ecological system and there are limits to economic growth. The government must set long-term plans which do not affect ecological imbalance. It should meet the requirements of economic growth.
3. **The Dignity Principle:** This principle states that every human being in the present and future has a right to livelihood. Poverty eradication and redistribution of wealth in an economical way should be the main priority of the government and measured in those terms.
4. **The Justice Principle:** This principle ensures that benefits and burdens must be reasonably shared by all. This includes the use of natural resources, access to goods and services, and responsibility not to avoid and compensate for all the losses and damages. All institutions, corporates, and decision-makers need to be liable to approach principles of responsibility and personal obligation about their choices.
5. **Precautionary principle:** This principle ensures that new products and technologies developed should not harm the environment, human beings, the ecosystem. It should not have destruction and unexpected efforts on humanity and the environment. The burden of proof should lie on the person concerned and he/she should avoid the shifting of burden.

5:07 am), <https://thehimalayantimes.com/opinion/green-gdp-sustainable-development/>.

⁸ Exploring Green Economy & Principles, A guide book to the Green Economy, Issue 2:, [http://www.greengrowthknowledge.org/sites/default/files/downloads/resource/GE_guidebook_Issue2: UNDESA pdf](http://www.greengrowthknowledge.org/sites/default/files/downloads/resource/GE_guidebook_Issue2_UNDESA.pdf).

⁹ *Ibid.*

6. **The Resilience Principle:** It emphasizes that diversity and diversification are preconditions for the sustainability of life. A diversity of organizational models and governance levels needs to be cultivated, along with diversified economic activity that minimizes commodity dependence.
7. **The Governance Principle:** The Governance Principle states that subsidiary democracy must be upheld and revitalized in accordance with the principle of prior informed consent. All policies, rules, and regulations need transparent and participatory negotiations that include all affected people. Structural transformation should be driven by appropriate public investments that guarantee benefit sharing.
8. **Beyond GDP Principle:** This principle recognizes that mere GDP should not be used as a measure for progress and growth. But we have to design policy goals in such a way that it takes into account environment, social well-being, and environment policies and this will show the real GDP growth.

These principles could help us to develop environment policies and better understand the efficiency of policies and hence, India can adopt the principles of the green economy in line with economic development.

III. GREEN ECONOMY AND SUSTAINABLE DEVELOPMENT IN INDIA

The main motive of the green economy is to make sure sustainable development and meet a harmonious construction between economic and ecological development as expressed by Brutland Report to a perspective in which socially sustainable development is the aim, ecological sustainability is a fundamental need and the economy is seen as a tool.¹⁰ India being a member state of the United Nations Environment Programme has adopted the 2030 agenda for Sustainable Development. This agenda is a plan of action for people, the planet, and prosperity.¹¹ It integrates and recognizes eradicating poverty in all spheres, removing inequality among member states, preserving the planet, and sustaining economic growth.¹²

India ranked very poorly in SDGs 2018 index-112 out of 156 countries assessed.¹³ This indicate

¹⁰ Eva Alfredsson Anders Wijkman, *The Inclusive Green Economy Shaping society to serve sustainability -minor adjustments or a paradigm shift?* Mistra, (April 2014).

¹¹ <https://www.undp.org/content/undp/en/home/2030-agenda-for-sustainable-development.html>.

¹² *Ibid.*

¹³ Sachs, J., Schmidt-Traub, G., Kroll, C., Lafortune, G., Fuller, G. (2018): *SDG Index and Dashboards Report 2018*. New York: Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN).

that India has a long journey to go ahead in achieving Sustainable Development Goals. In 2013 as a result of air pollution, India suffered a loss of 8.5% equivalent to GDP.¹⁴ Furthermore, the World Bank released a report in 2016 that gave the assessment that the annual cost of environmental degradation in India amounts to about 3.75 trillion equal to 5.7% of GDP.¹⁵ Although the economy (GDP) of our country is increasing, but the negative consequences will be seen in the long run. Sustainability of nature & ecological system has been considered necessary because of the extraordinary vulnerability in terms of life for which we all need to suffer in future or at a later stage if there is any extreme change in the structure of an environment causing the elimination of a portion of the essential plant and species, diminishing biodiversity and influencing our biological system.

IV. GREEN GROWTH

Green growth involves rethinking growth strategies concerning their impact on environmental sustainability and the environmental resources available to poor and vulnerable groups.¹⁶ Ministry of Environment, Forest and Climate Change has recognized that green growth and poverty eradication will give the vision of Sustainable Development. Under the Copenhagen Accord, India has advocated its domestic mitigation action as an endeavor to cut the emissions intensity of its GDP by 20–25% by 2020 in comparison to the 2005 level.¹⁷ More recently in its Intended Nationally Determined Contributions (INDCs), India has announced to cut the emissions intensity of its GDP by 33–35% by 2030 in comparison to the 2005 level.¹⁸ Subsequently, green development has assumed importance in environmental justice. This concept has far-reaching effort to mitigate climate degradation and, in the meantime, accomplish economic development that is socially comprehensive and environmentally sustainable. In a developing country like India whose economy is rising at a faster pace, the environmental effect is threatening as it will place serious constraints on land, water, fuel, energy, and high commodity prices.

¹⁴ World Bank and Institute for Health Metrics and Evaluation. 2016. *The Cost of Air Pollution: Strengthening the Economic Case for Action*. Washington, DC: World Bank, (Updated: 09 Sep 2016, 03:22 AM IST). Dipti Jain, <https://www.livemint.com/Opinion/AU3JZ499V8mJKHbUEZEDmO/Air-pollution-cost-India-85-of-its-GDP-in-2013.html>.

¹⁵ World Bank. 2013. *India: Diagnostic Assessment of Select Environmental Challenges, Economic Growth and Environmental Sustainability, What Are the Tradeoffs?* Washington, DC. © World Bank. (Volume 2.) <https://openknowledge.worldbank.org/handle/10986/16028> License: CC BY 3.0 IGO.

¹⁶ 13th Finance Commission Report, 2010-2015, (Vol 1), https://www.prsindia.org/uploads/media/13financecommission_full_report.pdf.

¹⁷ Green Growth and Sustainable Development in India: *Towards the 2030 Development Agenda*, TERI & Global Green Growth Institute, https://www.teriin.org/projects/green/pdf/National_SPM.pdf.

¹⁸ *Ibid*.

According to World Bank Report¹⁹, rising temperatures and change in rainfall patterns could cost India 2.8 % of GDP and lower the living standards of about half of the country's population by 2050. This will result in low agricultural yields, lower labor productivity, and degradation in health. There will be a water crisis, a food crisis leading to a higher demand for essential commodities and higher prices. The amount to which our economy will grow green will depend upon its capacity to cut the number of resources required to support the economic growth and development to enhance social equity and employment creation. Green growth and its development will play an important role in balancing these priorities. It has been projected that a 30% reduction in particulate emission will lower the GDP by about \$ 97 billion or 0.7% with very little impact on the GDP growth rate.²⁰ It will significantly reduce the harm done to health by \$ 105 billion which to some extent will compensate for the loss.²¹

The entire point of the Green economy is to develop an economy that will check the environment issues and scarce use of natural resources. India will have to suffer in the long run if such issues are not taken into consideration. So not only the economy of the country will run smoothly without affecting its GDP growth, but it will also include judicial decision on sustainable development for boosting infrastructure and other sectors of the Indian economy on the green economy path.

V. JUDICIAL ACTIVISM AND SUSTAINABLE DEVELOPMENT IN INDIA

After Bhopal Gas Tragedy in 1984, India saw development in the field of environmental jurisprudence and has seen an impressive series of other cases in environmental law.²² One such legislation passed by Parliament was the Environment Protection Act 1986. This was an “umbrella” legislation designed to give a framework for Central Government co-ordination of the activities of various Central and State authorities established under previous laws such as the Water Act and the Air Act.²³ This reality couldn't be ignored that developing countries like India whose economy is developing at a quicker pace and environmental degradation in these developing countries and worldwide, experts internationally came with the doctrine called *Sustainable Development*, which means a balance between development and the environment.

This concept first came into the limelight during the UN conference on Human Environment

¹⁹ <https://www.worldbank.org/en/news/press-release/2018/06/28/climate-change-depress-living-standards-india-says-new-world-bank-report>.

²⁰ <http://www.worldbank.org/en/news/press-release/2013/07/17/india-green-growth-necessary-and-affordable-for-india-says-new-world-bank-report>.

²¹ *Ibid.*

²² Abraham, C. M. (1991) ‘*The Indian Judiciary and the Development of Environmental Law*’, South Asia Research, 11(1), pp. 61–69. doi: 10.1177/026272809101100104.

²³ <http://www.ecology.edu/environmental-legislation.html>.

held at Stockholm in 1972. But the proper definition came into the picture in the Brundtland Report of 1987 which defines Sustainable Development as “*development that meets the needs of the present generation without compromising the ability of the future generations to meet their own needs.*”²⁴ This report accentuated the significance of development in terms of economic development and ecological development. The ultimatum is to merge and integrate economic and ecological considerations into decision making.²⁵ The world Summit on Sustainable Development in Johannesburg in 2002 was held to address the issue of environmental degradation, achieve speedy economic growth & keep an eye on depleting natural resources that future generations will need for their progress and prosperity. The Summit focused on three core issues and identified that to achieve sustainable development, economic development, social development, and environmental protection have to be integrated.²⁶

Indian Judiciary in a bid to preserve the ecological system and protect from environmental degradation has played an important role in embracing Sustainable Development. The Principle of Sustainable Development for the first time was adopted in the case of Vellore Citizen Welfare Forum v Union of India and the court held that “*Remediation of the damaged environment is part of the process of 'Sustainable Development' and as such polluter is liable to pay the cost to the individual sufferers as well as the cost of reversing the damaged ecology.*”²⁷ In Narmada Bachao Andolan v Union of India & Ors, it was held that “*Sustainable Development would come into play which will ensure that mitigative steps are and can be taken to preserve the ecological balance.*”²⁸

In M.C. Mehta v Union of India, “*it was held that Development and Environment Protection are not enemies. It is possible to carry to on development activity applying the principles of Sustainable Development, in that eventuality development has to go on because one cannot lose sight of the need for the development of industries, irrigation resources and power projects, etc. including the need to improve employment opportunities and generation of revenue. A balance has to be struck.*”²⁹ In Indian Council for Enviro- Legal Action v Union of India & Ors, the court held that, “*while economic development should not be allowed to take place at the cost of ecology or by causing widespread environmental destruction and violation,*

²⁴ Report of the World Commission on Environment and Development: Our Common Future, Page 41.
<https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf>

²⁵ *Ibid.*

²⁶ <https://www.un.org/development/desa/dspd/2030agenda-sdgs.html>

²⁷ AIR 1996 SC 2715.

²⁸ AIR 2000 SC 3751.

²⁹ (2004) 12 SCC 118.

at the same time the necessity to preserve ecology and environment should not hamper economic and other developments."³⁰

These judgments on the interpretation of Sustainable Development by the Supreme Court of India indicate that importance has to be given to sustainable development and environmental and vice-versa. To preserve ecological imbalance and degradation, developmental activity has to be regulated. Therefore, we need to adopt stringent economic policies, legislations, laws, regulations, and advanced technologies which will ensure sustainable development (economic development as well as environment development).

VI. APPLICATION OF ECONOMIC TOOLS IN GREEN ECONOMY

Essential to an understanding of economics movement is a set of fundamental concepts. The most central assumption in economics is that human beings are rational maximizers of each satisfaction and, in turn, respond to incentives. It is important to realize that economics, as understood here, is not restricted to the analysis of monetary issues; there are non-monetary aspects as well. Usually what is aimed through economic reasoning is the improvement of efficiency. A more efficient allocation is one that increases the net value of resources. Being efficient is the main goal of all economic regulations. The integration of environment into economics refers to the use of economic tools and practices in framing laws and policies to study how humans impact the ecosystem and its resources. From a macroeconomics perspective, economic tools are used to study how different taxes and subsidies, laws, regulations, and policies promote a healthy environment. At the microeconomic level, economic tools can be used to study how laws and regulations influence the behavior of firms and households to arrive at a predictable environment assessment. The following part of this essay provides for different economic tools that are relevant in determining environmental degradation. Analyzing a policy suggests what would be the possible outcome of resource depletion and economic loss, how the country will perceive the new situation, and what implication this has for the full array of harmful effects.

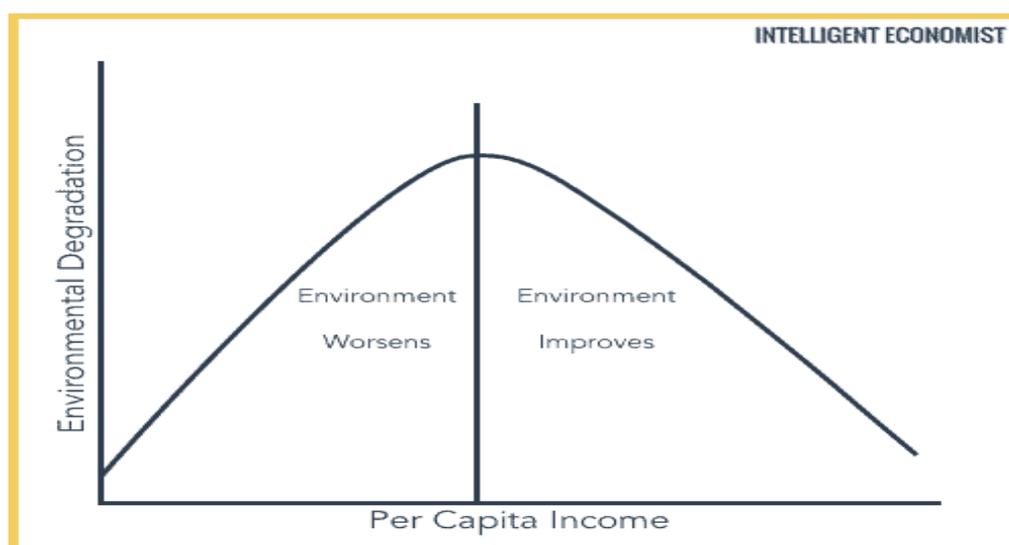
(A) *Environmental Kuznets Curve*

The environment Kuznets Curve is a hypothesized relationship between various indicators of environmental degradation and income per capita.³¹ In the initial time of economic development, degradation and pollution increase, but beyond some level of income per capita., the pattern changes, and high-income levels economic growth leads to environmental

³⁰ (1996) 5 SCC 281.

³¹ David I. Stern, *The Environmental Kuznets Curve*, *International Society for Ecological Economics*, (June 2003).

improvement.³² The contention for Environmental Kuznets Curve testing is that nation accumulates new technology, arrangements for its development and in this way, the income of the general population rises and they esteem natural resources when the nation sees extreme improvement in their economy. People at the initial stage value development and therefore exploit natural resources and nature. After some accumulation of wealth, they value the environment and ecosystem. This is why EKC's shape is an inverted U curve. The stage of economic development is expressed on X-axis and environmental degradation on the Y-axis.³³



EKCs are constructed using three models: log-linear, log-quadratic, and log-cubic to explore the relationship between income (constant GDP and per capita GDP) and selected environmental indicators.³⁴

Research has been conducted in India about EKC. Most appreciated one, Managi and Jena (2007), has brought out the EKC relation between environmental productivity of three pollutants, such as SO₂, nitrogen dioxide (NO₂) and suspended particulate matter, and income with the analysis of states level industrial data during 1991-2003. The aftereffects of the board investigation reveal that the scale effect overwhelms over the technique effect and the combined effect of income on environmental productivity is negative.³⁵ A research study from 1960 to 2010 was conducted comparing the relationship between CO₂ and GDP. It indicated that there exists an N shaped curve for CO₂ emissions.³⁶ This means that there is an increase in technology for environment protection, improved efficiency, etc. However, again rising of the

³² *Ibid.*

³³ <https://www.intelligenteconomist.com/environmental-kuznets-curve/>.

³⁴ Rudra A, Chattopadhyay, A. *Environmental quality in India: Application of environmental Kuznets curve and Sustainable Human Development Index. Environ Qual Manage.* 2018;1–10. <https://doi.org/10.1002/tqem.21546>.

³⁵ Dr. Michael Von Hauff & Mr. Avijit Mistri, *Global Journal of Human Social Science: (E) Economics, Global Journals Inc (USA)*, (Vol 15 Issue 1).

³⁶ <http://www.asianonlinejournals.com/index.php/JOEN/article/view/946/html>

curve indicates that as GDP is increasing further this decline in the emission level is not sustained. The economy witnesses a further increase in these emission levels and the tunneling through the inverted U-shaped EKC is temporary.³⁷

The improvement of the condition and environmental framework with income growth to a great extent relies on the administration arrangements. Approaches to cut down outflows and pollutants will have a tremendous effect on the state of EKC. Bringing innovation in environment protection, utilizing alternative modes will create a U-shaped EKC curve. Here are some of the determining factors of policymaking for environmental preservation, which are also determinants of the impact of economic growth on the emissions of pollutants.³⁸

1. Stages of industrial development, state of technology
2. Types of pollutants: SO₂, CO₂, contaminated water
3. Economic factors: lower-income countries are less inclined to introduce pollution abatement technology
4. Political Behavior
5. Scale of Economic activity

People tend to value those goods which will have a positive impact on the environment once the income threshold is achieved. At a higher income, people's priorities will change as they will value the negative effects of pollution and try to achieve a clean environment. In other words, the path of the equilibrium income-pollution starts to decrease when "*the marginal rate of substitution between consumption and pollution declines faster than the marginal rate of transformation between consumption and pollution as income increases.*"³⁹

Further, an increase in income reflects an increase in the size of the country's economy. Keeping the technology effect as constant, an increase in the economy leads to environmental deterioration. Further, as the country develops, the economy shifts towards the service sector and lighter manufacturing, which should have lower emissions per each unit of output (Stern, 2004), thus progressively lowering the local level of environmental degradation.⁴⁰ Environment Kuznets Curve might be useful to recognize market-driven and arrangement driven instruments when trying to explain the driving forces behind the relative

³⁷ *Ibid.*

³⁸ Ota T (2017), *Economic growth, income inequality and environment: assessing the applicability of the Kuznets hypotheses to Asia*. Palgrave Communications. 3:17069 doi: 10.1057/palcomms.2017.69.

³⁹ *Supra* Note 34.

⁴⁰ *Ibid.*

and absolute decoupling of contamination patterns from economic growth.⁴¹ A country with green policy and technology will try to meet economic growth and abate environmental degradation with a rise in income as already said above. As the motivation behind environment policy is neither to moderate development nor to diminish the output of particular sectors, it is significant that it allows the greatest extension for innovative technological solutions to environmental problems.

(B) Property Rights in Environment Protection

Property rights are defined as a set of rules and regulations in the use of scarce resources and goods. The set of rules includes obligations and rights, the rules may be codified by law or they may be institutionalized by other mechanisms such as social norms together with a pattern of sanction.⁴² Property rights-based measures create the right to use natural resources or to pollute the environment up to a predetermined limit and allow these rights to be traded.⁴³

The possibility of these measures is that if people reserve an option to use natural resources, they will think about these resources for the long term and deal with them economically. Likewise, the rarer these rights and the more demand is for them, the more they will cost and this will guarantee that the rights are used most effectively and that they don't go waste. No one could have felt that natural resources could be ever claimed. To support this assertion, let's take the example of fisheries exploitation in India, assessments done on fishing indicate that there has been over-exploitation of nearly two-third of the fish stocks in India and commercial stock has been fully exploited.⁴⁴ Overfishing will destroy the ecosystem negatively and alter the ecosystem negatively.⁴⁵ In the short run, the size of the stock determines the growth of the stock, which is the flow that may be caught without diminishing stock. In the long run, there is a more complicated relationship between the growth and the size of the stock. The growth depends mainly on two factors: (i) the food supply, and (ii) the density of fish. The food supply is negatively correlated, and the density is positively correlated, with growth.⁴⁶ The food supply

⁴¹ PROTECTING THE ENVIRONMENT AND ECONOMIC GROWTH: TRADE-OFF OR GROWTH-ENHANCING STRUCTURAL ESTABLISHMENT?

<https://www.prsindia.org/uploads/media/13financecommissionfullreport.pdf>

⁴² *Property-Rights Approach to the Environmental Problem*. In: *Economics of the Environment*. Springer, Berlin, Heidelberg, (2000).

⁴³ Commonwealth Government of Australia, *Ecologically Sustainable Development: A Commonwealth Discussion Paper*, Canberra, AGPS, (1990).

⁴⁴ Ashish Fernandes, Sanjiv Gopal, *Safeguard or Squander? Deciding the future of India's fisheries*

<http://www.indiaenvironmentportal.org.in/files/file/Safeguard-or-squander-deciding-the-future-of-india's-fisheries.pdf>

⁴⁵ *Ibid.*

⁴⁶ Goran Skogh, *A Law and Economics Approach, Property and the Environment*. Goelzhauser, Greg. *Journal of Land Use & Environmental Law*, (vol. 19, no. 2, 2004), pp. 597–600.

will be plentiful if the stock of fish is small, but the low density will make it more difficult for the fish to find a mate. However, if there is less food, but the stock is large, it will be easy to find a mate.

Providing property rights in fishing management will check the over-utilization of fishing and prevent fishery collapse. This is because providing property rights where properly defined and effectively enforced will give the owner, an incentive to align with underlying natural resources. Providing such property rights has been largely favored and endorsed by economists who are of the view that such a regime would be to sustained growth and development.⁴⁷ Further economists have stressed the fact that giving private property rights in natural resources is essential for the growth and development of a nation for a longer period.⁴⁸ Let's take another model, urban lakes are among the best wellspring of reviving groundwater, however, today people have either infringed these lakes or utilized these lakes for dumping waste. These lakes can be restored either by giving complete property rights to the administration or to private entities who can revive these lakes. Giving property rights for the lakes will save the lakes somewhat and revive the sound biological system in the encompassing territories.

From these examples, it ought to be certain that open access to a common resource may cause the elimination of species and depletion of natural resources. Because of the earnestness of the issue, this situation has been named the tragedy of the commons.⁴⁹

Further, recent economic studies have indicated that environment-related problems and pollution arise largely from the lack or absence of property rights in the environment.⁵⁰ It is due to the lack of ownership or property rights in the natural resources which leads to inefficient resource allocation. It is implied that developing countries have weak property rights over natural resources as compared to developed countries that have strong private property rights. That is why there is overproduction and overconsumption of resources in developing countries.⁵¹ Since property rights in natural resources are not defined, the polluter is not made to internalize the cost of activities upon others. Furthermore, there exists no incentives for

⁴⁷ Simon Johnson et al., Property Rights and Finance, 92 AM. ECON. REV. 1335 (2002), see also Thomas J Miceli, Property in THE ELGAR COMPANION TO LAW AND ECONOMICS, 121 (Enrico Colombatto, ed., 2005).

⁴⁸ *Ibid*

⁴⁹ *Supra* note 40.

⁵⁰ H. Demstet, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347, 350 (1967). See also Richard Stroup, Free-Market Environmentalism, in THE CONCISE ENCYCLOPEDIA OF ECONOMICS.

⁵¹ Graciela Chichilinsky, Kyoto Protocol: Property Rights and Efficiency of Markets in INSTITUTIONS, SUSTAINABILITY AND NATURAL RESOURCES: INSTITUTIONS FOR SUSTAINABLE FOREST MANAGEMENT 144 (Shashi Kant and R. Albert Berry eds., 2005).

victims to initiate actions against the polluter.⁵²

Thus, a lawful step of such a nature would guarantee the externalization of costs of his activities by the polluter and create an incentive for the injured person to initiate an action against the polluter. If there should arise an occurrence of a risk to his/her exclusive resources/rights because of contamination; it would make the polluter consider, the unfavorable impact of his activities upon the people in question.

(C) Efficient- level of Pollution or Marginal Cost of Pollution

The efficient level of pollution is the measure at which its total benefits exceed its total costs by the greatest possible amount. This occurs where the marginal benefit of an additional unit of pollution equals its marginal cost.⁵³ Or Marginal Cost of Pollution means that an additional environment cost that results in the production of one additional unit. This economic theory says that it is not possible to meet a 100% reduction in pollution. People need goods and services to survive and therefore factories producing these goods will pollute the environment. But the question arises to what extent it can pollute the environment. We can understand this from two unique points. First, let's assume that we are starting in a world with no pollution. We value some things more than having an environment entirely free from pollution, and we produce those things up to the point where we decide that additional pollution is no longer worth it. Or, more realistically, if we start from a relatively polluted world, we can ask ourselves how much pollution we might want to dispose of before the costs exceed the benefits of a cleaner environment.⁵⁴

To achieve an efficient level of pollution, where total benefits exceed its total costs, the government can impose a tax on industries or industries that can adopt certain environment-friendly technologies. These things will reduce the marginal cost and total benefits would exceed. Taxes can directly address the failure of markets to take environmental impacts into account by incorporating these impacts into prices.⁵⁵ Take this hypothetical example and equating price with tax we can find as how this can help in reducing the environment to some extent.⁵⁶

⁵²Garrett Hardin, *The Tragedy of the Commons*, in THE EARTH SCAN READER IN ENVIRONMENTAL ECONOMICS 60, 62 (Anil Markandya & Juile Richardson eds., 1992).

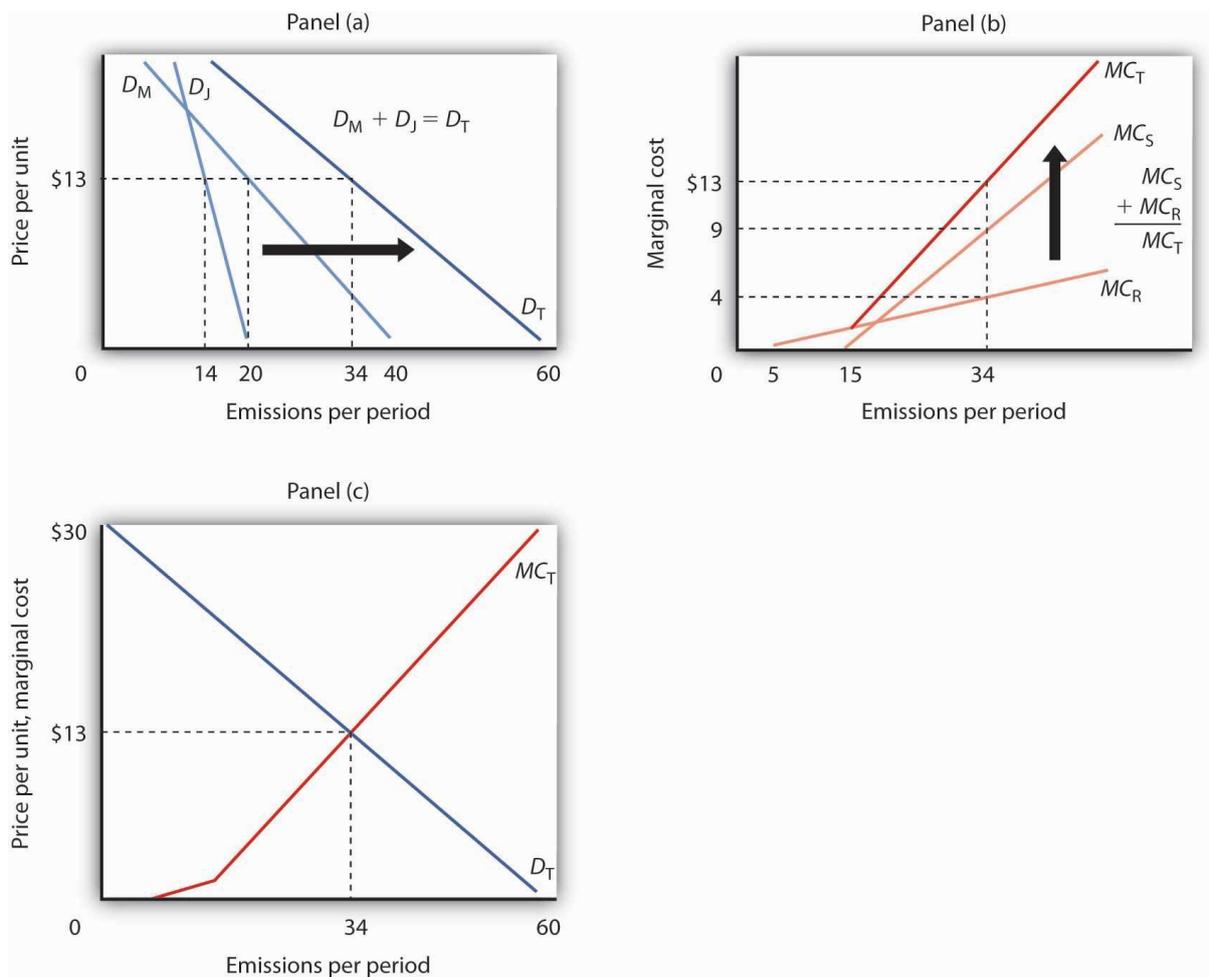
⁵³"*The Economics of the Environment*" from the book *Microeconomics Principles*, chapter 18 (v. 1.0).

https://2012books.lardbucket.org/books/economics-principles-v1.0/s21_economics_of_the_environment.html

⁵⁴ Palgrave Macmillan, *Determining the "Optimum" Amount of Pollution*. In: *What Environmentalists Need to Know About Economics*, Scorse J. (2010), New York.

⁵⁵ Environmental Taxation: *A Guide for Policy Makers*, OECD, (September 2011), For more information, please see Taxation, Innovation and the Environment available at www.oecd.org/env/taxes/innovation.

⁵⁶ Supra note 51.



By imposing the tax, (panel c) the marginal benefit of the 34th unit of emissions, as measured by the demand curve D_T , equals its marginal cost, MC_T , at that level. The quantity at which the marginal benefit curve intersects the marginal cost curve maximizes the net benefit of an activity.⁵⁷ By imposing tax liability suppose 13\$, an industry owner will have to pay a certain amount of green tax which will add to his cost. Therefore, he will cut his emission to bear the cost of production or he will adopt an alternate technology that is environmentally friendly as compared to 60 units when there was no tax liability.

This economic tool is important in pollution measures from an economic perspective is to find the pollution measure at which total benefits exceed total costs by the greatest possible amount, the solution at which marginal benefit equals marginal cost.

(D) Cost-Benefit Analysis

The commonest way of assessing the economic effect of the project is through cost-benefit analysis (CBA). Cost-Benefit Analysis compares benefits to costs and indicates the net benefit

⁵⁷Supra Note 52.

(or cost) of a project – the difference between its total benefits and total costs –to conclude its desirability and viability.⁵⁸ The essential theoretical foundations of Cost-Benefit Analysis are: benefits are defined as increases in human well-being (utility) and costs are defined as reductions in human well-being. Economists engross in the cost and benefit connected with the production or consumption of the next additional unit. For a project or policy to qualify on cost-benefit grounds, its social benefits must exceed its social costs.⁵⁹ While cost-benefit analysis remains controversial as a tool to shape environmental policy, the technique is “*here to stay*” and has become a central instrument for evaluating and justifying regulatory decisions in the developed world.⁶⁰

This analysis is used as a tool to frame any policy and supplement these policies effectively and efficiently. The ideal situation will be if the operational environmental-economic assessment tool can rank both costs and benefits for multiple remediation projects, which is the case for cost-benefit analyses.⁶¹ Cost-benefit analysis can either check the costs of different alternatives to reach a certain environment goal or check different environmental initiatives that can be achieved with a certain amount of money.

There are various methodologies to calculate Cost-Benefit Analysis:

- Project definition
- Identification
- Enumeration of costs and benefits
- Evaluation of costs and benefits
- Discounting and presentation of results.⁶²

The Cost-Benefit Analysis done on Delhi metro indicated that there is a one percent increase in the economic rate of return on investment in the Metro, pegged at 22.5 percent after accounting for the differences between shadow prices and market prices of unskilled labor, foreign exchange and investment in the Indian economy measuring economic benefits and cost

⁵⁸ L. Emerton, L., *Economic Tools Environmental Planning and Management in Eastern Africa*, IUCN - The World Conservation Union, Eastern Africa Regional Office, (Feb 1999).

⁵⁹ COST-BENEFIT ANALYSIS AND THE ENVIRONMENT: RECENT DEVELOPMENTS – ISBN 92-64-01004-1- OECD, (2006).

⁶⁰ Livermore, Michael A., *Can Cost Benefit Analysis of Environment Policy Go Global?* New York University Environmental Law Journal, (Vol. 19, Issue 1 (2011)).

⁶¹ Connie Nielsen, Klaus Weber & Camilla K. Damgaard Niras, *Environmental Economic Assessment Tools Remediation Technologies*, DMEEPA, ENVIRONMENTAL Project No. 1369 (2011).

⁶² Rajesh Rai & T.N. Singh, *Cost Benefit Analysis and Its Environmental Impact in Mining*, Jr. of Industrial Pollution Control, 20 (1) (2004) pp 17-24.

of the Metro.⁶³ The cost and benefit analysis are a useful tool to predict the damage caused by the environment pollution in terms of its impact of cost which helps the government and policymakers to take precautionary measures to minimize the damage and reduce the cost.

Therefore, these are some of the economic tools which can be applied in the green economy to protect the environment and with their assessment, the government can regulate, frame policies, and enforce stringent laws to protect the environment. From this perspective, the economic tools can empower and boost the progress into a green economy. They can substitute for greener items by eliminating obsolete technologies, transforming arrangements, and giving new driving force. They can fortify market foundation and market-based components, divert open speculation and bolster greener open acquirement.

VII. SUGGESTIONS

1. Economic tools such as property rights over natural resources can save our lakes and fisheries which have been exploited to a great extent. Lakes are acted as a dumping ground for many people, however strict laws have to be made to protect these natural lakes.

2. There is a more prominent need to discover administrative answers for outline land and groundwater rights. In the coming decades, an evenhanded dispersion of water rights will act as a significant test for diminishing agrarian disparities, and if accessible water resources are more equitably distributed, it will have a marked impact on the income distribution of farmers.⁶⁴ Before legislating law on groundwater, it is necessary to review the already existing legislation on groundwater and therefore draft policy on groundwater usage. Keeping in mind efficiency and equity, the choice will have to be made whether private or public ownership of wells for extraction of the resource is preferred.⁶⁵ This principle of property rights and Cost-Benefit Analysis has to be analyzed for proper implementation for the usage of water. New methods and technology have to be implemented to efficiently use water for agricultural and other purposes.

By 2030, the country's water demand is projected to be twice the available supply, implying severe water scarcity for hundreds of millions of people and an eventual six percent loss in the country's GDP.⁶⁶ Poor implementation of water harvesting should be regulated and enforced

⁶³ M N Murty, Kishore Kumar Dhavala, Meenakshi Ghosh and Rashmi Singh, *Social Cost-Benefit Analysis of Delhi Metro*, Institute of Economic Growth, Delhi University Enclave, (October 2006).

⁶⁴ Anindita Sarkar, *Socio-economic Implications of Depleting Groundwater Resource in Punjab: A Comparative Analysis of Different Irrigation Systems*, EPW (February 12, 2011 vol xlvi no 7).

⁶⁵ Rema Devi p., *Groundwater law in India: problems and prospects*, (1990).

⁶⁶ Composite Water Management Index: *A tool for Water Management*, NITI Aayog, (June 2018), http://social.niti.gov.in/uploads/sample/water_index_report.pdf

through proper channels. Subsequently, economic instruments can assume a significant job in water management and rationalize the policies and laws on the use of water management.

3. India still needs to contribute more to clean innovation and technology by analyzing cost and benefit analysis for environmental protection. Further, With the risk of global warming posing a potential threat, it is critical that green marketing turns into the standard and not an exception. This includes recycling of waste, metals, plastic, etc. Government has to apply stringent laws to implement green marketing and use this concept. Sustainable marketing is a more radical approach to markets and marketing which seeks to meet the full environmental costs of production and consumption to create a sustainable economy.⁶⁷

4. The government can impose a Pigouvian tax to lower pollutant emissions. It is imposed as a per-unit tax on a good, thereby generating negative externalities equal to the marginal externality at the socially efficient quantity.⁶⁸ Such an example could be the imposition of the carbon tax on those who emit carbon emissions. Since a Pigouvian tax allows the right to pollute, the higher the tax, the larger is the reduction of pollutants from the environment.⁶⁹ The environmental authority and government can meet the desired level of pollution by setting an emission tax at the appropriate level and frame law and regulation to meet the same.

VIII. CONCLUSION

Numerous difficulties and obstructions confronting developing countries in moving their economies to more environmentally friendly paths. On one hand, this ought not to avoid the endeavor to critically join environmental elements into economic development. Then again, the different obstructions ought to be distinguished and perceived and required to enable and support the sustainable development efforts. Policies have to be implemented more efficiently in India to move towards a “green economy” and achieve sustainable development goals.

Applying economic tools in the field of environment can help the government to frame policies and law more efficiently and effectively and strive conventional economy into a green economy. Although the government uses a command and control approach to punish environment offenders which is justified in India, however using economic tools in the framing of environment policies by the government will not affect the GDP growth and can check scarcity of resources in the long run.

⁶⁷ D.N.V. Krishna Reddy, *A study on Impact of Green Marketing on Sustainable Development (With Reference to Khammam District)*, Mother Teresa Institute of Science and Technology, (October 13-14, 2017).

⁶⁸ Introduction to Economic Analysis, Saylor Academy, (2012)

https://saylordotorg.github.io/text_introduction-to-economic-analysis/s00-license.html.

⁶⁹ Fernando Carriazo, *Economics and Air Pollution*, <http://dx.doi.org/10.5772/65256>.