



# STUDY OF CARBON NEUTRAL MATERIALS AND EFFECTIVE FACTORS FOR GREENROADS

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**Abstract :** This study aimed to minimize global challenges to sustainable development. Green roads can reduce emissions from fossil fuels and greenhouse gases if they are constructed with carbon-neutral materials. As a result, the materials used to construct green roads are carbon neutral, which allows them to absorb warmth and extra emissions released by vehicles. The reason is that there are so many natural aggregates used in construction. The paper places a focus on practical solutions to the aforementioned international issues. Road construction with carbon-neutral materials helps to reduce greenhouse gas emissions. The paper places a focus on practical solutions to the aforementioned international issues. In conclusion, "green revolutions" will be used as a concept to address global issues. Overall, the study of carbon-neutral materials and influential factors for green roads is a multidisciplinary field that requires collaboration between researchers, engineers, policymakers, and other stakeholders. Through ongoing research and innovation, this field can contribute to the development of sustainable infrastructure solutions that promote environmental, social, and economic sustainability. In conclusion, "green revolutions" will be used as a concept to address global issues. The tremendous economic growth of many nations has resulted in significant global climate change and unpleasant pollution.

**Keywords – Carbon Neutral Materials, Green Roads, Sustainability**

## I.INTRODUCTION

The tremendous economic growth of many nations has resulted in significant global climate change and unpleasant pollution. In addition to boosting population standards, a green economy "minimizes. When constructing green roads and highways, it is important to take the topography, environment, and geology of the region account. A few of the major benefits of green roads and highways for environmentally responsible construction. Road and highway construction with carbon-neutral materials helps to reduce greenhouse gas emissions. This is due to the substantial use of natural aggregate resources in the construction sector. The tensile strength of pavement will be raised by recycling various waste materials. Some of these waste materials can be sold to make money (by shifting policy from pollution to solution). Environmental challenges, ecological deficits, social instability, and negative externalities." In other words, it is "low carbon, resource-efficient, and socially inclusive." Due to its success in halting environmental degradation, which is the main barrier to economic progress, the green industry has gained prominence. The green economy aids developing countries in overcoming poverty and economic difficulties. One of the key advantages of a green economy is its capacity to create new export markets.

## II.LITERATURE REVIEW

A literature review was conducted to have a better understanding of how comparative research on "green economics and development for green roads and highways" was conducted. A thorough peer review process was used to evaluate research from reliable sources, with a focus on the idea of a green economy and the development of green roads and highways. Among these databases were Springer, Taylor & Francis, ProQuest Digital Dissertations, ACS, and European Bio-energy. Serious economic challenges and significant environmental risk are currently being faced by several countries. A few of these countries are, for instance, Myanmar, Nigeria, Cambodia, Ethiopia, Kyrgyzstan, Yemen, Tajikistan, Sub-Saharan Africa, Papua New Guinea, Bangladesh, North Korea, Nepal, Afghanistan, and the Republic of Congo, all of which are ranked poorly in the survivability index as a result of the economic and environmental crises they are currently going through. Gravel mining for construction exacerbates the problem of erosion and surface run-off, and the indiscriminate particle discharge from building sites seriously damages the

environment and leaves behind undesired depositions. The subtopics in the following chapter go into greater detail about these issues.

### 1. Green roads and highways' drawbacks and effects

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### 2. pollution to the greenhouse gas solution

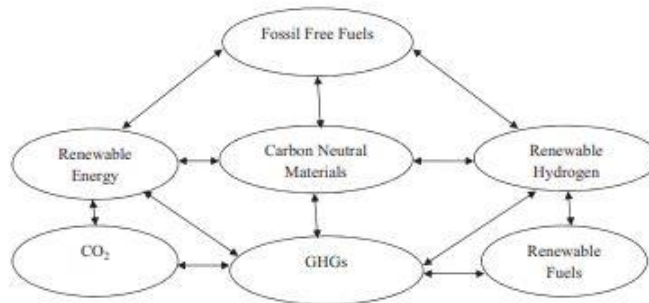
Fossil fuels and coal-fired power stations are significant sources of pollution, and GHGs, which are brought on by CO<sub>2</sub> emissions, are a global problem. The environment is significantly harmed by CO<sub>2</sub> emissions, which account for around 77.0 percent of GHGs, according to estimations. Energy is released when hydrogen reacts with water and oxygen to behave as a fuel. A variety of the procedures used to produce hydrogen need the use of energy from solar, wind, fossil fuels, geothermal, hydropower, nuclear, biomass, and other sources. In the process of making hydrogen, GHGs such carbon dioxide and monoxide are produced, which helps to raise the earth's temperature. Carbon neutral energy also contributes significantly to the advancement of fossil and hydrogen fuels by changing policies from waste to wealth to pollution to solutions based on sustainability. One benefit of using biofuels is the reduction of pollution caused by the conversion of CO<sub>2</sub> into biofuels, which also promotes sustainability. The primary cause of global warming is GHG emissions produced by humans, which constitute a problem on a worldwide scale. Because they are externalities, GHG emissions represent the worst market failure the world has ever seen.

### 3. Poverty reduction and protection of green economic growth

High rates of poverty have originated in small, unimportant, and conflict-affected nations as a result of insufficient sustainable development goals. So, in addition to having money and goods, poverty assures a justifiable level of living. Poverty is characterized by hunger and malnutrition, restricted access to healthcare and other essentials, social segregation and discernment, and the inability to make life decisions. If green economic development is to eradicate poverty and hunger, it must create fair employment opportunities for both the present and future generations. 840 million people in developing countries, primarily in Sub-Saharan Africa and Southern Asia, with an income of less than \$1.25 a day. About 50,000 people had to leave their homes in 2017 in search of protection from wars abroad. The bulk of those living in poverty—50% of those under the age of 18—are illiterate, reside in typical rural areas, and devote most of their time to farming. The fight against poverty is challenging and far from over. Because of their severe poverty, those who live in distant areas are becoming more and more difficult to reach. The majority of people still don't understand how to access safe roads, hospitals, electrical systems, clean water, and other essential infrastructure. Progress is frequently transient for individuals who were fortunate to escape poverty as well. The poor (those living in inaccessible locations) will be affected by climate change, economic shock, and food insecurity, consigning them to poverty. Therefore, it will be difficult to eradicate poverty by 2030.

### 4. Green highways and roads made on carbon-neutral materials

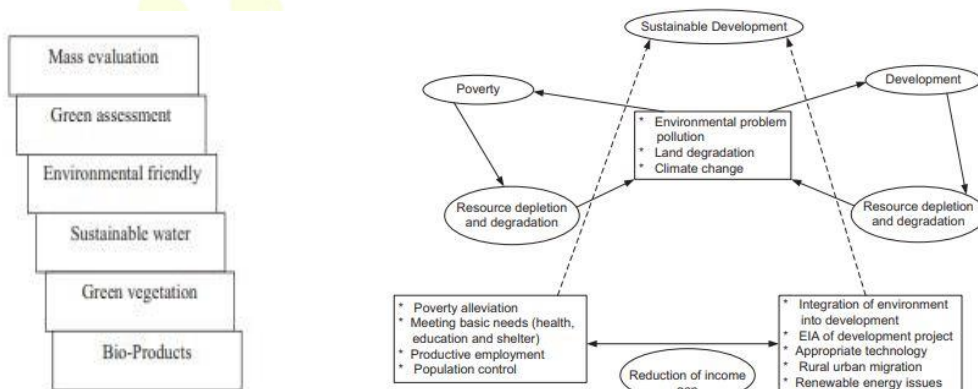
As atmospheric CO<sub>2</sub> levels rise, interest in green, carbon-neutral highways and roads is increasing. Any country that reduces its CO<sub>2</sub> emissions by a specified percentage will be given credit under the UN's "Carbon Credit" initiative. This credit can be used to purchase products. Carbon dioxide dangers to the climate and environment increased by 37.24 percent between 1990 and 2017 as a result of greenhouse gas emissions. The significant GHG emissions from road construction are mostly caused by transportation and construction supplies. Therefore, improving highway construction quickly is crucial for the advancement of national transportation. If green highways and roads are built appropriately with carbon-neutral materials, they can lower GHG and CO<sub>2</sub> emissions. Green roads are those whose construction emits little to no carbon dioxide. Green highways and roads can encourage commerce and aid in the development of new neighborhoods. Biofuels like biodiesel and ethanol release relatively less greenhouse emissions due to their negligible Sulphur content and lower concentrations of CO, CO<sub>2</sub>, and N<sub>2</sub>O than conventional fuels (GHGs). Utilizing a range of engineering supplies, resources, and petroleum products with little to no carbon dioxide emissions, green roads and highways are built.



### III. METHODOLOGY

Conducting a research entail obtaining data from a variety of sources and putting it to use in the context of a green economy. The preceding research's varied techniques were based on the notion of environmentally and economically sustainable systems. The concept of a green economy is the foundation for the global difficulties that the majority of growing nations are experiencing. Numerous factors were taken into account in order to determine the economic and environmental problems that now face developing countries. The primary problems facing green economies were identified and looked at based on the existing situation. Most of the world's issues were mostly brought on by CO<sub>2</sub> emissions from burning fossil fuels including gas, coal, and oil. According to Weick, V. 2016, every country in the world has its own distinct national circumstances for a green economy, however their associated policies differed. The following is a list of the crucial characteristics for running green sectors:

- I. An increase in a country's population and the percentage of green industries that contribute to GDP.
- II. An increase in green sector investments, both public and private
- III. Increasing the share of sustainable environmental products, goods, and ser-vices in the mass composition of consumption.



### IV. Human growth index, poverty index, and current condition inequality

The human growth index, multidimensional poor index, inequality human growth index, poverty, and hunger are all used in this chapter to present the statistics that have been gathered. The human growth index can be characterized as a summary metric used to calculate the long-term progress of respectable living standards, long and healthy lives, and access to fundamental information. The three fundamental facets of human development are another name for this long-term advancement. The fundamental human growth index that accounts for inequality is known as the inequality-adjusted human growth index.

#### 1. Poor multidimensional index

108 countries and 2.2 billion people worldwide are considered to be multidimensionally poor. Nearly 1.5 billion people are predicted to live on or less than \$1.25 per day in order to survive in a multidimensional deficit. Thus, multiple deprivation scores were computed for the three-dimensional sectors (i.e., living standards, health, and education). A deprivation score of 33.30% was usually used to distinguish between non-poverty and poverty. 18.40% and 18.50% of Nigeria and Republic of Congo, respectively, were multidimensional poor. Human growth index indicators based on selected countries from 2006 to 2017. The average means of original distribution and higher human growth are 10 C and 13 C respectively.

#### 2. Human development index with inequality corrected

The inequality-adjusted human growth index is the core measure of the human growth index adapted for discrepancies. As a result, the overall loss in human growth increases with a country's level of inequality [6,70]. Table 10 displays the human growth index adjusted for inequality from 2005 to 2017. Nigeria's overall loss and human inequality coefficients are higher than the average values for countries with low human growth indices, which are 32.00 percent and 31.70 percent, at 37.80 and 37.50 percent, respectively (Ethiopia, Sub-Saharan Africa, and Republic of Congo). However, Bangladesh has had the greatest overall loss, at 58.00 percent, followed by Papua New Guinea and India, all of which saw losses of 48.00 percent. To determine the poverty line

and mean, individual shares and income inequality were plotted. Human development index's effects on inequality from 2005 to 2017. An analysis of the inequality, human growth index, and poverty between 2011 and 2017

### 3. Developments in the domestic economy

However, Bangladesh has had the greatest overall loss, at 58.00 percent, followed by Papua New Guinea and India, all of which saw losses of 48.00 percent. To determine the poverty line and mean, individual shares and income inequality were plotted. Human development index's effects on inequality from 2005 to 2017. An analysis of the inequality, human growth index, and poverty between 2011 and 2017. Also, in 2017, the 10 biggest developed economies by GDP in both minimal and PPP were Germany, Spain, South Korea, USA, UK, Australia, Canada, Italy, Japan, and France.

## V. CONCLUSION AND DISCUSSION

Resources, personal money, property value, infrastructure, health status, and educational background can all be used to quantify poverty alleviation. To implement the green revolution, fiscal and non-fiscal strategies are utilized to quantify poverty reduction. If GHGs are employed as a feedstock for the creation of renewable energy, future generations will gain from this in two different ways. First, as GHGs are converted into renewable energy, pollution is reduced. Second, little to no pollution will be produced when developing roads and highways with carbon neutral building materials. Due to their neutrality, materials used to build roads can absorb extra vehicle emissions, heat, carbon dioxide, and greenhouse gases. Therefore, it is important to promote the use of carbon-neutral materials in the building sector. Reusing supplies and materials helps the highway construction sector cut its greenhouse gas emissions. One can contend that the idea of a green economy and sustainable living will aid in resolving international problems.

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