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GREEN FINANCE FOR SUSTAINABLE DEVELOPMENT: A THEORETICAL STUDY

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ABSTRACT

Sustainable development, is concerned with meeting the needs of present and future generations by protecting their interests fully and separately without effecting each other. It ultimately reflects the common belief that there is a single earth to live, no one can be deprived of. The term "Green Finance" has come into existence to complement Sustainable Development by taking care of economic benefits along with environmental benefits. This paper attempts to demonstrate the theoretical aspect of these basic components with a broad description of their areas and applications to make it easier for the readers to get an enhanced idea about them. Taking into consideration the necessity of Green Finance in Sustainable Development process, some recommendations are also provided that may help to achieve the goal more conveniently. Better theoretical concepts in this arena through this paper can motivate researchers to conduct diversified research from different perspectives and angles; in short to open new doors for research.

Keywords: Green Finance, Sustainable Development.

INTRODUCTION

Sustainable Development has become a key concern in today's world that presumes to meet the current demands of people without conceding the demands of upcoming generations. The concept was first developed almost a quarter of a century ago to reconcile economic, social and ecological dynamics (IUCN, 1980). Sustainable development cannot be ascertained without proper use of financing sources. Green Finance is a term that is used to describe an environment friendly means of financing to ensure Sustainable Development. Wang & Zhi (2016), described Green finance as "a phenomenon which combines the world of finance and business with environmentally friendly behavior". Basically, Green Finance is assumed to be an important concept in sustainable development, because without assuring proper and environmently friendly use of money sustainability can never be achieved.

Understanding the importance of these basic concepts in today's world, this study has been conducted to give a detailed conceptual idea about the terms to motivate scholars to go for a detailed and descriptive analysis about the topic.

The main objective of this study is to give a detailed idea about the key components and to logically explain the influence of Green finance on sustainable development. The rest of the paper describes an explanation of basic terminologies, mentions about the leading countries in the initiatives for Green Projects and Sustainable Development, Green Finance measures adopted by numerous countries and major challenges in Green Finance. Finally, some suggestions have been recommended by the authors for the problems normally

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witnessed that creates obstacles in widespread use of Green Financing in attaining sustainable development goals and finished with a brief conclusion.

1. OVERVIEW Of THE BASIC TERMINOLOGIES

1.1. Green Finance Definition

There is no specific definition of the term "Green Finance". Generally, it can be defined as extending financial services and carrying out all kinds of financial activities considering the affirmative benefits towards the environment.

To know about the term, "Green Finance" more specifically, a number of globally recognized definitions which have been picked up are as follows:

Table 1: Green Finance Definitions

Entities	Definition
European Banking Federation	"Green Finance includes, but is not limited to: a. Environmental aspects (pollution, greenhouse gas emissions, biodiversity, water or air quality issues); and b. Climate change-related aspects (energy efficiency, renewable energies, prevention and mitigation of climate change connected severe events)".
Organization for Economic Co-operation and Development (OECD)	Green finance is finance for "achieving economic growth while reducing pollution and greenhouse gas (GHG) emissions, minimizing waste and improving efficiency in the use of natural resources."
People's Bank of China (PBOC)	"Green finance policy refers to a series of policy and institutional arrangements to attract private capital investments into green industries such as environmental protection, energy conservation and clean energy through financial services including lending, private equity funds, bonds, shares and insurance."
Indonesian Financial Services Authority (OJK)	Sustainable finance in Indonesia is defined as "comprehensive support from the financial service industry to achieve sustainable development resulted from a harmonious relationship between economic, social and environmental interests."
Government of Germany	"Green Finance is a strategic approach to incorporate the financial sector in the transformation process towards low-carbon and resource-efficient economies, and in the context of adaptation to climate change."

1.2. Objectives of Green Finance

The objectives of Green Finance which have been derived from the definitions are as follows:

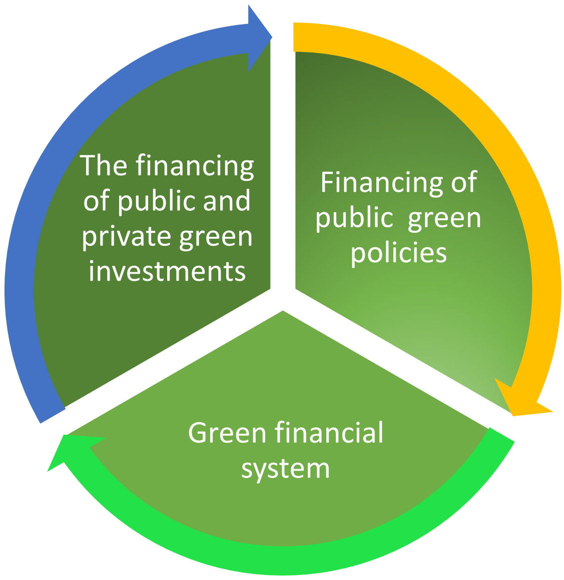
• To make financial investments in environment friendly projects.

• To focus on investments in projects that hinder climate change or contribute to reduce effects due to climate change.

• To maximize benefit and minimize waste of the available natural resources without causing any harm to surroundings.

1.3. Elements of Green Finance:

Green Finance is a wide concept which covers a pretty good area of the total financial system of an economy. It can be better understood from the proposed definition of Dr. Nannette Lindenberg, where the researcher mentioned the Green Finance covers three things:



Source: Dr. Nannette Lindenberg's Illustration

1.4. Types of Green Finance Products Being in Practice

A number of Green Finance products are being used in countries worldwide with different names or headings. They are as follows:

Table 2: Green Finance Products Being in Practice

Products	**Specification**
Environmental Funds and Biodiversity Funds	These kinds of funds offer financial backing to projects conserving biodiversity or businesses covering the area of biodiversity. They normally promote organic agriculture, ecological tourism and sustainable development of forest and fisheries.
Debt-for environment Swaps	Under this kind of funding, a creditor country and a less developed country come to an agreement that the loans of the lesser developed country would be exempted if the developed country provides sources of funds to environmental fund that is meant for protecting biodiversity. the United States, Sweden and Germany are the examples of the most active countries developing debt-for-environment swaps projects,

Forestry Securitizations	Financing under this heading is extended to the enterprises of forestry exploitation which set up securities transfer all of the business profits to a new legal subjects which then will obtain funds from the investors by issuing securities in the capital market and will loan the revenues to the enterprises of forestry exploitation, Examples are found from countries like the Unites States and Brazil. The system of mitigation banking of wetland and endangered species is found in the United States and the system of tradable native vegetation obligations in Brazil.
Weather Derivatives	Weather derivatives are meant for handling the negative financial losses caused by changes in climate. If the level of climate change exceeds the prescribed standard, the enterprise signing weather derivative contract may require a certain amount of compensation in return.
Nature-linked Securities	Nature-linked Securities transfer the risk of natural disasters and climate change to investors in global capital market. The sponsors issue debt securities through setting up a special purpose vehicle (SPV) where sponsors secure a compensation on the occurrence of natural disasters from the SPV against payment of a certain amount of insurance fee to SPV regularly.
Green investment Funds	Investment companies and trust funds invest their money in in green projects, i.e. projects that are “environmentally friendly”, “moral", "green", "social responsibility" or containing "sustainable" standards,

Source: An article by Wang & Zhi (2016)

1.5. Recommended Potential Green Projects

With reference to Opportunities in Green Finance (2009), Chowdhury, et al (2013), proposed some projects where there exists green financing opportunities. Those are mentioned below:

• Renewable energy projects, such as, solar power, solar home lighting, solar street lighting, desalinization plants, geo-thermal energy, biomass based power etc.

• Fuel substitution, such as, coal to oil to gas to hydrogen in power plants, manufacturing process industries, automobiles. Fuel shift from natural gas to compressed natural gas (CNG) or Liquefied petroleum gas (LPG) in the transport sector and related equipment finance.

• Energy from biomass, such as, biofuels from rice husk, sugarcane bagasse, molasses waste etc.

• Cultivation for biofuels, agroforestry.

• Fuel efficient equipment.

• Energy efficiency improvement and waste heat utilization projects.

• Recycling of waste vermicomposting, compost from sericulture waste/cocoons, paper, coconut fiber, cloth/yarn, jute wastes, garments waste.

• Rain water harvesting by rooftops, farm pond.

• Soil conservation/watershed structures-On-farm development, contour binding, bench terracing.

• Carbon sequestration projects like horticulture and forestry, social forestry, afforestation.

• Green housing/habitat-Rain water harvesting, waste management, renewable/solar energized, sanitation, eco-friendly material.

• Biofertiliser/biopesticide, Rhizobium, Azotobactor, Azolla, Tricoderma, Tricogramma.

• Green microfinance.

• Improved Jute retting technology.

• Cultivation of and use of eco-friendly material/handicraft-Jute.

• Finance projects which address conservation issues such as prawn hatchery, fish seed preparation, ornamental fisheries.

• Cultivation of aromatic and medicinal plants.

• Rural and eco-tourism.

• Bee keeping.

• Integrated farming models.

• Other project and activities that reduce anthropogenic emissions, management of methane emissions from municipal landfills, management of methane emissions from agriculture and cattle manure management.

2. SUSTAINABLE DEVELOPMENT

The term “sustainable development” can be often seen on corporate websites and in political platforms. More and more companies, universities and many other kind of organizations have been interested in sustainable development. In fact, it has become a kind of conceptual cornerstone that defines ideas of contemporary society. Sustainable development is about integration: developing in a way that benefits the widest possible range of sectors, across borders and even between generations.

2.1. Sustainable Development Definition

IISD defines Sustainable Development as: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

2.2. Goals of Sustainable Development

The general goal of sustainable development (SD) is the long-term firmness of the economy and environment; this is only attainable through the integration and acknowledgement of economic, environmental, and social concerns throughout the decision making procedure.

2.3. Requirements Needed for the Mission of Sustainable Development

Our Common Future (WCED 1987; 65) mentioned that the strategy for sustainable development aims to promote harmony among human beings and between humanity and nature. In the specific context of the development and environment crises of the 1980s, which current national and international political and economic institutions have not and perhaps cannot overcome, the pursuit of sustainable development requires:

- A political system that secures effective citizen participation in decision making,
- An economic system that is able to generate surpluses and technical knowledge on a self-reliant and sustained basis,
- A social system that provides for solutions for the tensions arising from disharmonious development,
- A production system that respects the obligation to preserve the ecological base for development,
- A technological system that can search continuously for new solutions,
- An international system that fosters sustainable patterns of trade and finance, and
- An administrative system that is flexible and has the capacity for self-correction.

3. RELATIONSHIP BETWEEN GREEN FINANCE AND SUSTAINABLE DEVELOPMENT

Green Finance and Sustainable Development are inter-connected to each other because:

- without green finance sustainability cannot be gained. Reasons are-
- without assuring sustainability in financial system overall sustainability cannot be achieved.
- the objective of meeting the need of present generation without compromising the future cannot be attained without the assurance of Green Finance in the economy.
- without sustainable development green finance is incomplete as green finance itself is subject to / is meant for ensuring sustainability.

3.1. Countries Leading in The Initiatives for Green Projects And Sustainable Development

A report, published by United Nations Environment Programme (UNEP) released a list of number of countries that are already engaging with green financing practices. Emma Rumney, a reporter at Public Finance International reported that, "A report by the UNEP, found that countries like Kenya, Bangladesh and Jordan are at the forefront when it comes to finding innovative ways to match financial market development with national priorities, green projects and sustainable development". Besides these countries, Central America, Egypt, Mongolia, Morocco, Thailand, Vietnam, Mauritius and Philippines were on the list showing initiatives taken by each country for the same purpose.

4. GREEN FINANCE MEASURES ADOPTED BY NUMEROUS COUNTRIES

G20 INSIGHTS published a proposal declaring measures taken by members of G20 to assure green transformation. They are:

Table 3: Green Finance in Different Countries

Country	Measures
Brazil	The BOVESPA Stock Exchange set up a Corporate Sustainability Index as early as 2005. The Banco Central do Brasil has introduced requirements for banks to monitor environmental risks, building on a voluntary Green Protocol from the banking sector. Brazil's banking association (Federação Brasileira das Associações de Bancos, FEBRABAN) is developing a standardized assessment methodology and automated data collection system to monitor flows of finance for green economy sectors.
China	The French government introduced mandatory climate-change-related reporting for institutional investors (Article 173 of France's law on "energy transition for green growth") starting in January 2016.
France	The French government introduced mandatory climate-change-related reporting for institutional investors (Article 173 of France's law on "energy transition for green growth") starting in January 2016.
Indonesia	The Indonesian financial regulatory authority (Otoritas Jasa Keuangan, OJK) published a Green Finance Roadmap in 2014.
India	The Reserve Bank of India (RBI) has included lending to small renewable energy projects within the targets of its Priority Sector Lending requirement which require banks to allocate 40% of lending to key sectors such as agriculture and small and medium-sized enterprises.
South Africa	Since 2010, environmental, social and governance (ESG) disclosure indicators have been introduced by the Johannesburg Stock Exchange.
United Kingdom	In 2015, the Bank of England's Prudential Regulation Authority published a report on the impact of climate change on the UK insurance sector.
Germany	The German national Development Bank "Kreditanstalt für Wiederaufbau" (KfW) currently belongs to the largest Green Bond issuers worldwide.

5. CHALLENGES RELATED TO WIDESPREAD APPLICATION OF GREEN FINANCING

Green Financing activities are gaining popularity all over the world for the abundance of benefits being derived from the financing activities both at present and future. Initiatives taken to implement Green Financing vary country to country and advancement in this issue are not alike because of the existence of diverse barriers. A report was organized in cooperation between DBS and UN Environment Inquiry to gain an insight into the green finance opportunities, the characteristics of those opportunities, and current green finance flows in ASEAN from 2016-2030 where a couple of barriers have been identified. They are-

• The challenge of a relatively limited pipeline of commercially viable green investment opportunities.

• Underdeveloped green toolkit for financial decision makers.

• Lack of non-financial environmental makes it difficult for companies to attract new sources of green funds.

• Inadequate analytical capabilities restrains flow of funds for green investment.

• Technology risks, because of lack of expertise in green projects.

• Lack of existence of sound policy frameworks.

A report by Berensmann K, et al (2017) in G20 INSIGHTS identified some microeconomic, macroeconomic and political barriers that create obstacle in mobilizing sufficient private capital for sustainable investment. Microeconomic barriers arise from information asymmetry, maturity mismatches between long-term green investments and the relatively short-term time horizons of savers, and, inadequate analytical capacity.

Macroeconomic barriers consist of general barriers along with some specific financial barriers. Microeconomic barriers arise from information asymmetry, maturity mismatches between long-term green investments and the relatively short-term time horizons of savers, and, inadequate analytical capacity. Political barriers include lack of strategic policy signals, political country risks, regulatory risks and distorting policies.

Actual challenges faced by individual countries may vary depending on economic condition, infrastructural development, mentality of the citizens regarding learning and accepting changes, government initiatives, population density, availability of resources and alternatives, geographical locations and weather. That's why it's difficult to find homogeneous challenges faced by all the countries around the world.

NECESSARY RECOMMENDATIONS AND CONCLUSIONS

Problems related to Green Finance vary, as do solutions to those problems. In general, some points must be taken while using Green Finance in reaching the goal of sustainable development, as Sustainable Development cannot be achieved without proper implementation of Green Finance in economic activities. They are listed below:

•Problems related to green finance faced by individual countries are different. So they must be identified separately and solutions to the problems must be done in a more customized way.

•Awareness about green investment, green financing and environment protection is a pre-condition for inviting citizens to contribute to sustainable development. Awareness programs and promotional activities must be organized in a way that are best fitted to actual needs.

•Worldwide collaboration must be ensured to provide for all kinds of support like technical, financial, conceptual, communicational etc. Unity is a must to ensure uniform progress all over the world.

•Continuous research must be conducted to measure the standing of individual countries with regard to obtaining sustainable development. Country wise, continent wise, economic standing wise or relative importance wise research works should be encouraged to open doors for learning news ways to attain sustainable development. Measuring present status to goal of attaining sustainable development is also important enough to plan for to do's in future.

•Continuous innovation in the field of developing new ideas and alternatives in green financing must be encouraged as there is no limited/ specific area to attain the objective of attaining sustainable development.

•More research works should be welcomed in green finance area so that a clear and complete idea about green finance is derived and new and innovative green financing techniques are generated.

•Measures taken to overcome obstacles must not be confined to policies or documents. They must be implemented at the early without wasting time.

•Each and every market participant must contribute to attain the goal ensuring their active and effective participations from all aspects.

•Last but not least, policies and measures in green finance area must be in line with obtaining goal of sustainable development, because it can never be forgotten that without financing, development of an economy cannot be realized and without green finance, sustainable development cannot be released.

Sustainable development is both an individual and a collective concept. Each and every country must work to ensure their present and future existence. At the same time all the countries around the world are supposed to work collectively for the same goal as they cannot ensure it until they become united because they live in the same planet. Green Finance is an inevitable component for ensuring sustainable development because a green and human friendly environment for present and future generation cannot be thought of without making necessary human friendly financial arrangements in investment activities.

This study has been conducted to construct a common platform for two very important elements in one frame, which have a direct influence on the existence of present and future living beings and relation of one element with the other. As it covers a general theoretical discussion, future research can be made more specifically covering particular areas and countries in discussion or using numerical data in analysis. Each and every innovative studies are expected to add value to this emerging and vital concept.

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