International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 12 | December - 2023 SJIF Rating: 8.176 ISSN: 2582-3930

India's Footing in Green Finance in Comparison to other Leading Economies of the World

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Abstract

In the contemporary world, as development is surging in terms of planning and literal efforts, the climate has become a leading issue, leading to the environmental standards being compromised. This requisites to take recompense steps by countries not just domestically but at the global level. Green finance gained prominence to tackle the prevalent issue. The paper pertains to a comparison of India with other top world economies up to rank eight, that are the U.S., China, Japan, Germany, U.K., France and Canada, with a special focus on their carbon emission curtailment goals and the issue of green bonds.

Keywords: Carbon emissions, climate, economies, green bonds, green finance.

Introduction

Stakeholders across the globe are starting to make an effort with respect to climate concerns, particularly with regard to decarbonization methods. A report by IEA (2023) affirmed that internationally, carbon emissions escalated due to the increased use of fossil fuels for energy production by 0.9%, or 321 million tonnes, in 2022, hitting a record-breaking high of over 36.8 billion tonnes. This certitude is an alarm requiring scrupulous attention by the world as a whole. In order to aid initiatives that reduce greenhouse gas emissions and help businesses to deal with and withstand the implications of climate change, the transition to a low-carbon or green economy would require very high levels of new capital investment, particularly by way of green financing. Green finance is a comparatively new concept and is in evolving stages. By emphasizing two contentious concepts that are, "green" and "finance," green

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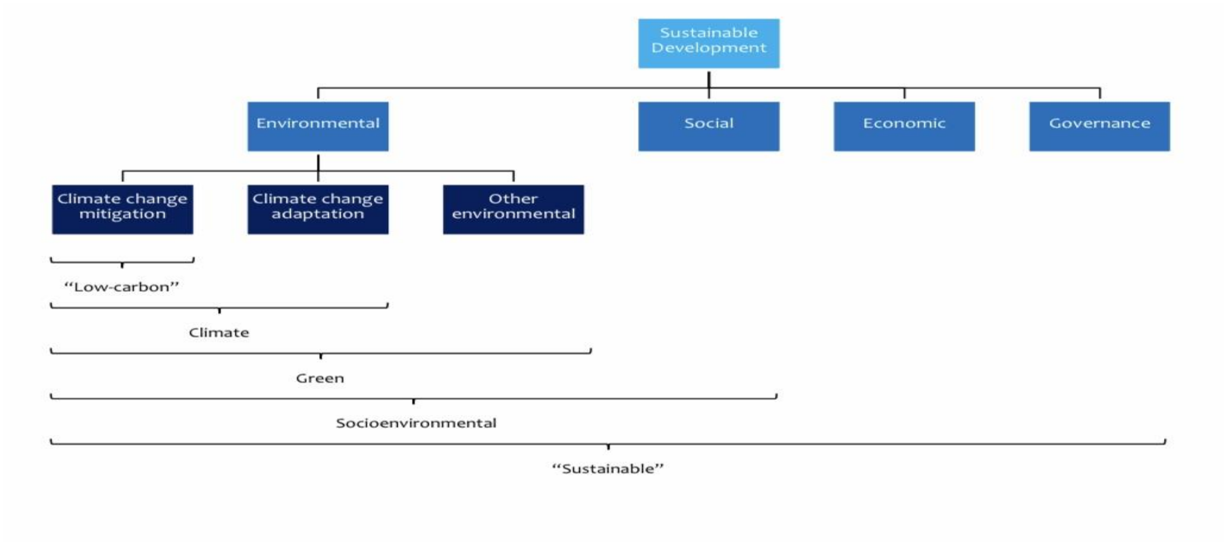
finance is an emerging financial trend that integrates environmental conservation with economic gains. As a corollary, there is a "great green multiplier" effect, which benefits in both ways- economically and environmentally, creating a scenario that is benefiting to everyone. Policymakers and researchers have shown a progressive focus towards green finance as interest in environmental preservation, climate change, and sustainable development grows on a worldwide scale. The term “green finance” is interchangeably used with terms like “sustainable finance”, “climate finance” and “low carbon finance,” however, there is a slight difference in their encompassing issues, though with overlaying domains. The below diagram clears the confusion with an easy visual explanation. The issues relating to the environment concern the state and working of the environment and systems within, such as renewable energy, greenhouse gas emissions, pollution, etc., with climate change mitigation and adaptation, and all other environmental-related concerns withal falling under this umbrella. Social issues, such as human rights, labour standards, health, and safety, are related to the rights, etc. relate to well-being, and desires of individuals and societies. Economic issues include how investments affect local, national, and international economic situations. And finally, overseeing the investment entities falls under governance issues.

Framework segregating intertwined concepts



Source: United Nations Environment Programme, 2016

Even with the tacit fact of being in the category of developing countries, India has procured a fifth place in the top world economies from ninth position in 2010, surpassing the strong ones like the United Kingdom, France, etc. and is expected to be a US$ 3.7 trillion economy in 2023 as postulated by the Reserve Bank of India. And, by 2030, India projects to see itself as the third-largest economy. The country has moved forward in terms of favourable relations with a surfeit of strong nations along with progress in the country's own developmental growth. But what India's standing is appertaining to sustainability or going "green" with respect to others.

For the purpose of the paper, a comparison is done of India with other top economies of the world with rank up to eight, namely, the United States, China, Germany, Japan, the United Kingdom, France and Canada, especially catering to carbon emission reduction targets and green bonds issued as a part of countries' efforts towards green commitments. A green bond is a type of financing instrument that can be issued by the government(s) and corporations to finance or refinance initiatives that have a favourable impact on nature and the climate.

Purpose of the Study

Research Gaps:

A plethora of information and discussions are widely available regarding the economic standing of various countries; and India's progress towards the same in comparison to other nations has been of intriguing interest, with various publications indicating changes or improvements in India's standing over past years and in relation to other countries. Although data has been available on green finance and on initiatives taken in this direction by India and other countries, whether domestic or international, little can be found in the form of comparative data pertaining to the same. Therefore, the study focuses on briefly understanding India's extent towards green finance in comparison to other economies, particularly with a rank up to eight in the world's top economies list. This will help in giving a clear and precise picture of India's footing pertaining to green finance.

Research Problem:

India's standing in terms of green finance in comparison to other top economies is yet to be studied and manifested.

The Objective of the Study:

The study is done with the objective to understand India's footing in green finance in comparison to other top economies of the world.

Research Methodology

Secondary sources have been referred to in order to collect data. Such sources include publications such as journals and reports by the government, international organisations and other entities, articles, research papers and other previous works conducted on the subject. On the basis of the information gathered, comparisons have been made, and suggestions are provided.

World's top eight economies have been considered, with India holding the fifth position, and other economies, namely, the United States, China, Germany, Japan, the United Kingdom, France and Canada. A brief comparison is made of India's green efforts with that of others.

Green Efforts by India

India became the 22nd nation, through the RBI's issuance of sovereign green bonds in 2022–2023 (HDFC, 2023). On the global league table of green bond issuance, 2022, India ranked ten, holding a much better position than other Asian nations, except Japan, which was ranked seven. The Reserve Bank of India announced $2 billion to fund green infrastructure developments around the nation by way of green bond issuance (Fintech Global, 2023). A large portion of green financing continues to come from domestic sources, with 83% in 2020 which includes banks, non-banking financial companies and other financial institutions. Of this, the private sector represented more than half of the green financing, almost 59% and government budgetary expenditures (including central and state) and PSUs accounted for roughly 54% and 46% of total public sector green flows, respectively (Climate Policy Initiative, 2022). India's G20 slogan, "One Earth, One Family, One Future," symbolizes the country's firm commitment to sustainability. The 2023 budget designated green growth as a major area of focus and included funding for renewable energy, energy storage, hydrogen, and agriculture that is more environmentally friendly. For the first time, the 1,000 largest corporations in India will be required to release a Business Responsibility and Sustainability Report (BRSR) in 2023 as presented in a report by the London School of Economics and Political Science (2023). The report also mentioned that there are concerns about how to effectively incorporate environmental, social, and governance (ESG) considerations into regular financial decision-making. Plus, questions about integrity in Indian businesses to attention stay in place and prompt some foreign investors to strip their stakes. Colenbrander et al. (2023) expounded that, in general, green, social, and sustainability bond issuance has been dissatisfying thus far, falling far short of what is required to support India's energy and environmental transformations. According to an RBI report (2023), India must devote 2.5% of its GDP to green financing by 2030. Additionally, a recent examination of the prominent banks and financial institutions in India indicated that there haven't been many attempts to quantify, assess, or handle the risks associated with the low-carbon transition. India has set to attain a net zero target by 2070. Moreover, more than $10 trillion is reportedly required with commencements in 2020 for just power, green hydrogen, and electric vehicles (Singh & Sidhu, 2021). The Prime Minister of India announced curtailing aggregate estimated carbon emissions by 1 billion tonnes by 2030 as well as carbon intensity by 45% in comparison to 2005 levels, by 2030. Joon Young Park, portfolio manager at IFC's Financial Institutions Group for South Asia branch said that sustainable growth can be achieved by focusing on climate financing.

Green Efforts by Other Economies

United States

An average of US$74 billion in climate finance was supplied yearly by corporate and public financial entities in the United States. This amounts to in excess of a threefold rise since 2014 and slightly under 13% of the US$574 billion in yearly worldwide climate finance flows (Climate Policy Initiative, 2021), which is not adequate given the facts that the U.S. owns 29% of the world's wealth, over 60% of the world's retirement plan assets, and US banks represent 15% of the world's assets under management. A large portion of climate finance in the United States goes towards the production of renewable energy, namely wind and solar energy (US$59.5 billion, or 81% of the total), making the United States the second-largest market for renewable energy following China. The United States must make investments of a minimum of US$250 billion annually towards climate mitigation strategies for the coming ten years to achieve net zero emissions by 2050. Almost 90% of the U.S. generated climate funds are dominated by the private sector, prompted by slumps in renewable technology costs and regulatory inducements that motivate such investments, while on the contrary, the public sector in the U.S. gives only 10% to the aggregate climate finance (Climate finance, 2021). The U.S. is lagging behind in the global climate financing initiative compared to other such markets. However, the U.S. ranked top-hole in the issuance of green bonds that exceeded US$80 billion during 2020-2021 (Barry, 2022). A report by the White House (2022) stated that the US$27 billion Greenhouse Gas Reduction Fund was formed under the Inflation Reduction Act to offer grant opportunities to seekers in order to stimulate investment in lowering emissions and benefit communities in need. Statista Research Department (2022) presented that around 500 billion US dollars in green bonds were issued globally in 2021, with the US market encompassing about 16% of the overall. The report also mentioned that green bond issuance in the United States has increased dramatically and the worth of green bonds issued in the United States in 2021 climbed by nearly 60%

above the levels reported in 2019 and 2020. Jia (2023) claimed that green finance has yet to have a noticeable impact in the United States and effects might be observed in the time to come due to the active engagement of various government agencies and businesses in the green bond market. The study also showed that green bonds are the primary tool of green finance in the context of decarbonization; other forms of green finance are employed to a lesser extent.

China

China today accounts for around one-third of all greenhouse gas emissions worldwide, making it the greatest emitter in the world. Given its aspiring goal for carbon reduction by 2060 after mounting it by 2030, China presents a significant potential for sustainable finance. According to UBS, the green finance sector in China has attained US$2.3 trillion (Forbes, 2023). China issued a big volume of green bonds internationally in 2022 with a total value of US$76.25 billion (Wu & Ahmad, 2023). China is anticipated to issue green bonds worth between ninety to hundred billion US dollars in 2023. Compared to other Asian nations in the green bonds market, which totalled US$120.83 billion, China has contributed to about two-thirds of the region's entire issuance of green bonds in 2022, manifesting her actions towards becoming a leader in green finance. However, there are certain issues to be paid attention to such as inadequate transparency and greenwashing concerns. To address this problem, the Shanghai Stock Exchange started mandating that all the funds (i.e., 100%) from issuing green bonds be spent on green initiatives, which was priorly 70%. China's green bond market achieved growth of 30% as the U.S. and European markets struggled due to the elevation in interest rates and political unrest. Further, there is not just one but several governing bodies regulating the sector, stipulating dissimilar rules to be followed pertaining to cashflows and disclosures. Steps have been taken to curb this problem as well. The Shanghai and Shenzhen exchanges were given instructions by the China Securities Regulatory Commission (CSRC) to amend their policies in order to align bond issuances with the nation's newly formed "China Green Bond Principles" and these stipulations are in accordance with those mentioned by International Capital Market Association (ICMA) as presented in a report by Sustainable Fintech. But these principles have not been made obligatory for the state-owned enterprises (SOEs) that have been reckoned to be the issuers of green finance accounting for more than 50% during 2019-2022 (Institute for Energy Economics & Financial Analysis, 2023), apparently posing a challenge.

Japan

Japan has been showcasing its determined and progressive steps towards sustainability. Schumacher et al. (2020) provided in their report that investments in sustainable assets surged 307% between 2016 and 2018, outperforming other countries including Europe and that the emerging sustainable finance methods would be accomplished through the establishment of green bond and sustainable investment markets. In 2020, 240 Japanese organizations became a part of the Japan Task Force on Climate-Related Financial Disclosures (TCFD), the world's largest collaboration (TCFD, 2020). However, even with strong market growth rates, Japan's sustainable finance markets remain small in contrast to other countries. The Principles for Responsible Investment (PRI) had been signed by 84 Japanese organizations during the year 2020 compared to 2954 PRI signatories around the world (OCED, 2020). But the Japanese green bond market seems to be flourishing. With a total issuance of US$17 billion as of end-2019, Japan's green bond sector is positioned as the ninth largest in the world and the second largest in the Asia-Pacific area after China and the position improved to seven in 2022. Domestic sales of sustainability, social and green bonds increased 47 times from 2016 to 2020, totalling more than US$15.04 billion (Fincity Tokyo, 2021). Also, in 2022, the government issued guaranteed bonds with a volume of US$500 million each during the commencement and end of the year (JBIC, 2022). during 2023- 2024, Japan intends to issue US$1.15 trillion in such bonds (Kajimoto, 2023). Japan is dedicated to meeting its carbon neutrality target by 2050. The issuance of green bonds and sustainability-linked bonds as well as sustainability-linked loans have displayed an increasing trend since 2019 (Green finance portal, 2023) backing the country's goal of net zero target.

Germany

Attention towards sustainable investments had seen an elevation in Germany Attention towards sustainable investments has increased significantly in Germany in recent past years, owing to both investors' increased demand for related financial products and the government's efforts to more effectively align the financial sector with climate and other nature-preservation laws. Based on the 2021 report of Forum Nachhaltige Geldanlagen, sustainably directed investments in Germany increased by approximately 35% during 2019-2020. The majority was generated by institutional investors (more than 80%), although volumes held by smaller individual investors increased significantly more rapidly and climbed about 120% within a year due to improved knowledge and better availability of sustainable finance options. However, the proportion of sustainably managed funds and obligations remained below 6.5% during the same year. And, Germany contributed only US$7.53 billion to the region's market for sustainability label funds, compared to an overall of US$261.45 billion, as per the European green fund's report (2021). Germany has established a target of reducing greenhouse gas emissions by 80-95% below 1990 levels by 2050 (Juergens et al., 2012). The German government aims to make Germany a prominent hub for sustainable finance and intends to contribute to helping the European Union achieve carbon neutrality by 2050 which would need a projected investment per year of US$376.7 billion (Kraemer & Wacket, 2021). A report by the federal government, Germany successfully issued its first green bond, worth US$7 billion, in September 2020 and this 10-year green bond was welcomed with success. Then the issue of the second green bond, at US$5.38 billion in November 2020 was a success too. In 2021, Germany was among the top issuer of green bonds (Barry, 2022); also, during the same year, the market value of green bonds in Germany touched US$51,098 million, showing a 22.1% rise from the 2020 value (GlobalData, 2022). In 2022, the German government issued US$15.61 billion in Green German Federal bonds. These securities totalled US$41.44 billion in circulation by the end of 2022. Germany has swiftly positioned itself as the second-largest issuer of green euro bonds (Federal Ministry of Finance, 2023). Over US$387.46 billion is set aside for "green expenses" every year, which might be utilized for backing up the sustainability records of the issued bonds (Wehrmann, 2022).

United Kingdom

The UK is acknowledged as one of the world's top green finance hubs (Financial Centre Futures, 2020). The sale of green gilts and Green Savings Bonds resulted in approximately £26 billion for the government's Green Financing Scheme since 2021 and these funds assisted initiatives that have definite environmental advantages as reported by HM Treasury, 2022. As well as the formation of the UK infrastructural bank with a capital of £22 billion to decarbonize and strongly initiate the movement towards the Green Industrial Revolution. Initiations have been made in this regard so as to lead in this arena that includes increasing investment in the green finance sector by £50-60 billion each year with a view to increasing climate resiliency and aiding in the restoration of nature, creating a strong green finance framework to give the financial industry the knowledge it needs to handle risks arising due to fluctuations or changes in climate, include the environmental platform in the UK government's green finance strategy, focusing on the goal of achieving net zero greenhouse gas emissions by 2050, as put forward by UK government in a report on green finance strategy (2023). The report further mentions that the economy extends the support beyond geographical boundaries and assists the synchronization of financial frameworks at the international level and encourages the flow of funds in developing green finance markets. The UK has, so far, lowered its greenhouse gas emissions by 43% since 1990, which is faster than any other G7 nation, as reported by the government in the green financing framework report (2021). The report added that the economy is also making progress towards its goal of reducing carbon emissions by at least 68% from that of 1990 by 2030, plus a 78% decrease in emissions from 1990 levels by 2035. The UK government was given two awards- “Largest Green Sovereign Bond” and “Sovereign Green Market Pioneer”- by the Climate Bonds Initiative in 2021 in recognition of its efforts as a global pioneer in green finance (HM Treasury, 2022).

France

Agence France Trésor issued its first Green sovereign bond (the Green OAT) in 2017, with an initial issuance volume of US$ 7.51 billion, making France the first country to issue a benchmark volume sovereign green bond, a total outstanding balance of US$ 33.2 billion of such bonds proceeding the end of 2021(Statista, 2022). Further, looking at the first issue's success, AFT issued a second Green OAT bond in 2021 with the same volume (ATF, 2022). France has committed to reducing, by 2030, compared to 2005 levels, carbon emissions (77%), nitrogen oxides (69%), non-methane volatile organic compounds (52%), particulate matter (57%), and ammonia (13%). France has witnessed that transport emits the most greenhouse gases among any sector in the country. Therefore, the attention of proceeds from sustainable finance has been towards “vehicle energy efficiency”, “carbon intensity” (CEREMA, 2020), as well as “modal shift” (VNF, 2020). By 2019, 40 investment funds were tagged under Green Fin Label, with a total value of US$ 12.34 billion (Label GreenFin, 2019) and 210 investment funds got a tag of Investment Socialement Responsible (ISR) label. In 2020, individuals, businesses, and governments contributed US$ 48.3 billion in climate investments. A report by Institute for Climate Economics (2021) provided insights that although such investment in France climbed by 10% year on year, this was not true across other sectors. Despite this fact, an additional investment of US$ 27.9 to US$32.2 billion would be required from 2023 to 2028 each year for the same, the report added. Moreover, vigorous actions would be needed to match the EU goal to reduce greenhouse gas emissions by 55% by 2023 in comparison to 1990 levels, which is prevailing at 40%. Kader & Nobanee (2022) found that there is a link between finance and sustainability in France but needed to make it more complimentary.

Canada

The Canadian government established Sustainable Finance Action Council in 2021 to guide the country's financial sector towards mainstreaming green finance. Besides investments by the public sector, significant investment will be needed for Canada to make progress toward a low-carbon economy along with achieving net-zero emissions by 2050 (Government of Canada, 2022). Since the launch of the Pan-

Canadian Framework, the Canadian government has pledged more than $100 billion to climate action, clean growth, and a green recovery and to reduce emissions by 40–45% from 2005, by 2030 (Government of Canada, 2022). Canada's world-leading price on carbon emissions is expected to hit $170/tonne by 2030 and ensuring that it costs to pollute, is a key to realizing the net-zero emissions objective. A report by Canadian Climate Institute in 2023 showed that Canada focuses on providing new standards for "green" and "transition". The "green" tag would be given to minimal to no carbon initiatives or practices that speed up the country's move to clean energy and initiatives that significantly lower the emissions from hard-to-decarbonize industries would be given the "transition" classification. The report further mentioned that a new investment budget of nearly $115 billion per year is anticipated for this purpose. Based on the 2020 Canadian Responsible Investment Trends Report by the Responsible Investment Association, investments that take into account ESG factors accounted for 62% of professionally administered assets in Canada, worth $3.2 trillion (Ivey100, 2023). The Canadian government offered an inaugural green bond in 2022 with a $5 billion, 7.5-year issuance. With an order book of around $11 billion and intriguing attention from green and socially responsible investors, who made up more than 70% of buyers, this was and still is the biggest Canadian dollar green bond sale on record. These green bonds were warmly welcomed; approximately half of the offering was bought by foreign investors (Government of Canada, 2022). The funds generated via these bonds have been distributed towards expenses that qualify the stipulations relating to climate and sustainability initiatives.

Schematic Data of Green Efforts of Top Eight Economies

Economies	Emission Curtailment Targets	Inaugural Sovereign Green Bond issuance year	Issuance amount of Green Bonds as of end 2022	Status in Green efforts towards other economies
United States	Net zero by 2050	Issued in 2008	US$ 380 billion	Active
China	Net zero by 2060	Issued in 2015	US$ 286.9 billion	Not active
Japan	Carbon neutrality by 2050	Issued in 2014	US$ 52.1 billion	Active

Germany	Carbon neutrality by 2050	Issued in 2020	US$ 217.5 billion	Active
India	Net zero by 2070	Issued in 2023	US$ 21.6 billion	Not active
United Kingdom	Net zero by 2050	Issued in 2021	US$ 68 billion	Active
France	Carbon neutrality by 2050	Issued in 2017	US$ 201.8 billion	Active
Canada	Net zero by 2050	Issued in 2022	US$ 54.2 billion	Active

Sources: OECD (2022); Climate Bonds Initiative (2022)

The above table juxtapositions the brief data of India with the rest of the world's top economies, placed in the rank-sequence, relating to economies' emission curtailment targets, the year in which the economies issued their first sovereign green bonds, green bonds issued by the year 2022 and their status in relation to extending green efforts-support to other economies. The table shows that the United States, the United Kingdom and Canada shared the emission reduction target of net zero by 2050 whereas the European Union nations- Germany and France- along with Japan aim to reach carbon neutrality by 2050. China expects to achieve a net zero target by 2060 and India by 2070. Further, the United States pioneered the issuance of sovereign green bonds in 2008, followed by Japan, China, Japan and so on, while India was the last one to issue the same in 2023. The United States, again, hold the top position with respect to total green bond issuance as of the end of 2022, that is, US$ 380 billion, followed by Germany and France. India issued US$ 21.6 billion, which is quite low in comparison to the aforementioned economies but reasonable while comparing it with other economies, namely, Japan, the United Kingdom and Canada and the fact that India is a developing economy. And, all the economies extend their support to other economies in terms of green finance except India and China.

Findings

1. Among only 22 countries that have issued sovereign bonds, India holds a position.
2. In terms of green bond issuance, India stands in tenth place globally, while other Asian nations, except Japan, are lagging behind.
3. India aims to achieve net zero carbon emission by 2070 which is 10-20 years later than other top economies. However, Japan, Germany and France aim at carbon neutrality.
4. India, being a developing country, invests with the objective of turning into a developed country. Therefore, efforts by India in relation to green finance have not been made to support other economies. Moreover, India is in agreements with various nations to fund domestic developments inclusive of green initiatives as such funds are falling short and hence, not in the position for international green efforts.
5. The issuance of green bonds at the end of 2022 has been US$ 21.6 billion in comparison to some developed economies Japan, United Kingdom and Canada with issuance of US$ 52.1 billion, US$ 68 billion and US$ 54.2 billion, respectively is remarkable. It indicates that India is in a pertinent position and that in the near future, India might elevate its green bond issuance.
6. The issuance of bonds linked to sustainability as a whole has failed to meet the need for a green transition.
7. India has not quantified, assessed and managed the negative implications with intricacies that might occur in the process of low carbon transition.
8. India is financing the green fund requirements majorly via domestic sources, mostly private sources of finance.

Conclusion

India is not only determined in scaling towards economic development but also represents itself and creates seemingly a position, whilst other arenas of development, in transition to a green economy. The country's green bond issuance aggregate ending 2022 in comparison to some developed economies is remarkable, considering that India is in its development phase. In addition to this, with the inaugural sovereign green bond issuance, India portrays its dedicated efforts towards the same. However, the country needs to lure investments via such financial instruments as they have not been adequate till the prevailing scenario. India's emission reduction target, in comparison to that of China, does not include an upsurge in emissions before finally curtailing it. But at the same time, India needs to state the implications of this transition in a profound manner in numerical terms so as to have a clear picture and act as desired.

India finances most of its green initiative by way of domestic financing. It indicates a positive point that India would not be increasing debts and flooding out funds in the years to come to fulfil repayment obligations; thereby securing funds for other trajectories. However, the fact that the country's falling short of funds towards green finance dedication, there might consider foreign sources of financing in order to achieve the set objectives.

Suggestions

1. Effects, in detail, on low carbon emission need to be evaluated based on numerical inferences as achievement of net zero emission is an ambitious target and requires step-by-step enchiridion, otherwise, such target's attainment could get blurred.
2. Requirements pertaining to increasing awareness and consciousness among the populace of the country is an essential step for luring investments that promote green finance, therefore, government as well as private entities should undertake programs to enhance the subject-concerned knowledge. Even a subject could be added to the syllabus for students, to inculcate the importance of green finance.
3. As the expectations through the issuance of sustainable, green and social bonds have not been satisfactory, the government needs to make such investments attractive by offering better returns to the investors as well as clearly stating and updating information about the specific environmental issue covered through such issuance to the investors.
4. Banks and financial institutions have been playing their required role as far as economic activities are concerned. They would need to include environmental and social risk concerns in their corporate credit assessment and appraisal systems to render green financing their preferred attention.
5. Green initiative-linked financial instruments could be manifested at a separate podium, presenting themselves as new avenues of investment so that investors don't consider such investments as any other investment alternative. This would showcase the green efforts needed along with the benefits and risks attached that could be attained via such financial products.
6. Brainstorming is needed to be done for bringing forth innovative financial products to attract attention to green finance as well as to increase participation in green investments.

7. India might consider increasing the portion of foreign sources' funding to realize the goals set in time.

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- Agriculture 4.0