Climate Action and Sustainable Development

Anu Satyal[1], Professor, Department of Economics, College of Vocational Studies, University of Delhi

Abstract

Sustainable Development Goals (SDGs) are development goals to be attained with attention to sustainability in terms of inter-generational equity. The human development gap between developed and developing countries is large. Associated with this is the larger per capita ecological footprint[2] of the developed countries compared with the developing world though the aggregate emission of High-Income Countries (HICs) is declining. The HICs have larger international spillovers which pose a serious threat to sustainable development. This paper asserts that the high Human Development Index (HDI) and SDG scores of the HICs have been achieved at the cost of a large per capita carbon footprint and high international spillovers thus imposing a huge cost on the environment. Therefore coordination between the sustainability and climate action in a synergistic manner is essential to attain all the SDGs.

Key words: SDGs, Climate Action, Ecological Footprint, International Spillovers, GHGs

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[1] Email: anu.satyal@cvs.du.ac.in. The author would like to thank two anonymous referees for their valuable feedback. The usual disclaimer applies.

[2] Ecological Footprint (EF) is defined as the difference between *how much nature we have* and *how much nature we use* (GFN, 2024). It measures the gap between the rate of consumption of resources and generation of waste and the rate of absorption of this waste and the ability of nature to regenerate itself. It is a measure of the amount of land needed to provide for a country's consumption and waste disposal. It measures the impact of human activity on nature (Radasci and Szigeti, 2024). This also includes the emissions of Green House Gases (GHGs) comprising carbon dioxide, methane, nitrogenous oxide and Flouride-based gases. Ecological deficit occurs when countries use more nature than what their ecosystems can regenerate or the bio-capacity. Further, they also consume resources of other countries reflected in International Spillovers. EF is measured in global hectares per person (gha/person) or in terms of the Number of Earths. The GFN notes that humans live on an average as if there are 1.7 Earths available and resource demand far exceeds the Earth's capacity for biological regeneration.
(https://www.footprintnetwork.org/ (accessed in April, 2025)

1. Introduction

"We may choose to deglobalize, but we cannot deplanetize".

Human Development Report (2023-24, p. v)

The United Nations (UN) member countries adopted 17 Sustainable Development Goals (SDGs) in 2015 to be achieved by 2030. The aim was to achieve economic development with social inclusion and environmental sustainability. Agenda 2030, though not legally binding, is a road-map of development based on a human rights-based approach. The 17 goals are dis-aggregated into 169 quantitative and implementation targets, tracked by measuring the performance of more than 240 indicators as part of the Global Indicator Framework. The SDGs are an inter-governmental agreement of what development ought to mean for people around the world by making it inclusive, green, fostering global partnerships, sharing technology, funds and building local capacities and resilience. The guiding principle of SDGs is to 'not leave anyone behind' and that there is no plan B because there is no planet B.[3] SDGs are development goals to be attained with attention to sustainability in terms of inter-generational equity. Human development aims to enhance well-being in all its forms - economic, social, environmental and political to assure the freedom to choose. It is essential to understand that the goals are not numbered in the order of importance. Rather, the framework recognizes inter-dependence and intersectionality among the goals. This implies that the non-attainment of even a single goal will derail the plan. The SDGs aim to provide all humanity a life of dignity and equity based on sustainable production and consumption. Unfortunately, the Sustainable Development Report (SDR, 2023) notes that the SDGs are off track; only 17 percent of the goals are on the path towards success. Multiple geopolitical conflicts, the aftermath of the pandemic, diversion of funds and climate change have jeopardized the sustainability of SDGs. Associated with this is the larger per capita ecological footprint of the developed countries even though their aggregate emissions as a group are on a decline. The movement towards environmental sustainability is slow. While the per capita footprint is small for larger emerging economies like China and India, their aggregate emissions are rising with the highest rate in India. The HICs also have larger international spillovers which extend their carbon footprint beyond national boundaries. Globalization,

[3] UN Secretary General, Ban Ki-Moon's statement in 2014 before the Climate Summit of 2014.

fragmentation of production and integration via global value chains also increase the generation of spillovers.

The HICs have high HDI and SDG indices but this comes at the cost of a larger carbon footprint[4]. The HICs consume immense global resources to cater to their wasteful consumption. They rely heavily on fossil fuels to power energy-intensive lifestyles. In contrast, low middle income and low income countries (LMICs and LICs) have lower SDG and HDI scores and smaller per capita ecological footprints. Past the half-way mark of achieving the time-bound Agenda 2030, the hiatus between HICs and LICs in terms of quality of life remains the same. Obviously, prosperity since the early 1990s has not trickled down anywhere. This is exacerbated by environmental degradation which inflicts an asymmetrically larger adverse impact of ecological damage on LMICs and LICs. These gaps will continue to persist if corrective climate action is not addressed seriously by all the countries.

Section 2 traces the history of SDGs and establishes the synergy between the SDGs and climate action. It provides evidence that the HICs have achieved their high standards of living at an immense cost to the people the world over especially the poor countries. Further, growth in the emerging economies and LICs has a huge ecological cost manifest in health crises, food shortages, droughts and floods. The loss of lives and livelihoods is borne more by the LICs which ironically have the smallest per capita carbon footprint. The SDGs can be sustainable only if production and growth objectives are scaled down in favour of distribution, poverty alleviation and provision of decent work and gender equality. Reliance on technology to overcome the loss of natural capital by man-made capital reflects a flawed understanding of SDGs (Pelenc, 2015). For growth to be inclusive, green and resilient, cooperation and policy coherence between developed and developing countries on technology, funds[5] and human capital formation is seen as 'global imperatives' (IMF 2019, 3).

[4] In 2022, 70 per cent of GHG emissions comprised fossil CO_2 emissions. The EU has reduced its share since 1990 from 14.8 per cent to 6.7 per cent. However, their per-capita shares remain large (Crippa et.al. 2023; EDGAR, 2023).

[5] Mohieldin et al. (2023) note that LICs have 8.4 per cent of world's population and less than 1 per cent of world's investment. LMICs have 42.9 per cent of word's population and only 15 per cent of world's investment spending. On the other hand the HICs have only 15.8 per cent of world's population and have more than 50 per cent of world's investment spending.

Section 3 speaks of synergizing climate action and sustainability. Section 4 concludes the paper.

2. Climate Action for Sustainability of SDGs

2.1. The Context

The SDGs define development as a multi-dimensional concept. Development is not confined to higher per capita incomes and higher rate of economic growth but includes the social, economic and environmental aspects in simultaneity. The yearly progress across the SDGs by regions and individual countries are traced in the Sustainable Development Reports (SDRs). More recently SDR (2023) observes that the SDGs are "seriously off-track" and the gains made between 2015 and the start of the pandemic have been considerably lost, aggravated by geopolitical tensions and conflict as well as climate change (SDR 2023, p. vi). It further notes the rise in inequalities between the rich and the poor countries reflected in the performance of the multi-dimensional SDGs. The only countries which have made significant gains in terms of the individual and aggregate SDG scores and have the top ranks out of a set of 193 countries are the high income countries (HICs). However, these countries have performed poorly on the environment-related goals comprising the SDG 12, 13, 14 and 15[6] even though the rich developed countries control 85-90 per cent of the global fiscal outlays and investments. This demonstrates that rich countries continue to control and spend larger amount of global resources on their material welfare to the exclusion of the poorer nations.[7] The low middle income countries (LMICs) and low income countries (LICs) have borne the largest brunt of environmental degradation in terms of food crisis, precarious survival and loss of employment opportunities, higher incidence of heat waves, droughts, wildfires and loss of biodiversity and extinction of many species in oceans and on land which has implications for the well-being of people in the developing countries especially the coastal communities. These countries face severe fiscal constrains to cope with these crises and have limited capacity to borrow.

[6] Appendix A presents the list of the 17 SDGs.
[7] Mohieldin et al. (2023) note that LICs have 8.4 per cent of world's population and less than 1 per cent of world's investment

The Human Development Report (HDR, 2023-24) notes that "inequalities in Human Development Index (HDI) values—which measure a country's health, education and standard of living—are growing between countries at the bottom and countries at the top of the index" especially in the post Covid-19 world (HDR,2023-24, p. v). Also, the aggregate SDG and HDI indices for the rich countries are positively related. The scores for individual SDGs are also directly related with the other goals, which imply that the attainment of one goal reinforces the attainment of other goals. The only exception are the scores for the environment related goals, SDG 12 and 13, and the international spillovers in trade. Further, the SDR (2023) notes that the SDG index gap between HICs and LICs for in the year 2015 and for 2022 is unchanged at 28 percentage points and is projected to increase to 29 percentage points in 2030. It also projects that global warming at 0.3 degree Celsius per decade will cross the upper limit of 1.5 degree Celsius to 2.8 degree Celsius by 2100.[8] Further, decline in bio-diversity, extinction of species, industrialization, excessive use of fossil fuels, urbanization with the associated urban sprawl and rise of slums, deforestation, loss of marine life especially fish stocks due to over-fishing, plastic pollution in oceans and seas, presence of micro-plastics in all of marine life and our food chains, food wastage and reduced access to food and inadequate nutrition all result in under-nutrition, malnutrition, wasting, stunting and anaemia especially in women and children in LMICs and LICs. This affects provision of quality education and learning and deficient access to digital technology as was experienced during the pandemic in developing countries. All this makes international, regional and local cooperation imperative to build human, business, social, urban, cultural and natural capital.

In terms of green house gases (GHGs) emissions, the aggregate CO_2 emissions per annum form 70 per cent of GHG emissions. The US, India and China have the largest share in these emissions (Richie et al., 2023[9]). Food sector contributes 26 per cent to global GHG emissions (Richie 2019). A 43 per cent reduction in GHGs emissions has to be achieved by 2030, 57 per cent by 2035 and Net Zero[10] target by 2050[11] to keep the rise in temperatures below 1.5 degree Celsius (Emissions Gap Report 2024). The rate at which the sea levels are rising has doubled over the past ten years. It is predicted that the GHG

[8] SDR (2023, p. 4)
[9] https://ourworldindata.org/co2-and-greenhouse-gas-emissions (Accessed April, 2025)
[10] Net Zero implies that the GHG emissions especially CO_2 should be limited to only as much that can be removed or stored in the nature and therefore reduces it to zero levels in the atmosphere.
[11] https://www.un.org/en/climatechange/net-zero-coalition (Accessed in April, 2025)

emissions will lead to a change in weather patterns and all life on land and in water shall be affected by it. The current plans and pledges regarding climate action will only manage to reduce GHGs by 2.6 per cent by 2035 as against a target of 43 per cent. Sixty-three per cent of GHGs come from the US, China, India, Brazil, Russia and the EU, 77 per cent come from G20 nations and 3 per cent is contributed by 45 least developed countries (EGR, 2024). The poorer nations are 15 times more vulnerable to the ill-effects of climate change.[12] These changes have drastic consequences for increased conflict due to global shortages of water and food, loss of gainful work and decline in human productivity, mass migrations, increased vulnerability of the poor especially women and children, loss of human and non-human lives and unprecedented loss of bio-diversity and extinction of species. The worst affected are the LICs and the poorest in all countries. The health sector is particularly vulnerable to the ill-effects of climate change; a paltry 2 per cent of multilateral finance for climate change is earmarked for health projects. The energy sector[13] contributes 75 per cent of GHGs to the atmosphere. Climate change is singularly responsible for multiple crises like wildfires, heat waves, droughts and floods affecting sustenance, health and food security of 3.6 billion people living in vulnerable regions. Acidification and eutrophication of water bodies and deforestation with destruction of bio-diversity are also anticipated. During 2010-2019 there has been a rise of forest fires, droughts, floods and hurricanes across the globe and the decade witnessed maximum warming up the world over (UN, dept of global communications 2023).

2.2. Early Warnings

An early and serious warning regarding climate change was made in the 1970s in the *Limits to Growth* [LTG] which noted that the natural resources would deplete faster than their rate of regeneration (Meadows et al. 1972). This was reflected in the acceleration of global production and consumption since the 1950s. This warning was not taken seriously. The pursuit of high growth and a simultaneous ecological degradation continued unabated. Further, the benefits of growth were appropriated by the top one

[12] https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health (Accessed April, 2025)
[13] Energy sector includes emissions from fossil fuels, manufacturing/industry, electricity generation, heat production, transportation, construction and buildings. (https://www.wri.org/insights/4-charts-explain-greenhouse-gas-emissions-countries-and-sectors). (Accessed in June 2025)

percent of the global population in developed and developing countries. This resulted in the increase of the ecological footprint beyond the bio-capacity and planetary bounds of the ecosystem (GFN). Economic inequality had been criticized and redistribution underlined by the LTG. The UN Conference on the Human Environment in Stockholm in1972 followed by the Brundtland Conference of 1987, the Rio conference of 1992 and the adoption of the Millennium Development Goals (MDGs) in 2000 to be attained by 2015 derive their essentials from the LTG. The Paris Agreement (2015) was a legally binding commitment on part of the countries to keep the rise in global temperature to less than 1.5 to 2 degrees Celsius above the pre-industrial levels. By 2015, the MDGs had impacted poverty and hunger, increased access to quality education and health but the struggle for attaining gender equality, ecological restoration and many other targets were far from complete. This was then rolled over into a more elaborate set of 17 SDGs adopted in 2015 to be achieved by 2030. The 17 SDGs are listed in Table A1 in the Appendix.

The SDGs also aim to create strong institutions to ensure good governance and rule of law. It resolves to forge global partnerships to reduce poverty, hunger, fear, violence, disease and discrimination and achieve peace, justice, inclusion and prosperity for all by keeping human activity within the planetary bounds. To assure physical and mental well-being for all requires commitments on part of the rich nations towards the poor nations. SDR (2023) has already declared that the SDGs may not be achieved by 2030. If the goals have to be realistically achieved, despite the effects of geopolitical conflict and wars, the after-effects of Covid-19 pandemic and climate change due to unsustainable GHG emissions, action has to be taken now to attain net zero emissions target by 2050. Since 1950 the rate of growth of global output has accelerated at an unprecedented pace compared to a stable rate between 1750 and 1950 (Dasgupta et. al. 2021). This has been associated with a decline in natural resources, a rise in human and physical capital and an increase in GHG emissions made up of carbon dioxide, methane, nitrous oxide and flouride-based gases (Managi and Kumar, 2018). There arises ecological deficit as a direct conflict between growth and environment or the bio-capacity. The latter provides resources as well as absorbs the waste generated by human actions. There is a need to limit growth as the natural resources available to humanity are far short of the demand being made on these resources, which the resource economists call as the age of sixth

mass extinction or the Anthropocene era. This is different from the previous events of extinction because it is due largely to human activity and "unsustainable use of land, water and energy use and, climate change".[14]

The SDGs are a timely reminder to de-grow, de-couple, pursue circularity and adopt mitigation and adaptation measures, and cope with the loss and damage that has already been occurred to avoid unfavorable consequences of over production. It is of essence to preserve the endurance of people at the bottom of the pyramid and protect them from food shortages and loss of work opportunities particularly in the developing world associated with the destruction of life and bio-diversity in marine resources and on land mainly to augment food production. It is anticipated that the effects of climate change are and will be asymmetrically borne by the developing world even though their per capita emissions of GHGs is negligible. Notwithstanding the low per capita share of GHG emissions the aggregate emissions are high and rising for China and India.

3. Create Synergies between Climate Action and the Sustainability Agenda

Climate change involves a change in weather patterns, rise in sea level and extreme natural events like floods, droughts and cyclones. The main cause of climate change is the increase in GHGs[15] due to human action, which has attained historically high levels. These actions include livestock farming and food production which entails increased mechanisation and irrigation, intensive fertilizer use, conventional energy and water resources and wastage in consumption. Processed foods lead to dependence on energy and water resources. Energy-intensive manufacturing and nonviable architecture requires artificial cooling and heating increasing the GHG emissions. It is predicted that temperatures will exceed 1.5 degrees Celsius by 2035 and we shall experience warming of 2.5 degrees Celsius by 2100.[16] This has been singularly responsible for the rise in temperatures above the pre-industrial levels to more than 3 degrees Celsius within this century.[17] It is predicted that many countries will suffer heat waves, floods, droughts and

[14] https://www.worldwildlife.org (2023, p. 2) (accessed in April,2025)
[15] These comprise carbon dioxide, methane, nitrous oxide and fluorinated gases.
[16] https://www.un.org/sustainabledevelopment/wp-content/uploads/2023/08/2309739_E_SDG_2023_infographics-13-13.pdf (accessed in April, 2025)
[17] https://www.un.org/sustainabledevelopment/climate-action/ (accessed in April, 2025)

loss of bio-diversity.[18] The brunt will be borne more by the poorer nations. Of the fifteen cities predicted to be the hottest globally, 10 will be in India and 7 of these in the Vidarbha region of Maharashtra. There is a pressing need for Climate Action to aim for clean technologies and make economies more resilient to the effects of GHG emissions. The imperative is to reduce carbon emissions and pursue the SDGs in a synchronised manner to address issues related to climate change to successfully achieve sustainable development in all its dimensions. Climate change is perhaps the biggest threat and in urgent need of concerted attention of all governments, policy makers and members of the society, else it is a potential threat to long term sustainability of people and the planet. Previous efforts to address global warming go back to the UNFCCC of 1992 followed by the Kyoto Protocol of 1998 and the meeting in Copenhagen in 2009. The last one bound the members to restrict global warming to an average of less than 2 degree Celsius and made them commit funds towards addressing and minimising the loss and damage and mitigation and adaptation. Not all impact of climate change can be either prevented or adapted to. Loss and damage centre on economic and non economic losses. The former comprises loss of infrastructure, businesses, property and livelihoods, and the latter deals with displacement of communities and cultural losses. These efforts culminated in the Paris Agreement of 2015 which is an international legally binding agreement, signed by 198 countries, with a commitment to contain the rise in temperature to below 1.5 degree Celsius above the pre-industrial levels.

The production and consumption ecosystems directly impact the extent and the nature of climate change and climate action thus comprises mitigation and adaptation efforts with the support of necessary and effective institutions and global partnerships in sharing funds and green technology with developing countries to facilitate their transition to low-carbon systems. Climate Action involves three outcome targets of the need to build capacity and resilience, integrate this goal into national policy and planning and develop institutional capacity via human capital formation and education. The onus of achieving SDG 13 rests more on the rich and the developed countries who have committed funds and technology with appropriate capacity building support to the developing countries so as not to leave

[18] The year 2023 was recorded to be hottest year and the subsidies for the use of fossil fuels exceeded $1.5 trillion in 2022 due to the pandemic and the conflict between Ukraine and Russia (SDR, 2024).

them behind. The latter are highly vulnerable to the perils of climate change even though historically they have the lowest per capita carbon footprint.

Many SDGs affect the attainment of Climate Action. They include SDG 7 on clean and affordable energy, SDG 11 on sustainable cities, SDG 12 on responsible production and consumption and SDGs 14 and 15 on life below water and life on land respectively. There is a need to evolve clean and renewable energy policy across the globe, reduce the use of biomass for fuel and timely transfer of low-carbon technologies to the developing and LICs for which the provisions of sufficient climate finance is imperative. However, in COP 29 held in Baku only $300 billion annually in climate finance was committed by developed countries for helping the developing countries. With the rise in migration, both intra- and inter-country, there is a need for secure, affordable and climate friendly housing and provision of public transport systems to create safe space particularly for women and children and avoid mushrooming of slums. There is also a need for judicious use of material and natural resources while ensuring sustainable and inclusive growth and development of infrastructure and employment or decent work. There is a need to move to a circular economy and reuse, reduce, refuse, refurbish and recycle to reduce material and carbon footprint. The UNFCCC notes that developing countries need $6 trillion for their climate action adaptation and mitigation plans by 2030 (SDR 2024).

Climate change has hastened the loss of bio-diversity on land and in water and impacts the earning capacity of mostly low-wage women workers in coastal communities. Marine pollution caused by leakage of plastics and other forms of litter has led to a rise in micro plastics in our food chain. Deforestation due to pressures of growing food and rearing livestock has also accelerated the loss of species and bio-diversity. Agricultural practices and increase in the livestock have resulted in the rise in GHGs especially methane and brings into focus the need for effective institutions, incentives and innovations to pursue and evolve sustainable and resilient agricultural practices (Gulati and Juneja, 2021). Sustainable development aims to increase people's well-being and raise opportunities to allow them to acquire capabilities and have the freedom to choose a life they value. This directly depends on the pace of growth and creation of decent work which in turn have implications for reduction in poverty, inequality and hunger. The pursuit of relentless growth has resulted in a crisis of over-production in the presence of poverty and inequalities which constrain demand. Overuse of resources with direct impact on GHG

emissions in the use of energy and capital, knowledge and skill-intensive technologies in turn has an adverse impact on climate and causes extreme weather conditions including floods, cyclones and droughts and an increment in temperatures which threaten the food security of the vulnerable poor in developing countries. The latter have limited foreign exchange reserves to rely on food imports. Increase in heat and droughts are bound to make a large mass of people food-insecure in terms of decline in availability, entitlements and nutrition leading to health issues like stunting and wasting, malnutrition, under-nutrition and anaemia especially in women and children. Unsustainable production and agricultural practices lead to an overuse of scarce ground water, fertilisers and pesticides and dumping of industrial effluents result in water pollution. This adversely impinges on the goal of providing clean water and sanitation. Climate change and global warming makes the poorer nations vulnerable to droughts, floods and affects the availability of drinking water. It also affects the productivity of people in the regions experiencing extreme heat. The SDGs on good health and well-being and access to quality education can contribute in providing solutions to climate crisis. Provision of quality education helps create skills and knowledge to address these crises.

Climate change mitigation and adaptation to attain sustainable development are global public goods. This requires all the rich countries to come forward and partner with the poor nations in sharing technology, funds, expertise and help build local capacity and exploit local knowledge systems. Efforts of one country to successfully combat GHG emissions are not sufficient to curtail overall global level of emissions unless other countries follow suit because the latter's emissions will not be confined within their geographical bounds and will substitute for the control of emissions by the focus country. There is thus a need to follow a systemic approach to mitigate climate change effects and ensure equity and well-being for all in an inclusive and a sustainable way.

It is estimated that timely action can curtail 250,000 extra deaths per annum due to heat and water borne diseases between 2030 and 2050 (UN Climate Action Fast facts). Mitigation of GHGs due to better and sustainable transportation facilities, food systems including packaging and distribution and shift to alternate, renewable energy is expected to contribute to large physical and mental health benefits and major financial savings to the tune of $ 8 billion per day.

Transformative changes in all ecosystems with the use of cleaner and less energy-intensive industry and agriculture technologies, renewable energy sources, green public transport options and climate smart agriculture is the imperative that has to be adopted to attain inter-generational, sustainable and resilient development. Barbier and Burgess (2020) and Jackson et al. (2019) argue that fossil fuel subsidies and fertiliser and irrigation subsidies should be redirected towards provision of clean water and sanitation and clean energy. Climate finance to developing countries has to increase from the average US $ 803 billion in 2019-20 to an aggregate of US $ 6 trillion by 2030.[19]

3.1. Data, Methodology and Empirical Results

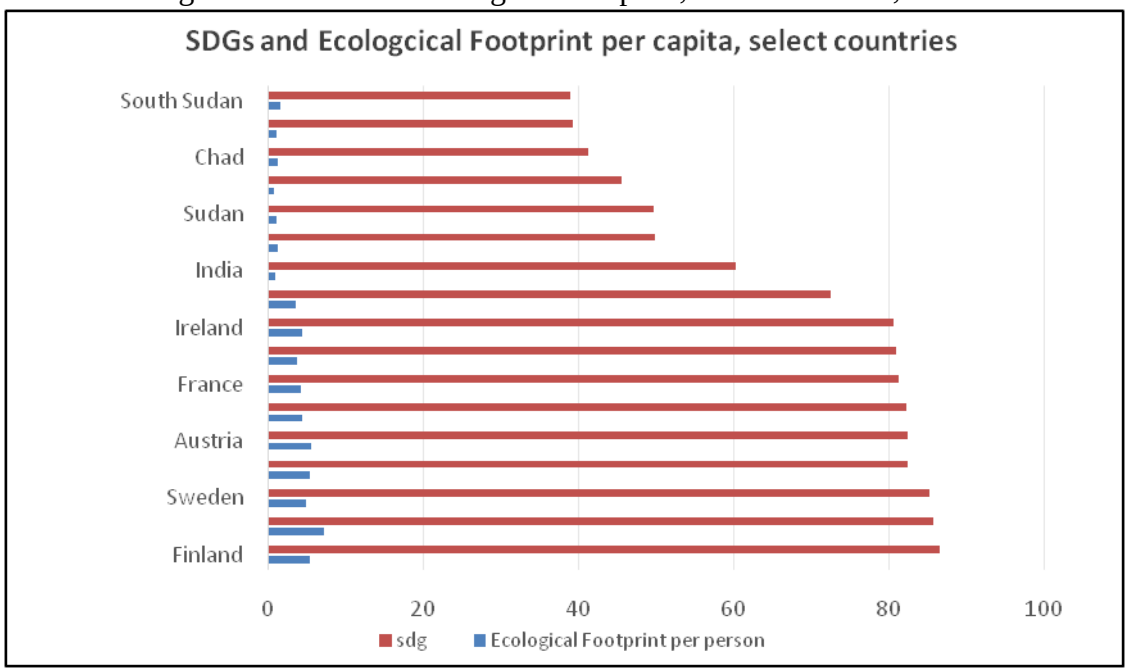
The SDG dashboard[20] provides data on all the aggregate and individual SDGs, by countries and by regions. We look at the relation between the overall SDG score with ecological footprint for a select group of countries given in Figure 1. It shows that countries with lower SDG scores have a lower per capita footprint and the top SDG scoring countries have a larger per capita footprint. Hence there is greater resource and energy intensity of economic activity in top ranking countries. Radacsi and Szigeti (2024) note that LICs have the lowest aggregate and individual SDG scores exacerbated by poor infrastructure and weak governance structures (SDG 16) excepting SDGs 12 and 13. The HICs have high aggregate and individual scores except for the SDG 12 and 13. Next we compare HDI with planetary adjusted HDI[21] and aggregate SDG index with SDGs 12, 13, 14 and 15 across regions. We also look at the inverse relation between the aggregate SDGs score and international spillover index. All the results are presented for geographical regions and also by countries classified according to income levels - HICs, LMICs, HMICs and LICs.

Figure 2 shows that the gap between SDG 12 and 13 between the LICs and HICs is the largest suggesting that LICs have higher achievements on these two goals compared to HICs which have not managed to contribute to climate action and reduce their carbon

[19] https://www.un.org/sustainabledevelopment/wp-content/uploads/2023/08/2309739_E_SDG_2023_infographics-13-13.pdf (accessed in April, 2025)
[20] Data source: https://dashboards.sdgindex.org/downloads (accessed in April, 2025)
[21] In an ideal scenario where there are no pressures on the planet, the PHDI equals the HDI. However, as pressures increase, the PHDI falls below the HDI. In this sense, the PHDI measures the level of human development when planetary pressures are considered.

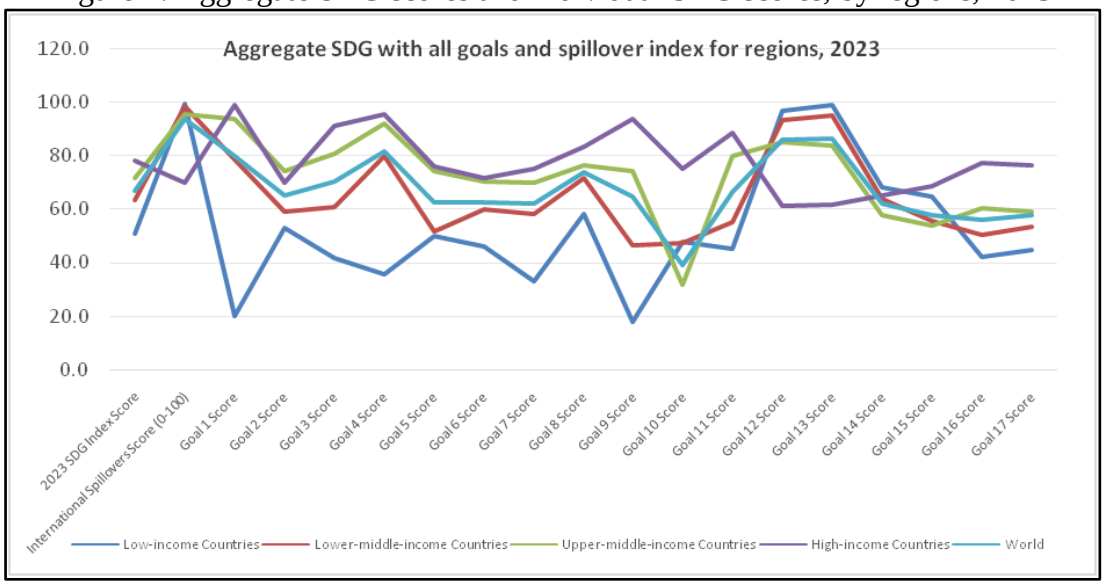
footprint. Both Figures 3 and 4 show the environment related SDGs which show the same pattern of the lowest SDG 13 scores for OECD and HICs and Figure 4 shows the pattern very clearly that regions with highest SDG scores have the lowest scores on SDG 12 and 13.

Figure 1: SDGs and Ecological Footprint, select countries, 2023



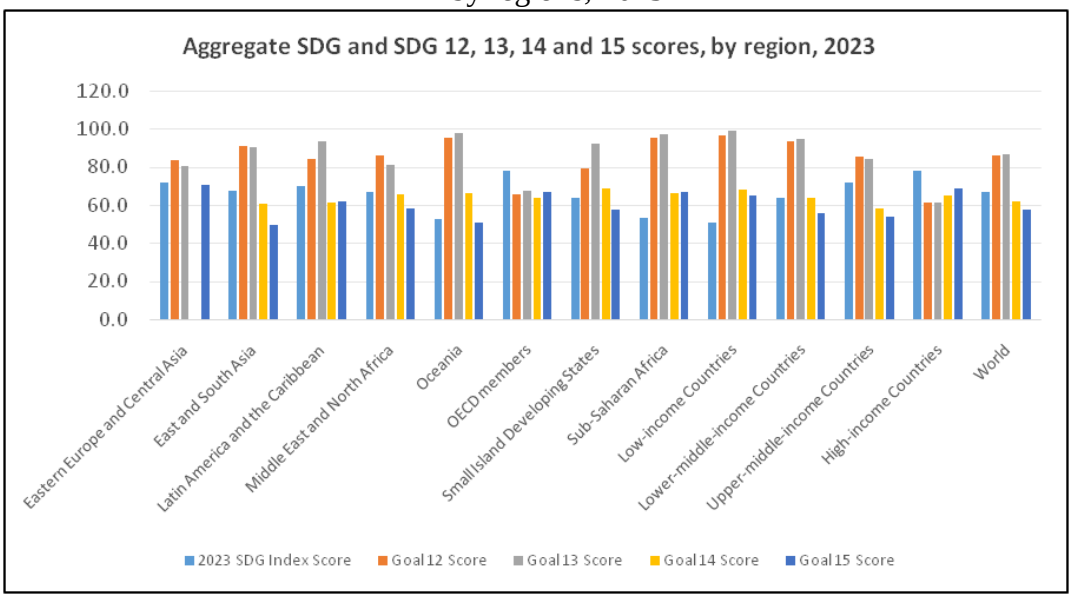
Source: SDG Dashboard and Global Footprint Network (GFN)

Figure 2: Aggregate SDG scores and Individual SDG scores, by regions, 2023



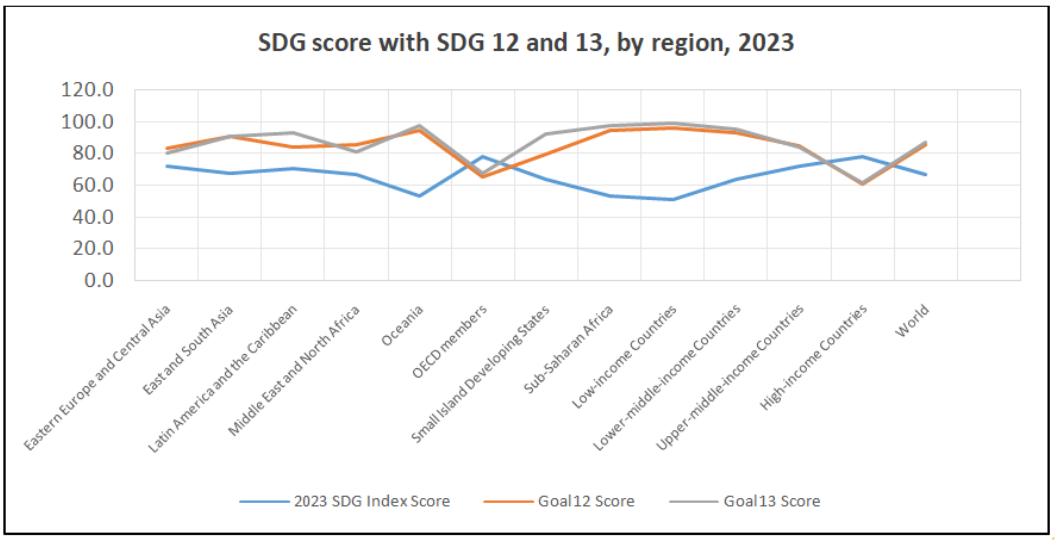
Source: Data obtained from SDG dashboard

Figure 3: Aggregate SDG scores and Environment related SDGs (12, 13, 14 and 15), by regions, 2023



Source: Data obtained from SDG Dashboard

Figure 4: Comparisons of aggregate SDG scores and SDG 12 and 13, by regions, 2023

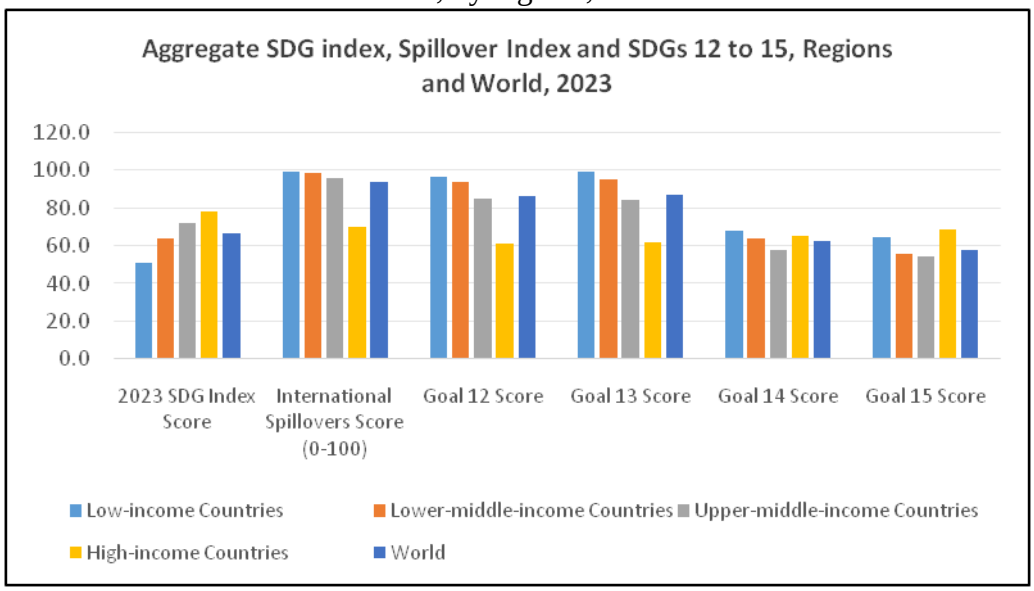


Source: Data obtained from SDG Dashboard

Figure 5 shows that the HICs which have the highest SDG score followed by UMICs, LMICs and LICs have the lowest international spillover index in conjunction with lowest scores on goals 12 and 13 following the same gradation for the other three income groups.

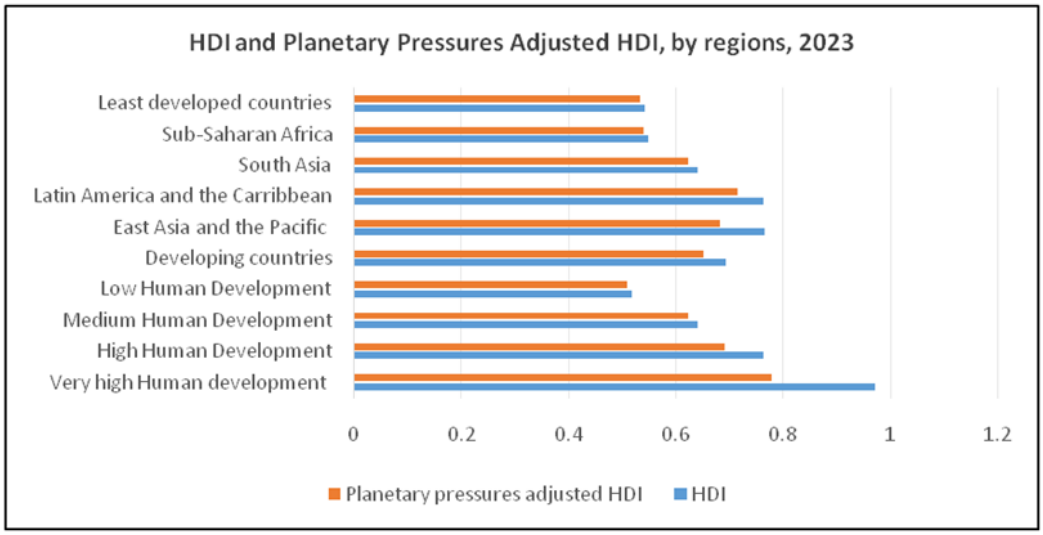
HDI gives the standard of living in terms of an equal weighted index using per capita income, education and health indicators. HDR (2023) also publishes planetary pressures adjusted HDI[22] as shown in Figure 6.

Figure 5 SDG score (aggregate) and SDG 12, 13, 14 and 15 with International Spillovers Index, by regions, 2023



Source: Data obtained from SDG Dashboard

Figure 6: HDI and Planetary Adjusted HDI, by regions, 2023



Source: Data obtained from SDG Dashboard and HDR, 2023

[22] Planetary pressures-adjusted HDI or PHDI is obtained by adjusting the value of HDI by CO_2emissions and the per capita material footprint. This takes into account the impact of human pressures on the planet (HDR, 2023).

The impact of HDI on the environment is reflected in the gap between the two measures which clearly appears to be the largest for countries with very high and high human development as well as for the countries in East Asian and the Pacific.

We further estimate the impact of international spillovers[23] and carbon footprint on SDG scores empirically. We took data of 140 Countries for the year 2024 from the SDG dashboard. Table 1 presents the summary statistics of the three variables and Table 2 presents the OLS regression for:

$$sdgscore = f(eco\_footprint\_percapita, international\_spillover\_index) \quad (1)$$

We expect to see that countries which have attained higher SDG score have done it at the cost of the environment both in terms of GHGs and spillovers. This is confirmed in the results presented in Table 2 with the two variables having a significant influence on SDG scores with correct signs.

Table 1 Summary Statistics

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
eco_footprint_percapita	140	3.229	2.35	0.6	12.3
sdgscore	140	67.8	10.02	40.1	86.4
international_spillover_index	140	83.9	15.18	28.5	98.7

Source: Author's calculations

The correlation coefficients between the three variables are significant at 5 percent level of significance. The correlation of SDG scores with per capita footprint is positive (0.57) and with international spillovers is negative (-0.57). The results for a simple linear regression of the SDG score (sdgscore) as the dependent variable on per capita ecological footprint (eco_footprint_percapita) and the international spillovers index (international_spillovers_index) are presented in Table 2. The coefficient of per capita ecological footprint is positive and that of international spillovers is negative which supports the result that those countries which have higher SDG scores have lower

[23] The spillover index ranges between 0 (worst case) and 100 (best case).

spillovers index which is less preferred to a higher value of the index and also have a larger ecological footprint.

Table 2: OLS estimates for SDG scores, 2024

VARIABLES	sdgscore
international_spillover_index	-0.170**
	(0.0698)
eco_footprint_percapita	1.592***
	(0.451)
Constant	76.91***
	(7.057)
Observations	140
R-squared	0.351
F-Stat	37.1
Prob > F	0

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: Author's own calculations

3.2. Smart solutions

The above exposition brings to the fore the idea that the LICs, and LMICs are being left behind. This pattern of growth and environmental degradation needs to be reversed to overcome food insecurity, decline in health, poor work opportunities, poverty and other associated challenges which are a direct consequence of climate change. There is a need for the members of the civil society to work towards reducing their individual footprint and influence governments to adopt policy solutions to reduce the overall footprint of the country. By 2050, 70 to 80 per cent of the world's population will be living in the cities and hence sustainable housing, public transport and efficient energy solutions are all required to curtail the footprint alongwith cleaner industrial and agricultural technologies. Resort to the use of renewable energy is imperative to address climate change. Reduction in food waste and processed foods are a crucial way to ensure sustainability. Aspects of gender equality in women's access to family planning and increase their labour force participation to achieve social, economic and political empowerment also contributes to

find sustainable solutions to food security, use of renewable energy and reduce malnourishment, stunting and wasting in children.

4. Conclusion

The difference between the HICs and LICs is manifested in low SDG scores and low HDI in the LICs. Prosperity in HICs has created a huge ecological footprint the cost of which is borne by the poorer parts of the world. Addressing these disparities requires international policy cooperation to create global partnerships, share ideas, technology, resources and build local capacities especially in finance and resource-constrained low-income countries in the presence of a real and binding ecological constraint. It is essential to deliver the 'global public goods'[24] to overcome the excesses beyond planetary bounds to preserve biodiversity and mitigation and adaptation efforts of changing weather conditions and carbon emissions. The imperative is to decouple[25] and encourage circularity to reduce humanity's ecological footprint. All stakeholders must de-grow and end irresponsible production and consumption.[26] The empirical results firmly establish that countries which have experienced high SDG scores have depleted nature more than the sustainable levels, contributed to global warming and have extended their carbon footprint beyond their national boundaries. Ten years of Agenda 2030 has failed to close the development gap between the countries at the top and the bottom of the list of SDG scores which will continue to persist if global partnerships are not forged and the developed coutnries fail to provide timely and adequate climate finance, technology and assistance to the developing world. The LTG paradigm with which the story of the SDGs began is more relevant to the survival of humanity today than it was in the 1970s.

[24] HDR (2023-24, p. v.)
[25] This refers to economic growth with minimum or no adverse impact on the environment by improved efficiency in various activities, reduce consumption especially of natural resources, evolve sustainable and clean technologies and adopt the use of renewable energy, land restoration and conserve the exploitation of bio-capacity to make practices sustainable (Radacsi and Szigeti, 2024).
[26] HDR (2023-24, p. v.)

Appendix

Table A1: Sustainable Development Goals

SDG	Name	SDG	Name
1	No poverty	10	Reduced inequalities
2	Zero hunger	11	Sustainable cities and communities
3	Good health and well being	12	Responsible consumption and production
4	Quality education	13	Climate action
5	Gender equaity	14	Life below water
6	Clean water and sanitation	15	Life on land
7	Affordable and clean energy	16	Peace, justice and strong institutions
8	Decent work and economic growth	17	Partnerships for the goals
9	Industry, innovation and infrastructure		

Source: UN SDGs, https://www.un.org/sustainabledevelopment

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