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Research Paper

Sustainable Living and Earth Overshoot Day

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ABSTRACT

Since industrial revolution, the development model followed by different countries has been primarily aimed at achieving accelerating growth more often at the cost of environmental degradation and over-exploitation of resources. According to a report published by United Nations Environment Programme (UNEP, 2024), extraction of the Earth's natural resources tripled in the past five decades. On the other side, there exist fundamental inequalities between countries. High-income countries consume six times more resources and generate 10 times more climate impacts than those living in low-income countries. In the process, ecological and environmental balance was compromised to a great extent leading to several negative impacts on our planet. In response, sustainable development model was advocated. Internationally, several initiatives were undertaken to promote sustainable mandate – Rio declaration (1992), UN Millennium Development Goals, Paris agreement and recently originated Sustainable Development Goals (SDGs). Pressure is also mounted on the corporates to integrate sustainability into their core business strategies. MNCs, therefore, are compelled to rethink their business models, integrate ESG principles into decision-making, and enhance transparency in sustainability disclosures. But the focus of sustainability is largely confined to macro level and as such individuals and communities are still outside the ambit of sustainability which limited the extent of success. The concept of sustainable living assumes significance in this respect. Sustainable Living is a micro level concept that aims to reduce impact on the planet by conserving natural resources, minimizing waste and using less energy. It is a philosophy to reduce personal and societal environmental impact. It encourages people to minimise their use of Earth's resources and reduce the damage caused during human and environmental interactions. Sustainable living simply means rethinking and reorienting our mindset; changing our behaviour and consumption pattern so as to live in harmony with nature. There is, however, no direct way to measure or understand the extent of sustainability of our living pattern. The recently introduced idea of Earth Overshoot Day (EOD) and Country Overshoot Day (COD) may provide significant insight into it. Simply speaking, EOD is the date in a year when humanity's resource consumption exceeds the planet's ability to regenerate them. It marks the date of a year when human consumption has reached a level equivalent to regenerative capacity of planet ecosystems. For example, in 2023, the EOD was 202 days which means that earth bio-capacity can sustain the livelihood of humanity (at current consumption pattern) for 204 days or up to 25th July. It also meant that from 25th July 2023 to 31st December 2023, humanity is living at the capital stock of earth. In other word, humanity is using 1.7 fold resource than our earth can regenerate. By

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2030, it is expected that population of earth will require resources of 3 Earths. Interesting to note that in 1971, EOD was 362 days meaning that consumption of humanity was almost fully aligned with earth's regenerative capacity. Unsustainable resource consumption and waste generation are largely responsible for the declining trend in EOD suggesting that our living has become more and more unsustainable over time. The continuous decline of EOD reinforces the need of reorienting our lifestyle choices on urgent basis. Individuals need to adopt lifestyle choices which promote circular economy. We must embrace 7 R's of sustainability – Rethink, Refuse, Reduce, Reuse, Repair, Repurpose and Recycle – with regard to consumption and waste generation. These principles facilitate our move towards a more circular economy by questioning our ever-increasing needs, avoiding unnecessary consumption and waste minimization. Undoubtedly, it will not happen overnight. Neither all will endorse it. But even a handful of people or groups can make huge difference. A study by the University of Michigan in the United States confirms that the rules agreed upon by groups of the population guarantee the efficiency of a sustainable life strategy. This appears to be the silver lining of the problem.

Keywords: *Sustainable Living, Earth Overshoot Day*

1. Over-exploitation of Resources for Growth:

Over centuries, growth has been the driving force for any economic activity. Be it individual income or corporate profit or National Income (GDP), growth is widely believed as the symbol of development and prosperity. Human activities over the years especially after industrial revolution, therefore, have been primarily aimed at achieving accelerating growth and development more often at the cost of environmental degradation and over-exploitation of resources. Over-exploitation of resources such as forests, minerals and water has resulted in pollution, loss of biodiversity, and soil erosion (Tawiah et al., 2021; Y. C. Zhang et al., 2022). According to a report published by UN Environment Programme (UNEP, 2024), extraction of the Earth's natural resources tripled in the past five decades. Material extraction is expected to rise by 60% by 2060 and could derail efforts to achieve not only global climate, biodiversity, and pollution targets but also economic prosperity and human well-being.

Moreover, there are fundamental inequalities between countries – high-income countries consume six times more materials and generate 10 times more climate impacts than those living in low-income countries. The resources used by Upper middle-income countries have been doubled in the past 50 years due to their own growth and relocation of resource intensive processes from high-income countries. During the same period, per capita resource consumption and related environmental impacts in low-income countries has remained relatively low and almost unchanged since 1995. This has led to a rapid depletion of resources and a substantial decrease in environmental quality. In the process, ecological and environmental balance was compromised to a great extent leading to several negative impacts on our planet. These pushed the human civilization at its highest risk both at global and local level. It is because of these wrongdoings that we are being held responsible for global climate change, degradation of natural resources, pollution of our environment in so much so that life becomes dangerous and even driven many plant and animals at the zenith of their extinction.

2. Sustainable Development Initiatives: Macro Perspective

In view of these, the idea of sustainable development was emerged which called for harmonious balance between three elements – economic development, social equity and

environmental protection. Since then the word 'sustainability' has become the buzzword. It has occupied the centre stage of all discussions and debate in different international forums, corporate faternity and social interactions. Internationally, several initiatives were undertaken to promote the cause of sustainable development. Notable among them are Rio declaration (1992), UN Millennium Development Goals, Paris agreement and recently originated Sustainable Development Goals (SDGs). It is also recognized that corporates as the suppliers of goods and services have to play a major role in promoting sustainable development goals. Accordingly, the concept of Triple Bottom Line (TBL) was introduced which paved the way for sustainability reporting. As environmental, social and governance (ESG) concerns take center stage in corporate accountability, key stakeholders including capital markets, governments and civil society are putting on corporates to integrate sustainability into their core business strategy. The research findings suggest that sustainability reporting has witnessed exponential growth, moved from a "paucity" stage in 2000 to the "saturation" stage in 2022, and is still ongoing (Benameur, et. al. 2024). Over the years, corporate across the globe and different geographical locations have been steadily progressed from voluntary based sustainability reporting to mandatory sustainability reporting aiming to held corporates more accountable for their commitments towards sustainability. In response, MNEs are rethinking their business models, integrating ESG principles into decision-making, and enhancing transparency in sustainability disclosures (Burritt et al., 2020; van Tulder & van Mil, 2023).

3. Sustainable Living: Micro Perspective

The world has changed greatly in response to these efforts but much of the vision of sustainable development is directed towards Government and business houses and as such individuals and communities are almost outside the ambit of such programme which limits the extent of success. In this context, the term 'Sustainable Living' was appeared for the first time in the Sustainable Development Goals (4 Education and 12.8 Responsible Consumption). Sustainable Living is a micro level concept that aims to reduce our impact on the planet by conserving natural resources, minimizing waste and using less energy.

Climate change, air pollution, world hunger, and water scarcity are among the most pressing global problems. The root cause is, most of us, unfortunately, do not live sustainably. The carbon footprint indicates how many raw materials we use and how many pollutants we cause with our consumption. The way we buy, what we buy, how we travel, work or spend our free time – all determined the amount of our ecological footprint. Sustainable living is a philosophy to reduce personal and societal environmental impact. Sustainable living means keeping our carbon footprint as small as possible and acting in a socially responsible manner. It encourages people to minimise their use of Earth's resources and reduce the damage of human and environmental interactions. It involves making conscious choices in areas like diet, transportation and consumption to ensure a healthier environment for future generations and to promote social equity. As our lifestyle choices have significant impacts on resource consumption (or resource conservations), climate change, loss of biodiversity and inequality, the cost of inaction at the micro (individual level) would result into very large and staggering level of losses at the macro level.

The concept is very simple – if every individual starts behaving in a way conducive for sustainable system, then collectively, we can very easily achieve the goal of sustainable development. Sustainable Living simply means rethinking and reorienting our mindset; changing our behaviour and consumption pattern so as to live in harmony with nature. Change in behavioural level is necessary in the ways we socialise, exchange, share, educate

and build our identities. **Sustainable living, therefore, means understanding how our lifestyle choices impact the world around us and finding ways for everyone to live better and lighter.**

4. Earth Overshoot Day (EOD) and Unsustainable Consumption

Now, the question is how to measure it or understand it? It is to be noted that there is no direct way to understand the sustainability of our living. However, some indirect measures are available such as carbon footprint, per capita resource consumption, and waste generation, energy consumption at individual level or community level, etc. The recently introduced concept of Earth Overshoot Day (EOD) and Country Overshoot Day (COD)may also provide significant insight as to sustainability or otherwise of our consumption of resources.

In 2006 Global Footprint Network came up with 'Earth Overshoot Day by combining two measures – Ecological Footprint and Bio-capacity. EOD is calculated by the following formulae:

$$\text{EOD} = \frac{World\ Biocapacity}{World\ Ecological\ Footprint} \times 365$$

Another expression of EOD is made in terms of number of earths required to sustain the present level of consumption of humanity which is given by:

$$\text{No. of earth required} = \frac{Ecological\ Footprint\ per\ person}{Biocapacity\ per\ person}$$

Table 1: Trend and Progress of Earth Overshoot Day (EOD)

Year	Earth Overshoot Day	Day of the year	Year	Earth Overshoot Day	Day of the year
1971	December 29, 1971	362	2000	September 16, 2000	255
1972	December 31, 1972	365	2001	September 11, 2001	250
1973	December 8, 1973	337	2002	September 19, 2002	258
1974	December 4, 1974	333	2003	September 12, 2003	251
1975	November 29, 1975	328	2004	September 1, 2004	240
1976	November 25, 1976	324	2005	August 25, 2005	234
1977	November 22, 1977	321	2006	August 22, 2006	231
1978	November 13, 1978	312	2007	August 14, 2007	223
1979	November 3, 1979	302	2008	August 14, 2008	223
1980	November 23, 1980	322	2009	August 22, 2009	231
1981	November 24, 1981	323	2010	August 8, 2010	217
1982	December 2, 1982	331	2011	August 4, 2011	213
1983	December 9, 1983	338	2012	August 1, 2012	210
1984	November 17, 1984	316	2013	August 1, 2013	210
1985	November 7, 1985	306	2014	August 3, 2014	212
1986	November 5, 1986	304	2015	August 4, 2015	213
1987	October 31, 1987	300	2016	August 6, 2016	215
1988	October 17, 1988	286	2017	August 1, 2017	210
1989	October 12, 1989	281	2018	July 28, 2018	207
1990	October 16, 1990	285	2019	July 29, 2019	208
1991	October 20, 1991	289	2020	August 9, 2020	218
1992	October 30, 1992	299	2021	July 29, 2021	208
1993	October 26, 1993	295	2022	July 25, 2022	204
1994	October 16, 1994	285	2023	July 25, 2023	204

Year	Earth Overshoot Day	Day of the year	Year	Earth Overshoot Day	Day of the year
1995	October 9, 1995	278	2024	August 1, 2024	212
1996	October 3, 1996	272			
1997	October 5, 1997	274			
1998	October 6, 1998	275			
1999	September 25, 1999	264			

Source: https://overshoot.footprintnetwork.org/newsroom/past-earth-overshoot-days

EOD is the date in a year when humanity's resource consumption exceeds the planet's ability to regenerate them. It marks the date of a year when human consumption has reached a level equivalent to regenerative capacity of planet ecosystems for that year. In other word, it is the time point of a year when humanity's Ecological Footprint exceeds Earth's Bio-capacity. For example, in 2023, the EOD was 202 days which means that earth bio-capacity can sustain the livelihood of humanity (at current consumption pattern) for 204 days or up to 25th July. It also signifies that from 25th July 2023 to 31st December 2023, humanity is living at the capital stock of earth. In other word, humanity is using 1.7-fold resource than our earth can regenerate. By 2030, it is expected that population of earth will require resources of 3 Earths. Interesting to note that in 1971, EOD was 362 days meaning that consumption of humanity was almost fully aligned with earth's regenerative capacity.

Trends of EOD (Table 1) showed that humanity has been in a state of "ecological overshoot" consuming resources at a rate that would require multiple planets to sustain, and the day has been progressively occurring earlier in the year since 1971. For example, in 1980, it was 322 days which came down to 213 days in 2015 (or 4th August). In 2024, the EOD is 212 days (1st August) requiring about 1.75 Earths to sustain the current rate of consumption.

5. Sustainable Living Mandate: Individuals' Responsibility

Undoubtedly, unsustainable resource consumption and waste generation are responsible for the declining trend in EOD suggesting that our living has become more and more unsustainable over the years. According to WHO, there are now around 7.7 billion people living on the planet and that number is increasing meaning more pressure on stock of resources. The only viable option is to rethinking our lifestyle preferences and rationalizes our consumption pattern if we want to influence EOD positively.

Followings are some simple lifestyle adjustments that can be made to promote sustainable living mandate:

Raise awareness level: This is the first step. Understanding how our choices contribute to the environment negatively is crucial. We have to find out how our actions and habits feed into our pressing problems. We can share our knowledge with others and support policies that promote ecological balance and environmental protection. Self-awareness would help us to decide our consumption pattern aligned with environment. It also motivates others to adopt sustainable options.

Control use of plastic: The use of plastic particularly the single use plastic is at critical point mainly because of its non-biodegradability. Individual commitments and actions can make a huge difference to cut down on plastic use in our daily life and can lead to collective changes at the community level. By making conscious choices to reduce plastic footprint, we can help the environment and set a precedent for others, including future generations, to

follow. Small steps, taken consistently, can lead to significant environmental impacts. These are as follows:

- **Minimize unrecyclable single use plastic consumption,** for example, saying no to plastic straws, utensils, and bags can make a big difference. Carrying own reusable alternatives is a small effort with a big impact.
- **Choose reusable plastic** while discarding single use plastic or replace it with waterproof options such as glass and stainless-steel products.
- **Look for minimum packaging.** For example, bulk purchase reduces the amount of packaging waste. Additionally, choosing products with eco-friendly packaging or no packaging at all can further reduce our plastic consumption. Avoid frequent online procurement.
- **Recycling and upcycling:** While recycling is important, it's not a complete solution. Upcycling, or creatively reusing items, can give plastic products a new life, reducing the need for new plastics.
- **Supporting sustainable brands:** Choosing brands committed to environmental stewardship can amplify your impact. By supporting these companies we are contributing to a larger movement for change.

Conserve water and energy: Conserving water means using water supply judiciously and responsibly. Following are some ways to minimize water wastage:

- Close the water faucet when washing the dishes and brushing our teeth.
- Check for leaks in pipes and toilets
- Only use the washing machine when it is full (this will also help with your energy consumption)
- Bath using bucket and mug to replace the use of showers.

Another most impactful thing is to conserve energy. This can be done simply by turning off lights when leaving a room or ensuring your home is well-insulated. These little practices can add up to big energy savings over time. Another way to reduce your impact at home is to transition to renewable energy sources. This could mean anything from solar panels to a small wind turbine. If this is not possible, we can also support renewable energy initiatives by buying green power from your utility company. Unless you purchase renewable power from your electricity provider, your energy likely comes from the regional electricity grid, which is primarily generated through the combustion of fossil fuels that emit significant greenhouse emissions and cause detrimental public health impacts. Making small changes to conserve energy, buying verified renewable energy, and investing in energy-efficient products are effective ways to reduce your carbon footprint.

Responsible buying behaviour: Every product we purchase has an environmental footprint, from the materials used to create it to the pollution emitted during manufacturing to the packaging that ends up in landfills and incinerators. Even if you can recycle or compost a product at the end of its life, the upstream damage has already been done. So, before you buy, ask yourself if you really need it. If you do, consider buying second hand instead of new, and look for products made from lower-impact materials and with minimal packaging and shipping. Instead of using paper towels, opt for reusable cloths. Look for products that are made from recycled materials while buying something.

Minimize the waste generation: Reducing the waste especially non-biodegradable waste is one of the most important things we can do for the environment. So many of the things we

throw away end up in landfills or get dumped into the ocean, where they pollute the water and pose a threat to sea life. Globally, the UN projected that municipal solid waste generation would grow from 2.1 billion tonnes in 2023 to 3.8 billion tonnes per year by 2050. Focus on reducing, reusing, and recycling, which include buying less, opting for second hand items, and properly recycling what you can.

Travel responsibly: The transportation sector is one of the largest emitters of greenhouse gases. Fossil-fueled transportation emissions create smog, soot and other harmful air pollution. Changing our driving habits can dramatically reduce carbon footprint. Alternative commuting can be promoted to reduce traffic and pollution, save money, support a healthier lifestyle, and make a positive impact on our environment and community. Walk, bike, carpool, use of public transportation or join ride or bike shares can contribute much. Combine errands to make fewer trips. We must support investment in electric vehicle fleets and charging stations, and consider buying electric vehicle.

Educate and advocate for sustainability: We should educate ourselves about the climate crisis, the impact humans are having on the planet, and the need to cut down on waste, plastics, and greenhouse gas emissions. It would help us to raise our voice to advocate for a more sustainable world.

THE WAY FORWARD

The continuous decline of EOD reinforces the need of reorienting our lifestyle choices on urgent basis. The way we moved towards unsustainable living over the past five decades cannot be nullified easily. The process will, definitely, be slow and challenging. However, humanity should start thinking urgently on sustainability of their consumption pattern and waste generation. In essence, individuals need to adopt lifestyle choices which promote circular economy. People should embrace 7 R's of sustainability – Rethink, Refuse, Reduce, Reuse, Repair, Repurpose and Recycle – with regard to consumption and waste generation. These principles facilitate our move towards a more circular economy by questioning our ever-increasing needs, avoiding unnecessary consumption and waste minimization. Undoubtedly, it will not happen overnight. Neither all will endorse it. But even a handful of people or groups can make huge difference. A study by the University of Michigan in the United States confirms that the rules agreed upon by groups of the population guarantee the efficiency of a sustainable life strategy. This is silver lining of the problem which is evident in more and more thrust on sustainability.

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Conflict of Interest

The author(s) declared no conflict of interest.

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