

With Inclusion and Equity, can Sustainable Development Goals (SDGs) Flower within the Planetary Boundaries?

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ABSTRACT

The present state of planetary boundaries reflects on unsustainable consumption of natural resources, driven by population growth, economic development and lifestyle changes. It also reflects on economic transactions that do not reflect true cost of production. One collective human effort that responds to the social, economic, and environmental issues to ensure equality for all humans by way of sustainable development is the Sustainable Development Goals (SDGs); a set of 17 goals with 169 targets adopted by 193 countries at the General Assembly of the United Nations in 2015.

This paper presents a conceptualized model for vital socio-economic and natural resources and the governance requirements to achieve SDGs within planetary boundaries. It does this by identifying the foundational roles, capacities, and values provided by the Earth systems to enable diverse human activities to be planned and implemented. The model identifies challenges and barriers to equity, inclusion, and social justice and identifies innovations in restoration, policies and stable leadership to achieve sustainable development within safe and just planetary boundaries.

(Keywords: Sustainable Development Goals, SDGs, biodiversity, water resources, agriculture, environmental management, sustainability, inclusivity)

INTRODUCTION

Nature, environment, and Earth systems form the basic building blocks of human civilization. The planetary boundaries framework conceptualized by Rockström, et al. (2009) assesses the anthropogenic impacts on the functions of the Earth systems to estimate a “safe operating space for humanity” considering the unprecedented

degradation of the natural environment (Crutzen, 2002; Stern 2007).

Since the industrial revolution, human activities have dominated the biological, chemical, and geological processes on the Earth presenting serious challenges to its self-regulatory capacity and its resilience (Green, et al., 2017; Steffen, et al., 2015). The planet is experiencing rapid urbanization and a growing ecological footprint (Wackernagel and Rees, 1996; Kitzes, et al., 2008). Increased demand for food and water strain the ecosystems and challenge their ability to provide ecosystem services (Satterthwaite, et al., 2010).

Both urbanization and agriculture are engaged in excessive use of natural resources, contributing to global climate change, biodiversity loss (McDonald, et al., 2008), and to variations in water cycles (Hoekstra and Chapagain, 2007 and 2008). Changes in water cycle have compounding adverse consequences on agriculture, energy production, transportation, human health, and to ecosystem functions (Gleick, 1993; FAO, 2011).

Scientific assessment by Rockström, et al. (2009) identified nine interdependent “planetary playing fields” where the boundaries of critical environmental parameters for the Earth systems lie. These boundaries include the physical circulation systems of the planet (the climate, stratosphere, ocean systems); global biogeochemical cycles (nitrogen, phosphorus, carbon, and water); biophysical features of Earth such as marine and terrestrial biodiversity; and land systems—all of which are essential for the planet’s self-regulatory capacity and for its resilience.

Humankind has transgressed four of the nine planetary boundaries for climate change, biosphere integrity (which includes biodiversity), land-system change, and altered biogeochemical

cycles (Rockström, et al., 2009; O' Neill, 2018; and Steffen, et al., 2015). Of these, climate change and biosphere integrity are the two “core boundaries”, altering either “would significantly drive the earth system into a new state” (Steffen, et al., 2015).

The present state of planetary boundaries reflects on unsustainable consumption of natural resources, driven by population growth, economic development and lifestyle changes (Vitousek, et al., 1997; Dasgupta and Ehrlich, 2013; and Steffen, et al., 2015). It also reflects on economic transactions that do not reflect true cost of production (Costanza and Daly, 1994; Costanza, et al., 2014).

The situation also calls for all stakeholders in the Earth systems from scientists, policymakers, and others, to seek solutions to address this accelerating crisis (Mace, et al., 2014). It underlines the urgency for deliberate use of the planet's resources to ensure its continued habitability to all life forms (Rockström, et al., 2009; Whitmee, et al., 2015; O' Neill, et al., 2018).

Sustainable Development Goals

One collective human effort that responds to the social, economic and environmental issues to

ensure equality for all humans by way of sustainable development is the Sustainable Development Goals (SDGs) (Griggs et al. 2013).

SDGs are a set of 17 goals (Figure 1) with 169 targets adopted by 193 countries at the General Assembly of the United Nations in 2015.

The SDGs are characterized by (i) mutual dependency between the goals (Nilsson et al. 2016), (ii) their dependency on the natural, human, financial, physical (infrastructure) and social capital, and (iii) their reliance upon stable biophysical processes of the planetary system which form the foundations of these capitals (Costanza and Daly, 1994; Puydarrieux and Mésenge, 2018). To be sustainable, development pathways must work within the renewing and recreating capacity of the Earth system/biosphere (Folke, et al., 2011).

The word ‘sustain’ traces its roots to the Old French word ‘sostenir’ which means ‘give support to’ and to the Latin word ‘sustinere’ which means ‘to hold up; provide with means of support; to bear, undergo, endure’. Sustainable development is defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” by the World Commission on Environment and Development.



Figure 1: Sustainable Development Goals.

Recognizing the embedded meaning in the word 'sustain' from Latin and Old French, sustainable development would mean 'development designed by humans that holds up, gives means of support to (the environment), and undergoes and enduring challenges to hold up (the functions of life systems) while development is being achieved'.

A recent assessment of 150 nations by O'Neill, et al. (2018) draws attention to the relationship between the environment and sustainable development. It frames the question on the capacity of humanity to make progress (develop) at a rate in which the environment can sustain the progress and, to retain its own functional capacities.

In this age of hyper-consumption underlined by social and economic inequities and growing urban boundaries (Hoornweg 2016), making progress toward sustainable development would require recognizing the interlinkages between human and planetary well-being and conceiving development that is inclusive and perceptive of social equity issues (Raworth, 2012 and 2017; O'Neill, et al., 2018).

Achieving the SDGs within planetary boundaries would require innovations, equitable partnerships and a willingness to reduce resource use at individual level to secure basic needs such as nutrition, sanitation, access to clean water for the well-being of all, including the well-being and the health of our planet (O'Neill, et al., 2018).

INCLUSIVE AND EQUITABLE SUSTAINABLE DEVELOPMENT MODEL

The Inclusive and Equitable Sustainable Development model (Figure 2) conceptualizes the vital socio-economic and natural resources, and governance requirements to achieve SDGs within planetary boundaries. It does this by identifying the foundational roles, capacities and values provided by the Earth systems to enable diverse human activities to be planned and implemented. The model identifies challenges and barriers to equity, inclusion and social justice and identifies innovations in restoration, policies and stable leadership to achieve sustainable development within safe and just planetary boundaries.

This model draws inspiration from floral diagrams in botanical studies. Floral diagrams symbolize the different floral organs (bracteoles, bracts, calyx, corolla, androecium, and gynoecium), their structural arrangements that enable different parts to function together as a flower. Flowers are marvels of evolution, perpetuation and resilience. They are nature's tools that interlink diverse species through partnerships and to pass on adaptive knowledge through seeds.

Seeds carry forward the lessons of adaptation experience to next generation. The floral whorls enable this process by ensuring pollination, fertilization and seed set, to perpetuate evolutionary experience through seeds. Based on the type of flower, the structures vary, each arrangement designed to maximize adaptation and for evolutionary success.

Floral diagrams represent placement of different parts of a flower intricately linked to support each other to form a flower. Like the parts of a flower that are inter linked to make a whole functioning flower, the Inclusive and Equitable Sustainable Development model depicts the inter dependencies between the Earth systems and life processes defined by diverse capitals (natural, social, financial, human and physical) and activities (socio-economic, innovations, consumption patterns and governance) that facilitate sustainable development.

The floral wheel of Inclusive and Equitable Sustainable Development begins its movement with natural capital (representing the Earth system) in the outermost circle. Natural capital is the container of all systems that support life on the planet. Natural capital is the primary requirement to create and support other forms of capital and processes that result in diverse economic, social and other activities.

Planning interventions and designing activities to reach SDG targets would require identifying their dependencies on available natural capital (site specific with a broader regional/global interconnected view) and equitable access of this resource along with equitable access to human, social, financial and physical capital to all in the community. Communities accrue food security, economic security and water security using these diverse forms of capital.

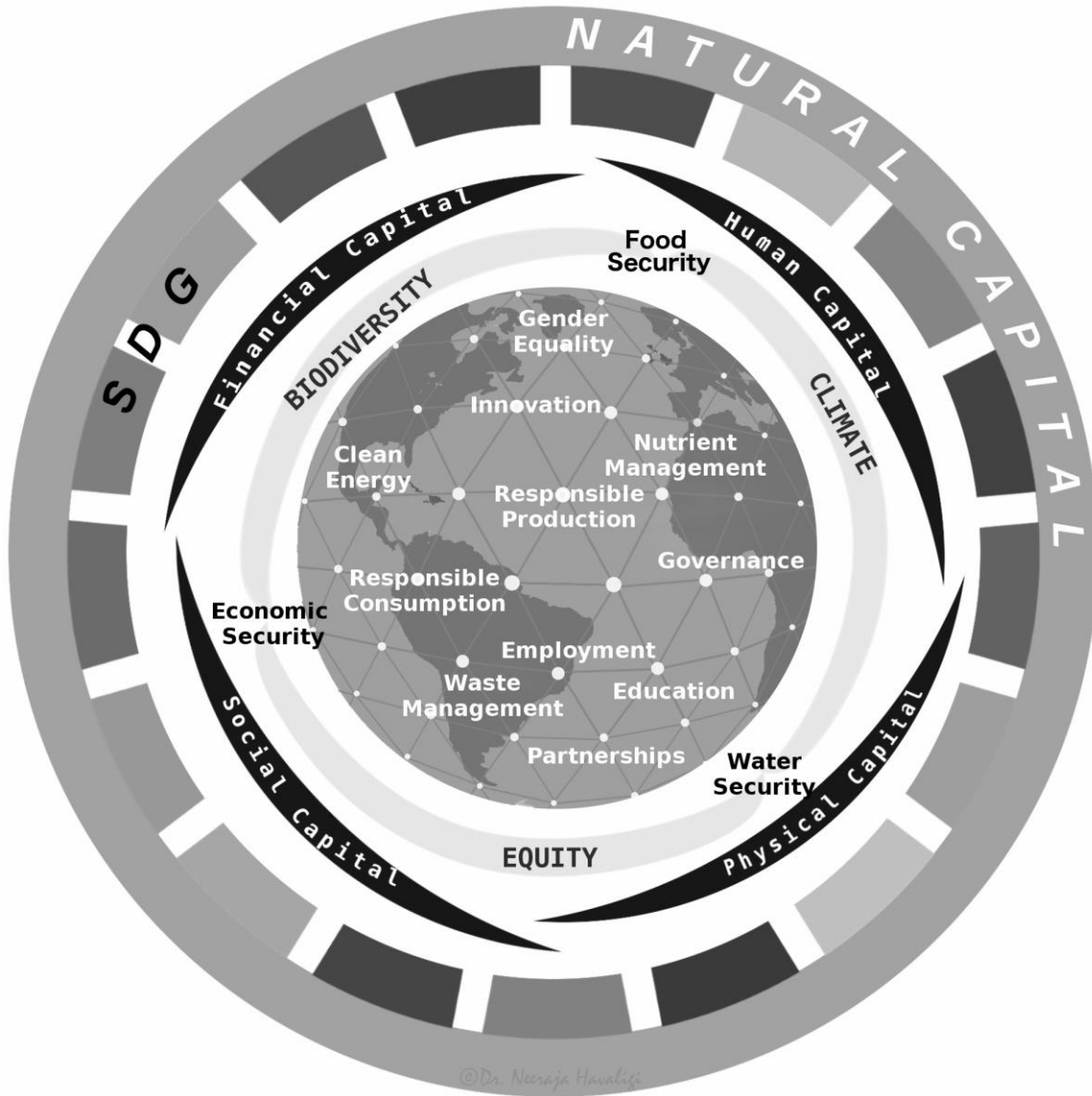


Figure 2: Inclusive and Equitable Sustainable Development within Planetary Boundaries[®].
 (Inclusive and Equitable Sustainable Development Model Copyright by Neeraja Havaligi, Illustrated by Uma Havaligi).

The stability of these securities within communities depends on appropriate use of biodiversity, with an understanding of the tenuous climate and ensuring equitable access of resources to all humans, fulfilling a critical need for 'just and safe space' described by Raworth (2012 and 2017). This relationship is depicted by their placement position within the floral wheel for Inclusive and Equitable Sustainable Development model.

At the heart of this wheel are human activities that gather the energies from the outer rings to enable innovation, and to strive for gender equality, responsible consumption, responsible production, clean energy, nutrient management, waste management, education, employment, and governance, and to establish partnerships to work toward common goals. These activities speak to targets set for the 17 SDG's and they enable economic, social, natural and political processes on the ground.

In the inner whorl, biodiversity and climate can function and continue to provide for humanity when used equitably and within limits. When these three factors are working within their whorls/boundaries (notice their placement in the diagram), communities could be expected to experience a sense of wellness from having food security, water security and economic security. This security relies on the processes/ products/ results emanating from the activities depicted in the innermost circle.

The inclusive and equitable sustainable development tool is supple and adaptive, showing intricate relationships between factors within a whorl and between whorls, allowing for its application across in diverse communities and regions.

To get a realistic insight to this model, let us take a case of protected area where a team of planners, managers and other stakeholders are involved in safeguarding biodiversity, land and water use. This team is also sensitized to the socio-economic and cultural dependency of local communities on these resources to be included in plans to reach selected SDG targets for their community.

- The natural capital in this case includes (and not restricted to) all sources of nourishment (food), sustenance (clean air and water) and maintenance (amicable climatic conditions).
- Social capital is the network between and within communities in that geographical area. Physical capital encompasses the buildings, equipment, and infrastructure, including access roads, irrigation canals, etc.
- Financial capital represents the money used in transactions.
- Human capital includes all the stakeholders with different levels of influence, demands, and access to resources.

These capitals have synergistic dependencies between each other. They are directly dependent on the natural capital enables the necessary conditions for resources such as biodiversity (for food and other life sustaining factors) to thrive, and regulates climate, thus supporting all potential activities emanating from use and conversation of these capitals through socio-economic-governance systems.

This model will help identify local and regional baseline capacities such as existing capacity for crop production and other productive activities within limits of available resources (land, water etc.); the threats and major challenges imposed on biodiversity, quality of water, soil health, etc.; research and development capacity integrating local knowledge and needs, education and health care systems that take an integrative approach to serve their communities, and more.

The model will also help identify needs such as lack of equitable access to land and other resources which could be a reason for its over exploitation, malnourishment in some communities within local population, and inequitable development in the community. The model will also point to presence of strong stable governance supporting informed policies and laws to guide locally appropriate development; identify major factors contributing to breaching boundaries. These factors could be economic, social and political structures including policies, stakeholder/investment interests that directly or indirectly support loss biodiversity and its knowledge within the community, promote unsustainable use of land and water resources, and deter inclusive equitable approaches to accessing resources and collective decision making.

Identifying these factors within the floral model will provide a visual representation of the influences these factors have on each other within the whorls, and their potential to influence other whorls. Analysis of trade-offs between the different factors within and between the whorls is imperative to identify interventions and to design opportunities for sustainability that remain within the planetary boundaries especially for water, biodiversity and climate change.

This inclusive and equitable approach can help gain momentum toward planning for appropriate SDG interventions through a more informed process, which can identify alternatives and innovations in creating practices, products, policies that help communities achieve their SDG targets using the planetary provisions available within their planetary boundaries.

Businesses, institutions and countries are expanding their horizon and measure progress with indicators that include well-being of the planet and people (Cassiers, 2009). This horizon has also gained momentum in integrating social

equity (Wackernagel and Rees, 1997) as a factor to ensure 'safe and just operating space' (Raworth, 2012) for human development. Integrating social equity and environmental costs of economic activities within the planetary boundaries approach is critical, especially as we increase in population and strive to reach western standards of living.

Inclusive and equitable sustainable development also calls for collaborative approaches in governance, scientific assessments and sharing know-how of social-ecological innovation (Galaz, et al., 2012). Application of Principle 7 of "Common but Differentiated Responsibility (CBDR)" from the Rio Declaration to SDGs will help different institutions and levels of administration to develop their own situation specific approach(s) to address local needs and targets (Kitzes, et al., 2008).

Identifying 1) policies that support multi-level institutional solutions, particularly those that hone SDG goals to local resources and needs; and 2) lessons in sustainable production and consumption, effective partnerships for peace, equity, and development especially those influenced by governance structures and priorities (Galaz, et al., 2012; Heck 2018) can determine humanity's' ability to live within planetary boundaries.

The inclusive and equitable sustainable development model advances planning for sustainable development interventions through community-based action, through:

- (i) clear insight of community needs, capacities and its on-going challenges with focus on inclusion, equity and valuation of natural capital which contributes to pressure on planetary boundaries;
- (ii) baseline information of threats to planetary boundaries in the geographic region based on GIS and other Earth system tools; and
- (iii) insights to community based skills and knowledge, transfer of technology and identifying traditional modes of valuing and celebrating natural capital for locally relevant solutions.

Understanding and quantifying the interdependent links in the different whorls of the inclusive and equitable sustainable development tool is critical

to determine possible appropriate SDG based solutions that can sustain within the planetary boundaries.

CONCLUSION

The SDGs were envisioned as a partnership with the planet not only to create equal opportunities and access for improved living for all humans, but also to ensure peace and protect the planets health and support all life forms. The profound remark by Ban Ki-moon (the United Nations Secretary-General from 2007-2016) in his address at COP22¹ "We don't have plan B because there is no planet B" caught global attention as we set pace to the envisioned SDGs to take root in our communities. However, our current understanding of breaching planetary boundaries has positioned our pursuit of SDGs in a profound predicament. It leads us to ponder on our ability to achieve and sustain the 17 SDGs by 2030 while not pushing the breaching boundaries by our actions.

Achieving SDGs by 2030 will require a re-examination of business as usual approach on how we view and value natural capital; the Earth systems which define its existence; and how this value translates into equitable policies, governance directives and to every day actions.

Research indicates that equity is a powerful driver to partner with the planet (Steffen, et al., 2011) to create 'safe and just operating spaces' required to pave the path for achievable SDGs for humanity (UN, 2012; Griggs, 2013; Häyhä, et al., 2016). Planning for sustainable development within the breaching biodiversity and climate boundaries with safe and just operating space approach is urgent and inevitable (Lobell, et al., 2008; O'Neill, et al., 2018; Dearing, et al., 2014). The 'safe and just space' requires that consistent supplies of human and social capital be maintained along with natural capital, an asset on which all the human activity and its well-being is contingent upon.

However, current times of hyper-consumption are marked by our active engagement in bankrupting the assets on which human well-being depends,

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<https://www.un.org/sustainabledevelopment/blog/2016/11/secretary-generals-remarks-to-the-press-at-cop22/>

with high dependency on fossil fuel driven growth and development based on land use change and displacement feeding inevitable social tensions and conflicts (Barnett and Adger, 2007; Gleick, et al., 2014). Factoring these significant forces which are gaining momentum in pushing planetary boundaries is critical, in order to reach full potential of SDGs in communities across the world.

Development interventions and policies that imbibe and reflect environmental costs on society and uphold equity may help reign in the breaching boundaries. The Inclusive and Equitable Sustainable Development model helps identify local and regional baseline needs, capacities, and other factors contributing to breaching boundaries both locally and regionally. This would be the first step toward planning for appropriate need and place based SDG interventions.

Critical learning that paves alternative paths to inclusive SDGs comes from sharing lessons. Communities that have achieved SDG goals with holistic partnerships and deliberate efforts in equity and inclusion and economy which values partnership with the earth offer leadership to the path ahead. Such lessons and experiences will help energize the collective efforts from all walks of life, to move toward a more equitable, inclusive and just state for all residents of the Earth system.

Kofi Annan (United Nations Secretary-General from 1997-2006) observed, "If tolerance, respect, and equity permeate family life, they will translate into values that shape societies and nations²". While this remark was made in context of emphasizing the roles that families play in turning human rights to reality, it is just as well relevant to achieving SDG targets for 2030, which is nested in realistic premise that achieving sustainable development within planetary boundaries is realistic only with equitable and inclusive participation of individuals, communities, states and countries across geographic borders work together with a tangible knowledge the economic, social and life-sustaining value of the planetary boundaries that have closely supported our development this far.

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² <https://digitallibrary.un.org/record/253927?ln=en>

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