Southern Voice

2015 On Post-MDG International Development Goals

Occasional Paper Series

27

Growth within Natural Limits

The Debates, Propositions and Possibilities

Karin Fernando

Prasanthi Gunawardena

GROWTH WITHIN NATURAL LIMITS

The Debates, Propositions and Possibilities

Southern Voice Occasional Paper 27

Karin Fernando

Prasanthi Gunawardena

Ms Karin Fernando is a Senior Researcher at the Centre for Poverty Analysis in Colombo, Sri Lanka. She can be reached at: karin@cepa.lk

Dr Prasanthi Gunewardene is a Senior Lecturer at the University of Sri Jayawardenepura, in Colombo, Sri Lanka. She can reached at: prasanthigunawardena@yahoo.com

Publisher

Southern Voice on Post-MDG International Development Goals
Website: www. southernvoice-postmdg.org
E-mail: southernvoice2015@gmail.com

Secretariat: Centre for Policy Dialogue (CPD)
House - 6/2 (7th & 8th floors), Block - F
Kazi Nazrul Islam Road, Lalmatia Housing Estate
Dhaka -1207, Bangladesh
Telephone: (+88 02) 9141734, 9141703, 9126402, 9143326 & 8124770
Fax: (+88 02) 8130951; E-mail: info@cpd.org.bd
Website: www.cpd.org.bd

First Published February 2015

Disclaimer: The views expressed in this paper are those of the authors alone and do not necessarily reflect the views of *Southern Voice on the Post-MDG International Development Goals* or CPD or any other organisation(s) that they are affiliated with.

ISSN 2307-9827 (Online)
ISSN 2307-681X (Print)

Editor
Debapriya Bhattacharya, PhD
Chair, *Southern Voice on Post-MDG International Development Goals*
and Distinguished Fellow, CPD
E-mail: debapriya.bh@gmail.com

Cover Design
Avra Bhattacharjee

Preface

The *Southern Voice on Post-MDG International Development Goals* works as an open platform, and is a network of 48 think tanks from Africa, Latin America and Asia that seeks to contribute to the global post-2015 dialogue. Motivated by the spirit of wide academic inquiry, the initiative is committed to provide quality data, empirical evidence and policy analyses, derived from research in the countries of global South. Through strategic engagements, *Southern Voice* aspires to address the existing 'knowledge asymmetry' and 'participation deficit' afflicting the global discourse on post-2015 agenda.

With these goals in mind, *Southern Voice* launched a call for papers among its members to inform the global debate based on promoting original research on new issues that have emerged from various reports, structured conversations concerning the post-2015 agenda as well as from the discussions around them and beyond. Eleven research grants were offered during this phase.

In response to the call, we received numerous proposals which were reviewed by *Southern Voice* members. The research papers were also peer reviewed, and the revised drafts were later validated by the reviewer.

The resulting collection of papers highlights some of the most pressing concerns for the countries of the global South. In doing so, they explore a variety of topics including social, governance, economic and environmental concerns. Each paper demonstrates the challenges of building an international agenda which responds to the specificities of each country, while also being internationally relevant. It is by acknowledging and analysing these challenges that the research from the global South supports the objective of a meaningful post-2015 agenda.

In connection with the ongoing debates on post-2015 international development goals, **Growth within Natural Limits: The Debates, Propositions and Possibilities** by *Ms Karin Fernando*, Senior Researcher, Centre for Poverty Analysis (CEPA), and *Dr Prasanthi Gunewardene*, Senior Lecturer, University of Sri Jayawardenepura, Sri Lanka, analyses the Sustainable Development Goals (SDGs) through a conceptual framework derived from the growth within natural limits ideology.

Contributions of *Ms Andrea Ordóñez*, Research Coordinator of the initiative and *Ms Mahenaw Ummul Wara,* Research Associate, Centre for Policy Dialogue (CPD) and Focal Point at the Southern Voice Secretariat) in managing and organising the smooth implementation of the research programme are gratefully acknowledged.

I would also like to thank *Dr Fahmida Khatun*, Research Director, CPD, Bangladesh, for peer reviewing, and *Mr Michael Olender* for copy editing the paper. I would like to take this opportunity to recognise the support of Think Tank Initiative (TTI) towards Southern Voice, particularly that of *Dr Peter Taylor*, Programme Leader, TTI.

I hope the engaged readership will find the paper stimulating.

Dhaka, Bangladesh
February 2015

Debapriya Bhattacharya, PhD
Chair
Southern Voice on Post-MDG International Development Goals
and
Distinguished Fellow, CPD
E-mail: debapriya.bh@gmail.com

Abstract

This paper has developed a conceptual framework derived from the growth within natural limits ideology with which it analyses the Sustainable Development Goals (SDGs). The findings indicate that: for a sustainable development approach to work, it requires integration of different theoretical approaches and knowledge tracks – conceptually drawing from economics, social sciences and Earth sciences, and that it is still not a fully matured science. Applying such an integrated frame shows that the social domain is explicitly evident in the SDGs' with a high degree of ambition and clarity. However, the economic and ecological domains require further sharpness and do not clearly subscribe to the fundamentals of biophysical limits. The paper also concludes that developing countries, like the countries of South Asia, have an advantage in that they still operate within their biocapacity limits, and should look to plot a different path to the West, and address social, economic and environment issues simultaneously.

Contents

Acronyms

GDP	Gross Domestic Product
LDC	Least Developed Country
MDG	Millennium Development Goals
MNC	Multinational Corporation
SCP	Sustainable Consumption and Production
SDG	Sustainable Development Goals
SIDS	Small Island Developing States
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar

Growth within Natural Limits
The Debates, Propositions and Possibilities

Karin Fernando

Prasanthi Gunawardena

1. Introduction

Nearing the deadline of the Millennium Development Goals (MDGs), the global development community has conceded that current economic growth models have to be revamped, even transformed, to eradicate poverty, with due consideration to addressing inequalities and climate change. Reflecting these concerns, the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda, which was appointed by the United Nations (UN) Secretary-General Ban Ki-moon to consolidate the next set of global development goals, states that: "This is a universal challenge, for every country and every person on earth. This will require structural change, with new solutions, and will offer new opportunities" (HLP, 2013).

The UN Secretary-General indicates that the post-2015 goals should particularly focus on improving the lives of marginalised groups and empowering women. He emphasises that the post-2015 framework

> *must be bold in ambition yet simple in design, supported by a new partnership for development… It must be universal in nature yet responsive to the complexities, needs and capacities of individual countries. It needs to be rights-based, with particular emphasis on women, young people and marginalised groups. And it must protect the planet's resources, emphasise sustainable consumption and production, and support action to address climate change. Guided by this far-reaching vision, we can define a concise set of goals that will capture the imagination and mobilise the world (UN, 2013).*

In parallel, the outcome document of the latest UN Conference on Sustainable Development, widely known as Rio+20, proposes the establishment of Sustainable Development Goals (SDGs), which have greater emphasis on the challenge of environmental sustainability (see UN, 2012). Global commitment is sought to build a more just and equitable world that promotes sustained and inclusive economic growth, social development and environmental protection to benefit all, in particular children and future generations irrespective of race, gender, ethnicity and economic status. The SDGs acknowledge the necessity of dealing with climate change, mitigating greenhouse gases and recognising "the rights of nature" (OWG, 2014). The 17 SDGs build on the 10 MDGs and present a more ambitious agenda that has integrated the need to protect natural systems and resources, with protecting biodiversity being an objective alongside reducing poverty. With more than two years spent gathering ideas from the global community, discussions on the SDGs have taken place in a far more inclusive manner than those that led to the MDGs.

We are at the cusp of finalising the post-2015 goals. Formal proposals for the SDGs were put forward for negotiations by governments in September 2014. Following this first meeting, the UN Secretary-General released a synthesis report (see UN, 2014) calling on leaders to change the trajectory of the planet's future by changing how economies are managed and the relationship between people and the planet. This is a vital point for those who have been raising the alarm about the environmental

consequences of current pathways and lobbying for sustainable development for more than 50 years. However, the proposed SDGs (and their implementation) still raise questions: Do they go the distance? Are they transformative enough to protect the Earth's ecological functions, distribute development benefits more equitably and create a more just society? Do they align with a sustainable development model, where economic growth is controlled and managed within natural limits? Will they allow a metric for ecological processes to be developed and used?

This paper analyses the overarching SDG objectives and the goals in terms of how they conform to the principles of sustainability, which stem theoretically from the basis that natural resources are finite and ecosystems have a threshold capacity to absorb waste. This concept of natural limits to growth is advocated by ecologists and some economists, who use evidence to show that the recognition of these natural limits is fundamental for a sustainable transformation of the global economy. This paper describes a conceptual framework derived from the growth within natural limits ideology. The paper concludes with a discussion about how the SDGs align with a growth within natural limits framework and recommendations for enhancing such a framework to ensure that sustainability is embedded in the SDGs.

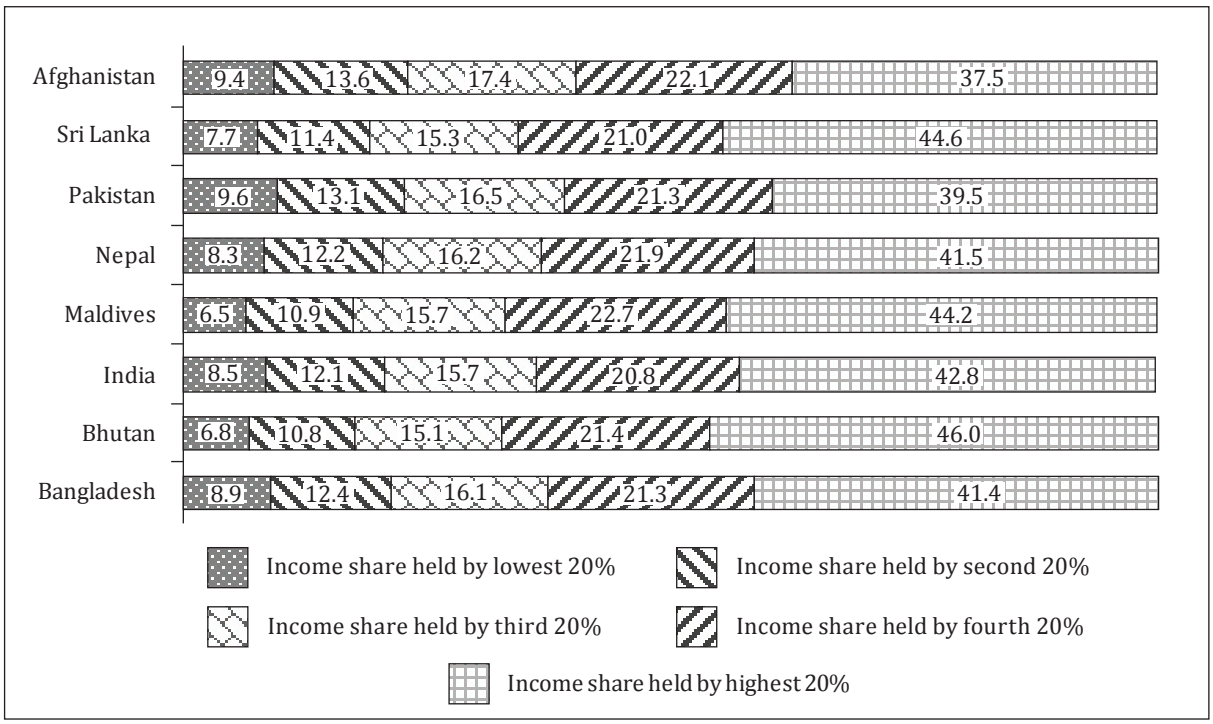
2. The Need for Transformation and a New Development Model

Recent advancements in reducing poverty are attributed to economic growth, which has generated jobs, investments and incomes and enabled fiscal space for social spending that has provided money, facilities and services for the poor. Economic growth, measured largely in terms of gross domestic product (GDP), remains the key indicator for economic development and social well-being. While economic growth has undoubtedly led to improvements in the lives of millions of people, current growth models – based on rapid, monetised, material development – have also created immense inequalities with increasing gaps between the rich and the poor – both within and among countries. Analysing data from 2001, the United Nations University's World Institute for Development Economics Research states that the richest 1 per cent of the world's adult population owned nearly 40 per cent of the world's household wealth (Davies *et al.*, 2006). A more recent study by Credit Suisse Research Institute shows that the richest 0.5 per cent hold well over one-third of the world's wealth (CSRI, 2010).

Countries in South Asia have experienced some of the fastest economic growth spurts in the new millennium but have yet to meet the needs of the poor (World Bank, 2015c). While economic growth has reduced poverty, there are still 507 million people, 33 per cent of the developing world's poor, living in harsh conditions in South Asia. From 1981 to 2010, the number of people living on less than USD 1.25 per day declined, but the number of those living on below USD 2 per day increased (ibid.). It is debatable if a meagre amount such as USD 2 per day allows people to live a decent life. When other indicators of social well-being are surveyed, South Asia continues to lag behind. The region still has 400 million illiterate adults, 300 million people facing hunger, 700 million people living without access to standard sanitation services, and some of the highest malnutrition rates in the world (SDSN, 2012). Multidimensional inequality[1] remains high within South Asia at 28 per cent, with only sub-Saharan Africa having a greater level of inequality at 35.5 per cent (UNDP, 2014). Figure 1 shows disparities in the accumulation of wealth in various South Asian countries. Current models of growth and development appear to have created a dichotomous South Asia where, on the one hand, growth and progress have led to a "Shining Asia," but deep disparities in how benefits are accrued and distributed have also created a "Suffering Asia," which is developmentally and morally unacceptable (Gunasekera, 2013).

[1]In this instance, inequality is measured by the "coefficient of human inequality," as developed in the most recent Human Development Report (see UNDP, 2014), based on an unweighted average of inequalities in health, education and income.

Figure 1: Distribution of Income or Consumption by Quintile



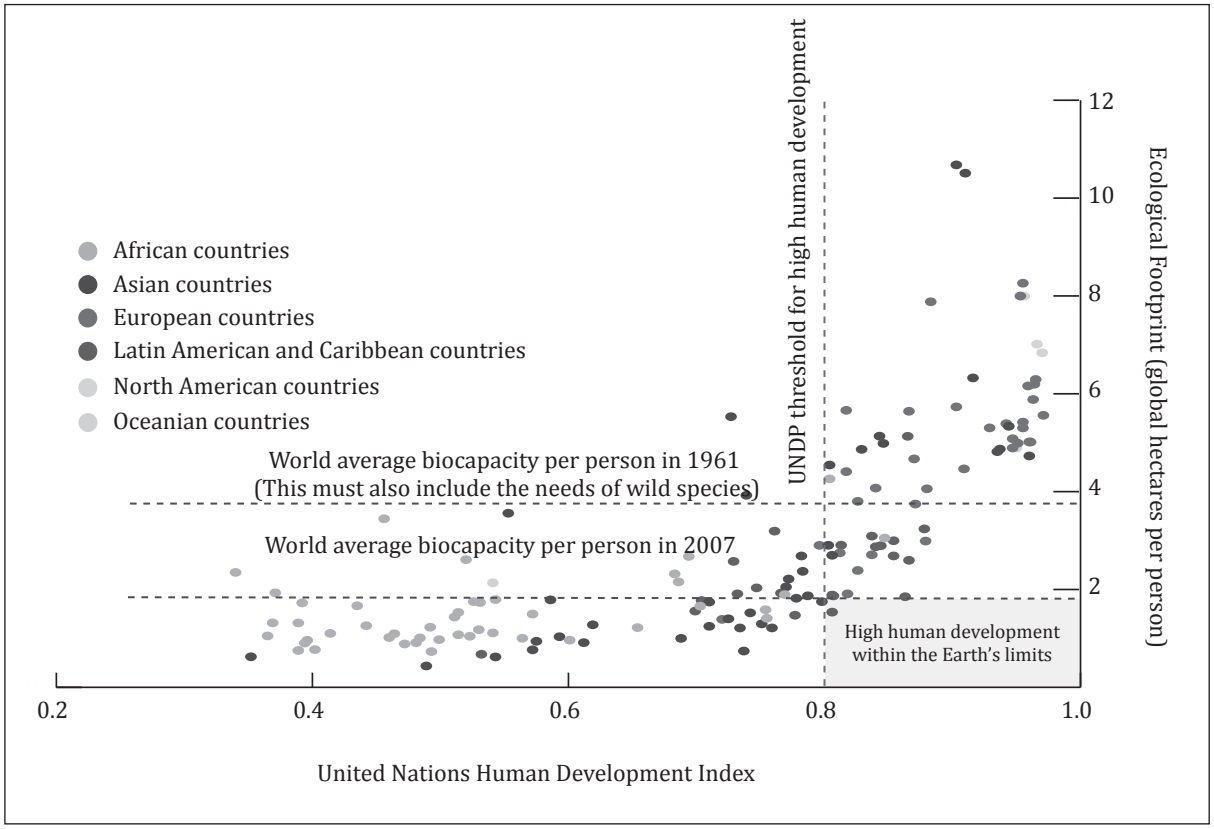
Source: World Bank (2015a, b).

Another consequence of the hegemony of current growth models is that the degradation and pollution of natural systems is seen as an unavoidable, even acceptable, part of economic growth. Ever-growing population numbers, increased life expectancy and intense consumption-based lifestyles mean that more natural resources, particularly energy resources, are needed to meet the demand.

The dangers of population growth without a concomitant increase in the means of subsistence were anticipated by Malthus in the early 1800s. More recently, the growth within limits ideology was delineated and popularised by Meadows *et al*. (1972; 2010). The growth within limits ideology is based on the overarching theoretical concept that the size of the economy, as well as the scale and growth trajectory of any economic activity, should not violate the biophysical limits of ecosystems, which refer to the abilities of ecosystems to continuously perform their regulatory functions and availability of non-renewable natural resources (Meadows *et al.*, 1972; Daly and Cobb, 1989; Daly, 2005). Some scientists argue that violating these limits leads to "uneconomic" growth, where the degraded environment and indirect social costs (for health, disaster response, etc.) outweigh economic gains (ibid).

The Ecological Footprint metric developed by the Global Footprint Network (see Ewing *et al.*, 2010) takes into account the natural resources of a geographic area, or "biocapacity," in its estimation of development. Calculations show that greater human development (as measured by the Human Development Index published by the United Nations Development Programme) has resulted in the greater extraction and use of resources (see Figure 2). A micro-level illustration using Rees's (1992) ecological footprint methodology shows that the fossil fuel and food needs of the 1.7 million inhabitants of Canada's Fraser Valley, a 400,000-hectare region, require 8.3 million hectares of land for continuous production. This means that the population is not only living well beyond its own natural resources, but also exhausting the natural capital of other people and places. This is to be expected in a globalised world, but a consequence of high levels of growth and development is the lack of consideration for the ecological implications of natural resource use. According to the Global Footprint metric, no developed country reached its "developed" status without exceeding its natural capital base.

Figure 2: Human Development and Ecological Footprint



Source: Ewing *et al.* (2010).

The dominant economic growth model is built on the assumption that there are enough natural resources to grow the economy, which is essential for human development, and if the economy stagnates or declines, like many did during the 2008-09 global financial crisis, then more people fall or sink deeper into poverty. However, scientists and economists continue to produce convincing proof that such an economy is extracting natural resources faster than they can be replenished and increasing pollution to levels that are affecting the regulatory functions of the Earth (Rockström *et al.*, 2009; Jackson, 2009; MA, 2003). The dire consequence of all this is climate change, a global phenomenon that destabilises the Earth's capacities to moderate temperature, nutrient cycles and climatic conditions.

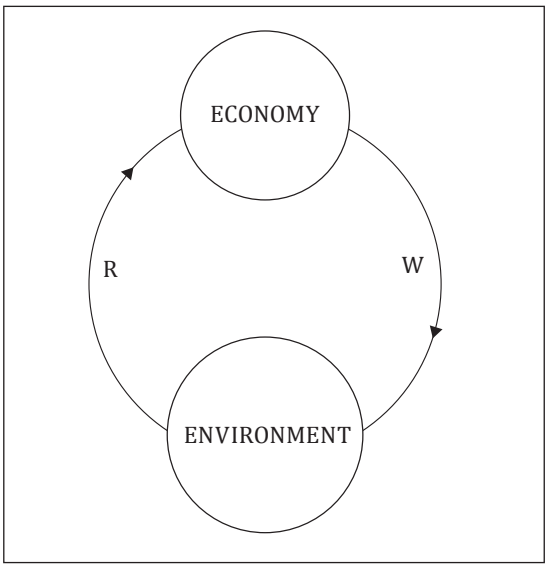
Climate change is a vicious cycle aggravated by human activity, which has and will have serious consequences on human well-being. Increased incidences of disasters, rising surface and ocean temperatures, as well as higher sea levels, melting ice caps and weather variability will affect cities, homes and businesses and reverse advancements made in human development thus far. The Intergovernmental Panel on Climate Change warns that "warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia" (IPCC, 2013). It also states that risks and vulnerabilities to sectors of the economy, human health, food security, livelihoods and poverty increase as temperatures rise (exponentially, in some places, at the level of 3^0C). The World Bank states that South Asia will be one of the most severely affected regions and the poor and vulnerable, unable to recover easily from such external shocks, will be the worst affected (World Bank, 2015c). This sums up the reality and challenge confronting governments in negotiations on the post-2015 development goals.

3. Growth Models vs. Growth within Natural Limits

The field of economics deals with the production, distribution and consumption of goods and services for the fulfillment of human needs. The foundation of these economic processes is the use of natural

resources, such as raw materials and ecosystem services, defined broadly as benefits people obtain from ecosystems, such as erosion control and pollination. The economy and the environment are entwined by two key linkages, resources and waste, denoted by 'R' and 'W' in Figure 3. Natural resources serve as a necessary input for any economic activity, which in turn produces waste to be reabsorbed by the environment. Unlimited economic growth is only a possibility under conditions of unlimited resources and waste assimilation. This latter point has fuelled debate between neoclassical and ecological economists over the role of growth and the ways in which the development of countries, communities and individuals should move ahead. At the core of this debate is the concept of sustainability (Gunawardena, 2013).

Figure 3: The Linkages between Resources and Waste



Source: Authors' illustration.

Neoclassical economics involves an abstract belief in the substitutability of natural and human-made capital. The depletion of natural capital is justified by the increasing wealth of current and future generations that is sustainable due to the assumed substitution of natural resources and their synthetic equivalents. The reliance on technology, increasing efficiency in resource use, and substitution of one scarce resource with another are prescribed as the way to keep growing and developing, tackle environmental challenges including climate change, and overcome scarcity. It can be argued that environmental economics was introduced to the neoclassical economic model to internalise environmental "externalities" and ascribe monetary values to natural resources and ecosystem services through mathematical formulations. The field fixes a market price on the environment that encourages greater efficiency and better use of natural resources. The economy then continues to function according to the neoclassical logic of consumer willingness to pay for "green" products and services. However, the field does not question the overall principle that growth can be limitless and market forces will adjust accordingly.

Conversely, ecological economics recognise the necessity of a critical minimum of natural resources to be maintained, which is linked to the non-substitutability of some resources, the uniqueness of some environmental components and the criticality of certain environmental processes essential to supporting life, such as climate control, nutrient cycling and pollution management. These considerations lead ecological economists to espouse three strong sustainability rules based on biophysical limits and Earth sciences (Farley and Daly, 2006):

1. For renewable resources, consumption (or the rate of use) should not exceed the rate at which that resource can be regenerated. Consequently, use should be determined by the quantity that can be produced using renewable resources.
2. For consumption of non-renewable resources, the rate of use should not exceed the investment into renewable resources that can be substituted for that use (e.g. an oil deposit can only be used at the rate at which some funds are set aside and invested in an equivalent renewable energy source that could replace it).
3. The rate of waste emission must remain within the assimilative capacity of the environment. Moreover, waste that cannot be assimilated by the environment should not be emitted (e.g. heavy metals, persistent organic pollutants, nuclear waste and emissions from burning fossil fuels). Above all, ecological functions that maintain life must not be compromised.

Working within biophysical limits questions consumption-based well-being that, under the dominant economic growth model's logic of "more is better," has led to exploitation and overuse of

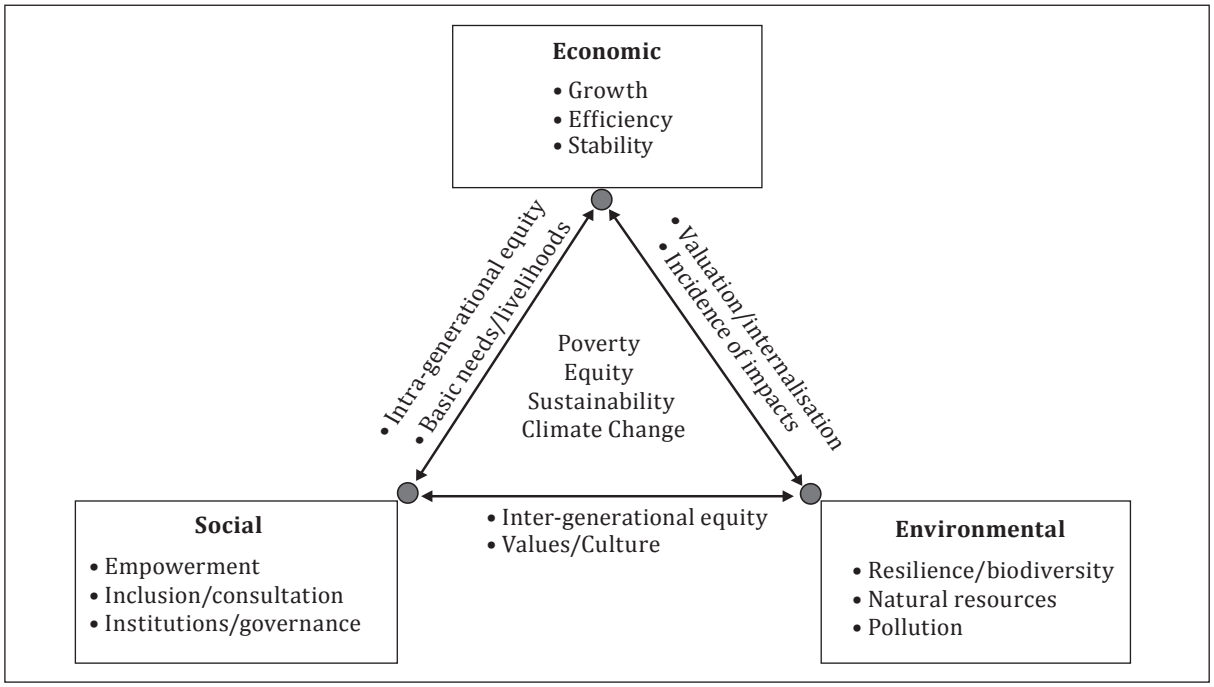
natural resources as well as skewing toward creating affluence rather than meeting basic needs. As the global population continues to grow, and indeed poorer countries quicken development, consumption rates will increase and, with them, so will ecological footprints. The Global Footprint Network estimates that if each person on the planet consumed like the average American did in 2007, the global population would need the biocapacity of 4.5 Earths, though if people lived like the average Indian, the population would use only half of the current Earth's biocapacity (Ewing *et al.*, 2010). These estimates raise questions about what type of development, what kind of lifestyles and for whose benefit governments should strive toward. Increasing sustainability is a complex exercise, which forces people to consider socio-ethical aspects with future generations in mind and their likely diminished natural capital, as well as the conditions for other living species. Dealing with consumption and consumerism requires tackling *prosperity* as well as poverty and dealing with rights, choices, ethics and aspirations, which are more subjective issues but those that can be revolutionary for the cause of saving the planet in the interest of humanity. The ecological approach evidently has a stronger sustainability base that considers the Earth sciences and a stronger orientation toward managing natural resources in the pursuit of economic growth.

4. Building a Conceptual Framework

In order to apply or assess the proposed SDGs against principles of sustainability and the growth within natural limits ideology, it is necessary to construct a conceptual framework. Existing sustainability models are visualised as a triangle, a Venn diagram or nested circles that incorporate economic, environmental and social domains. They recognise these domains as interconnected and try to give equal weight to all three. They also acknowledge that achieving sustainability is a non-linear complex system that incorporates various human and natural systems, scales, stakeholders, contexts and time.

There are several popular, though somewhat similar, sustainability models. "Sustainomics," a model developed by Munasinghe (2010), who is the former co-chair of the Intergovernmental Panel on Climate Change, is an integrated, multi-indicator-based assessment tool. In this framework, illustrated in Figure 4, the economic domain looks at improving human welfare (conceptualised as utility) and the willingness to pay for goods and services consumed. The environmental domain focuses on

Figure 4: The "Sustainomics" Triangle

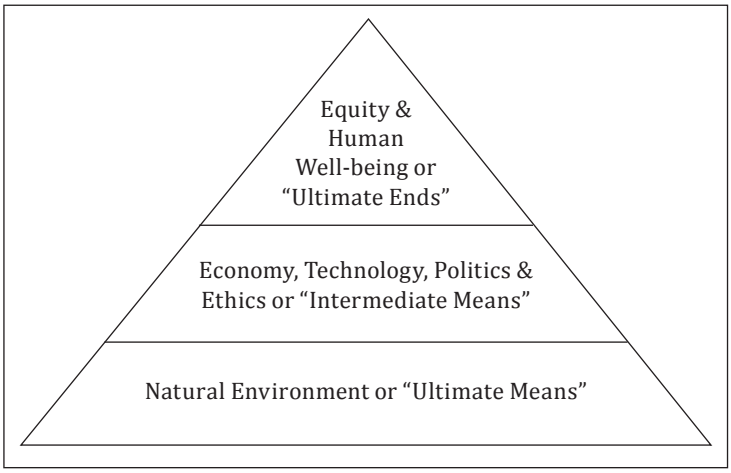


Source: Munasinghe (2010).

protection of the integrity and resilience of ecosystems, while the social domain emphasises the enrichment of human relationships and achievement of individual and group aspirations through empowerment, capacity, reducing vulnerability and conserving cultural capital. In this model, increased GDP is a necessary feature of the economic domain, but it is coupled with more efficient consumption and production, economic stability and increased employment to achieve economic sustainability (ibid.).

Daly, who was pivotal in increasing conceptual and analytical debate on ecological economics, proposed a slightly different model earlier in the 1970s. He uses a triangle, illustrated in Figure 5, to describe the relationship among the three domains and places the environment at the base, signifying that it is the foundation or the "ultimate means" – a healthy environment is a pre-condition for human life. At the apex are the social aspirations of equity and well-being for all humans that Daly describes as the "ultimate ends." The economy, politics and tools such as technology, along with appropriate ethics to guide processes, are the "intermediate means" to achieve the ultimate ends while conserving the ultimate means (Gjoksi and Sedlacko, 2010). Daly clearly distinguishes growth from development, which he sees as qualitative well-being, and insists that biophysical limits must be observed. Ethics refer to the requirement of the consideration of future generations, other species, the self-cancelling effects of aggregate growth and self-interest, and using technology beyond materialistic gains and as a way to overcome limits (Daly, 1987). He advocates a "closed system" in economic design – that is, a contained, cyclic flow of energy and matter – which is an alternative to the "open system," with a linear flow of energy and matter, in the neoclassical economic model (ibid.). While this is an ecological economics approach, the hierarchical model makes it hard to see directional changes (top-down, horizontal) between the three levels.

Figure 5: Daly's Sustainability Triangle

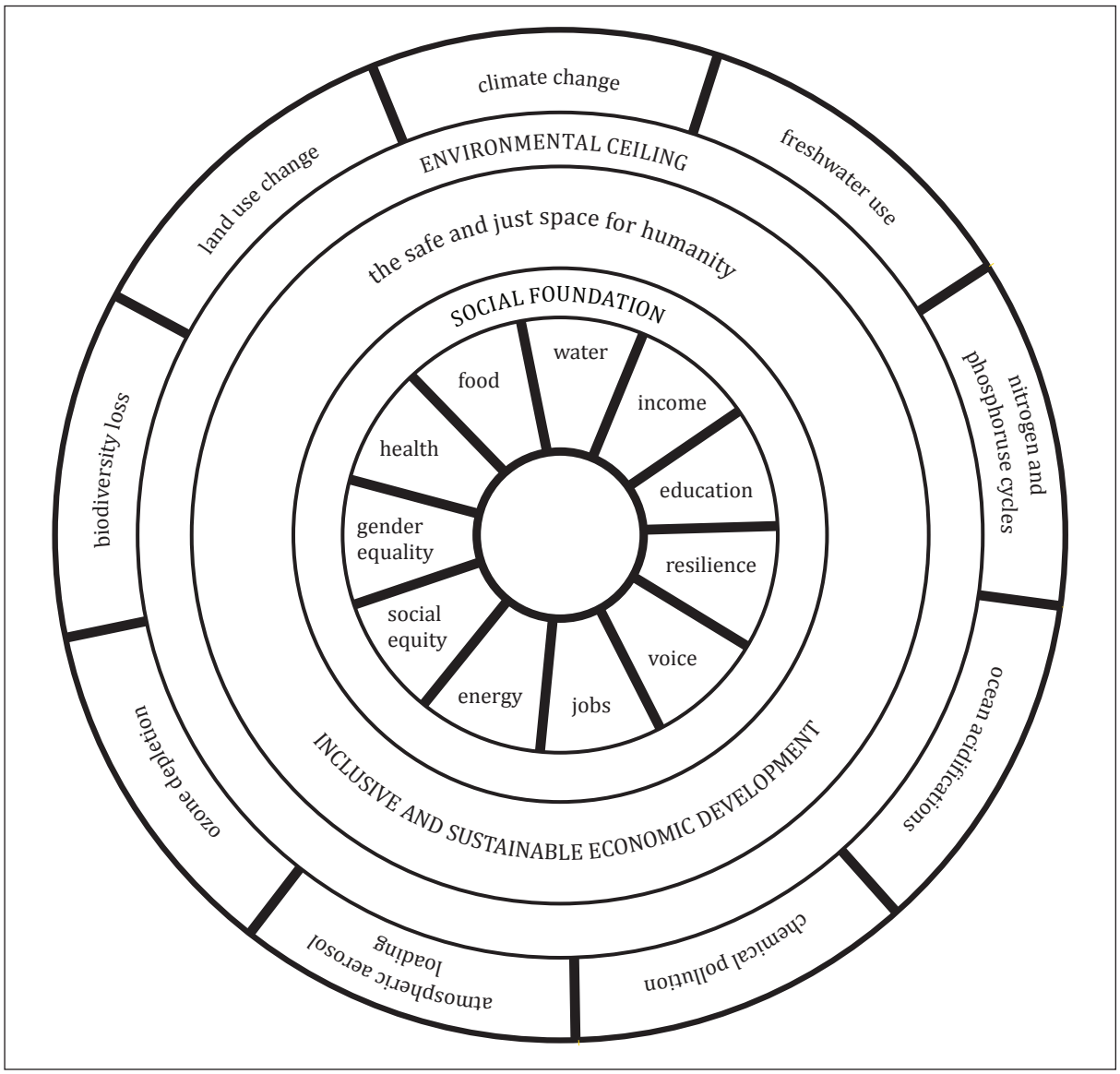


Source: Gjoksi and Sedlacko (2010).

A more recent model that looks at the relationship between human well-being and ecosystems is the Millennium Ecosystem Assessment (see MA, 2003). This model does not the split interactions into economic, environmental and social domains, but rather looks at how ecosystems' functions – provisioning, regulating, supporting and cultural services – interact and provide for the multiple dimensions of human well-being – security, basic needs, health, social relations and freedoms (ibid.). This model draws on Earth sciences and Sen's capability approach that defines human well-being as meeting capacities and opportunities. While this model is strong in terms of ecological and social considerations, as it clearly expands the social scope of well-being from income-based well-being to a multidimensional perspective, it does not look at economic processes explicitly, and therefore, critiquing the economic domain is less direct.

Going step further, there have been critiques of the SDGs based on sustainability models. One critique by Raworth (2012), an economist at Oxfam, uses what she coined the "doughnut economy," illustrated in Figure 6, which brings together social and environmental foundations. The social foundation is crowd-sourced from governments' social priorities during the run-up to Rio+20. The ecological foundation comes from the planetary boundaries, such as those related to ocean acidification and land-system change, that are deemed necessary to keep the Earth's ecosystems functioning. The space between these two foundations represents the "environmentally safe and socially just space

Figure 6: The Doughnut Economy



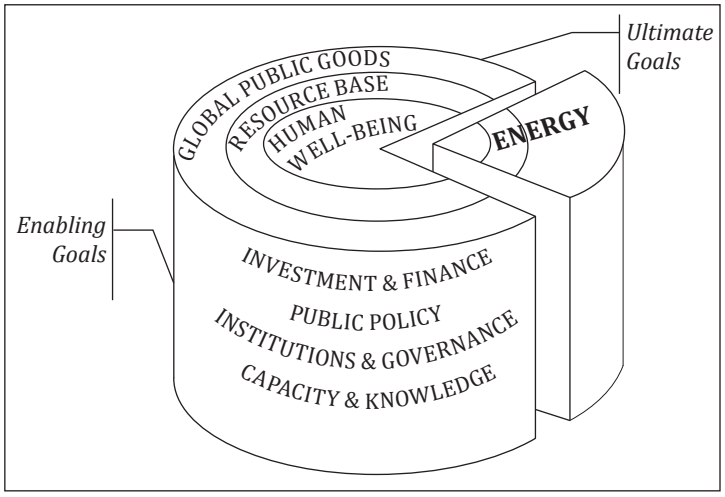
Source: Raworth (2012).

for humanity to thrive in" (Raworth, 2012). Raworth states that this model puts together a human rights perspective with ecological economics to create a closed system – the doughnut – where inclusive and sustainable economic development takes place. Raworth (2014) then compares each of the SDGs against this model based on level of priority, ambition and economic growth, assessing whether economic growth adheres to the social foundation and planetary boundaries, rather than whether growth functions as a component within a model that affects outcomes.

Nilsson *et al.* (2013) proposed another model, where a two-tiered analysis is applied to two sets of goals, as outlined in Figure 7. The first tier looks at the ultimate goals, identified as human well-being that consists of meeting basic needs, health, wealth, security, dignity and reducing inequalities. Human well-being, which is supported by a resource base comprised of net savings measured in physical and natural assets (resources are recognised to be scarce), requires collaboration to manage global public goods, such as ecosystems, markets and international security. The rationale for a people-centred model, rather than an environment-centred model, is to garner the support of policymakers. The second tier assesses the enabling goals or the means of implementation necessary to achieve the ultimate goals. Enabling goals consist of building human capacity through the development and transmission of knowledge, putting in place governance and institutional frameworks that

can empower people to achieve well-being and freedom, establishing public policies that provide sources of agency, power and legitimacy to attain the goals, and enabling investment and finance with these policies and institutions. This model also does not propose criteria to critique the economic domain directly.

Figure 7: A Two-Tiered Analysis Model

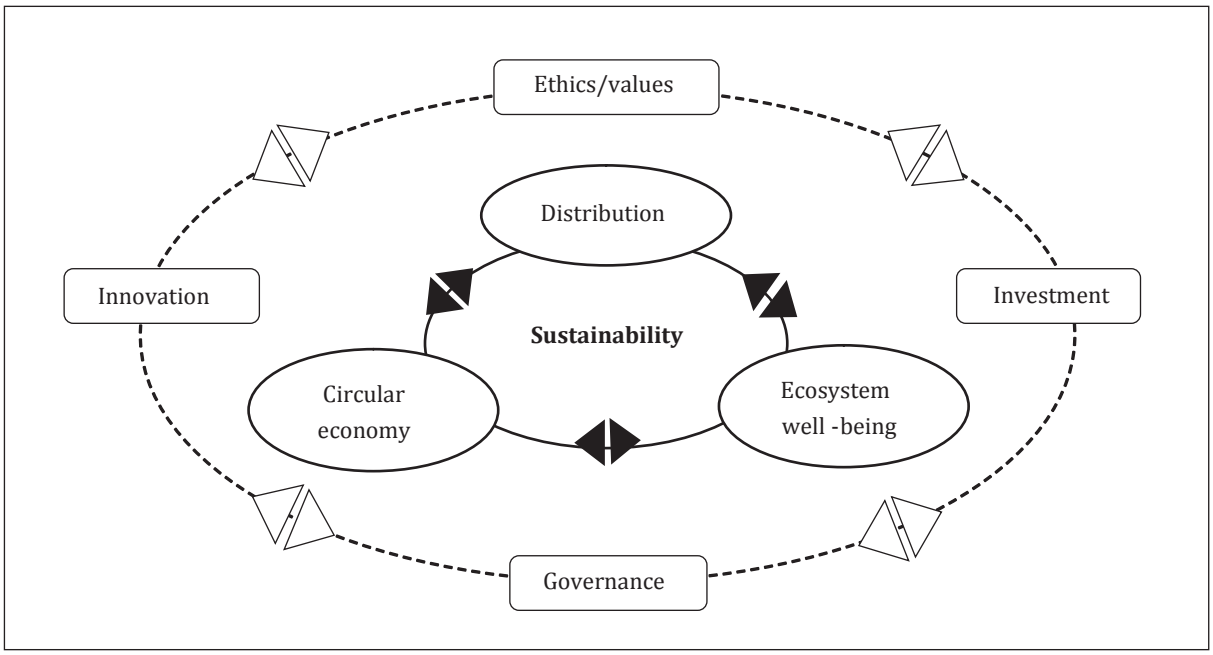


Source: Nilsson *et al*. (2013).

All these models largely agree on the ecological domain – human activities must not exceed or destroy the Earth's regulatory and assimilation capacities and development must take place within the biophysical limits of ecosystems and use non-renewable resources. However, they differ slightly on how to emphasise or address the other two domains, especially the economic domain. While the overarching objective of the social domain is equality, each model proposes slightly varying multidimensional measures of human well-being to be assessed. The economic domain is viewed from different standpoints (i.e. neoclassical, ecological economics perspectives), and not always seen as a separate domain (i.e. in some models, it is treated as a means to an end). An economic domain explicitly framed according to the principles of sustainability appears to be necessary to measure progress within the domain. Based on these existing models, the principles of sustainability and needed transformative shifts in world order that the proposed SDGs strive to catalyse, this paper proposes the following framework in Figure 8 as an integrated sustainability analysis tool.

In the visualisation of this framework, the inner circle is the core of sustainable development – the three integrated, equally important facets that have to drive development. They are part of a loop, where each facet influences the other in a non-linear dynamic system. The outer circle is the enabling environment, the means of implementation needed to support the integrity of the inner circle. Each facet and its orientation are described below.

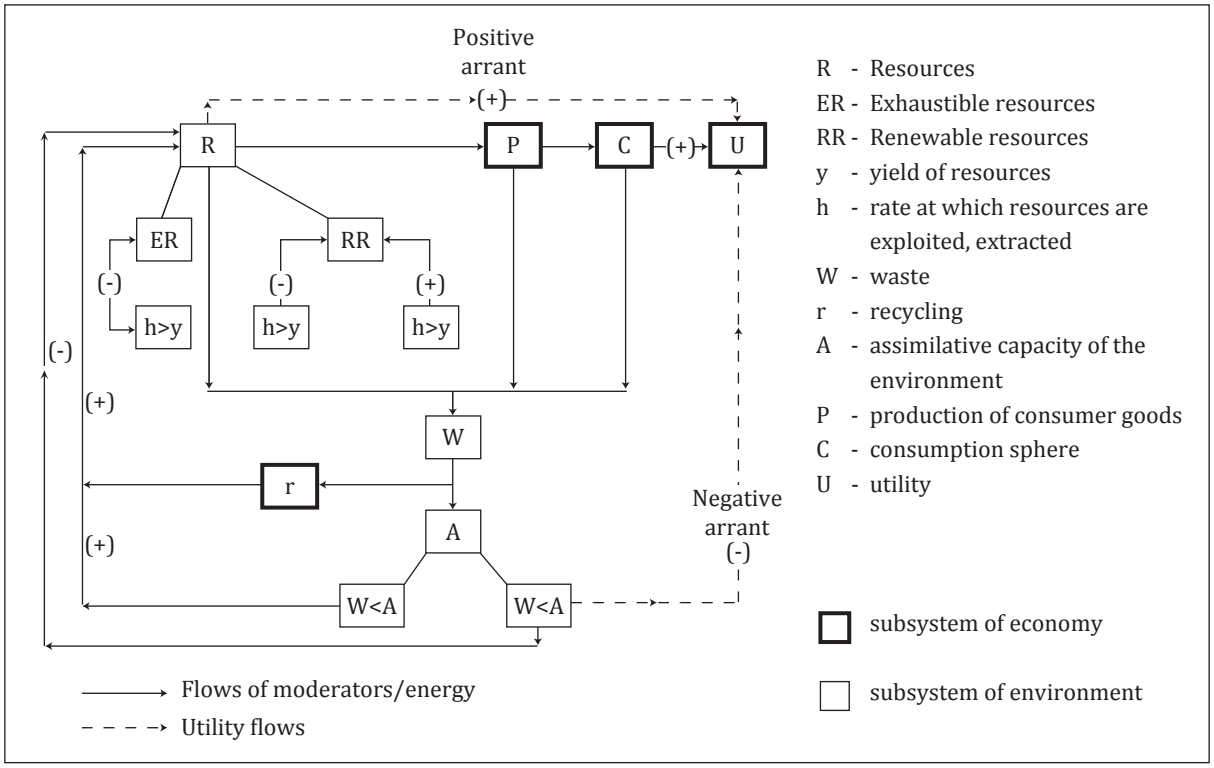
Figure 8: Conceptual Framework for Comparing SDGs



Circular Economy

The logic of a circular economy is to keep economic activities within the bounds of natural resource limits and the assimilative capacity of the environment. The circular economy can be seen as a "materials balance model," with the environment having three economic functions – resource supplier, waste assimilator and direct source of utility (e.g. aesthetic benefits). They are economic functions because they each have a positive economic value (i.e. if they were bought and sold in the marketplace, they would all have positive prices). Dangers arise from the mistreatment of the environment, stemming from the lack of recognition of the positive prices for these economic functions. The circular economy is further explained in Figure 9.

Figure 9: Model of the Circular Economy



Source: Pearce and Turner (1990).

The resources box (R) in the figure can be disaggregated into two types of natural resources. Exhaustible resources (ER) cannot renew themselves and include coal, oil, gas and minerals. Renewable resources (RR) can renew themselves. For instance, a forest produces a "sustainable yield," so that if *x* cubic metres of timber are cut in any year, the stock of trees will stay the same as long as the trees have grown by *x* cubic metres. The same is true for stocks of fish. Some resources, such as soil, are mixes of exhaustible and renewable resources. Some renewable resources renew quickly, while others take a longer time. If a renewable resource is harvested at a faster rate than it regenerates, the stock will be reduced. In this way, a renewable resource can be "mined," essentially treated like an exhaustible resource. If the choice is to sustain renewable resources, care must be taken to harvest them at a rate no greater than their natural regenerative capacity (Pearce and Turner, 1990). In terms of waste (W), the environment has the capability to absorb waste and convert it into harmless or ecologically useful products. So long as waste is disposed in quantities (and qualities) that are commensurate with the environment's assimilative capacity, the circular economic system will function just like a natural system (ibid.). What a circular economy model strives to do is extend the life and use of raw materials and reduce the amount of waste at every point, it seeks to be restorative based on material flows from design to planning to implementation (Ellen MacArthur

Foundation, 2015b).[2] The use of renewable energy, energy efficiency, 3R principles (Reduce, Reuse, Recycle) and clean technologies is embedded in the processes of the circular economy. Box 1 presents some examples of companies applying the concept.

Box 1: Companies' Experiments with the Circular Economy Model

The Ellen MacArthur Foundation and McKinsey & Company estimate that if companies shift to a circular economy model, 100,000 new jobs can be created in the next five years and over USD 1 trillion a year can be added to the global economy by 2025. Examples of companies that have adopted some aspects of the circular economy include:

- Ricoh, a Japanese multinational imaging and electronics firm, has put in place a process called "comet circle" where all product parts were designed and manufactured to be recycled or reused and also established the "GreenLine" label built on resource recirculation. The company also refurbishes and upgrades pre-owned machines.
- Mud Jeans, a Dutch jeans producer, has converted a good into a service by leasing jeans (at €5.95 a month) rather than selling them. It also will repair the jeans during the leasing period and a pair can be traded in for a new one after a year.
- Unilever, a well-known multinational consumer goods company, has introduced a "Sustainable Living Plan" that aims to source sustainably produced or harvested raw materials. Unilever's European external affairs director claims that 48 per cent of agricultural raw materials were sustainably sourced at the end of 2013, with the aim being to source 100 per cent by 2020.

Source: Ellen MacArthur Foundation (2015a).

Distribution

The neoclassical economic model perpetuates wealth based on market demand. For example, if a metal is a limited resource, using it to make luxury items leads to less availability of the metal for more necessary basic items, such as agricultural implements. Additionally, a few actors controlling the bulk of a resource marginalises others, while the poor rely on less or degraded resources or fewer value-added jobs linked to natural resources (e.g. small-scale fisheries and farming), which reduces their opportunity to move out of poverty. There are widespread asymmetries in incomes and access to services, decent jobs, healthcare, education and mediums of expression that need to be addressed. If poverty and inequality are to be addressed, given the realities of finite resources and widespread environmental degradation, it is necessary to prioritise the basic needs of all in society over wealth accumulation and more equitable distribution of economic benefits. It also requires addressing gross inequalities both within and among countries, inequalities among individuals and groups (i.e. minorities, women and groups based on caste, ethnicity, disability and sexual orientation), and the privileging of certain actors (e.g. companies) over others (e.g. citizens) as direct or targeted beneficiaries of development benefits (CEPA, 2013). Better distribution can be achieved through a combination of progressive taxes (that should not undermine safety nets and services for the poor), affirmative action, better governance, improvements in service quality and quantity for poor people, regulation and non-discrimination in enacting laws and regulations.

One way of measuring asymmetries in social distribution is a cost-benefit analysis. The problem with mainstream cost-benefit analyses is that justifying allocations for wealthy, living humans is much easier than acknowledging the entitlements of poor or unborn humans and other species (Gunawardena, 2012). Specific attention may have to be paid to environmental justice aspects related to the sharing of damage costs, which can arise as a result of not observing biophysical

[2]The circular economy model promoted by the Ellen MacArthur Foundation treats resources (R) in two ways: as biological resources (resources that can be returned to the biosphere safely) and as technical resources (resources that cannot be safely processed by the biosphere and the energy it holds is retained for as long as possible within the system).

Box 2: Cost-Benefit Analysis Applied to a Hydro Power Project in Sri Lanka

Table 1 shows the percentages of costs and benefits before and after applying distributional weights.

Table 1: Distribution of Costs and Benefits with/without Distributional Weights

Income group	Percentage of Costs/ Benefits without Distributional Weights (when η = 0)	Percentage of Costs/ Benefits with Distributional Weights (1< η > 0)	Percentage of Costs/Benefits when η = 1
Cost bearers			
Remote high income (visitors)	30.90	1.40	0.00
Remote high income (non-visitors)	10.90	0.97	0.00
Local high income (visitors)	3.20	0.66	0.00
Local low income (close to site)	55.80	96.96	100.00
Total	100.00	100.00	100.00
Beneficiaries			
Remote high income (non-visitors)	13.20	2.20	0.00
Local average income	86.80	97.80	100.00

Source: Gunawardena (2010).

A cost-benefit analysis of the project suggests that the project is a worthwhile undertaking. However, if local poor groups are the main cost bearers, while local and remote affluent groups are the main beneficiaries, the approach without distribution weights seems to be unfair (see column 2). When distribution weights are applied, the percentages of costs incurred by different groups differ significantly (see column 3). Costs for local low-income people are approximately 97 per cent of the total, while those for remote high-income groups become insignificant. With the distribution weights, at least 9 per cent of the project's generated electricity needs to be provided to the poorer groups for the project to pass the efficiency test.

The main implication for the government is that while implementing redistributive programmes in general, it is essential to adjust individual programmes to better reflect the concerns of the poor. If the incomes of very poor households without electricity are considered, the analysis may recommend even higher percentages of electricity benefits to be allocated for such groups.

Table 2: Distributional Weights of Different Income Groups

Income group	Mean Monthly Income (USD)	Distributional Weight
Remote high income	2,444.00	0.07
Remote low income	75.40	2.27
Local high income	533.00	0.32
Local middle income	136.00	1.26
Local low income	60.00	2.85
Local average income	171.00	1.00
Local people of the lowest income quintile	22.00	7.96

Source: Gunawardena (2010).

limits. Unequal sharing often occurs with costs and benefits related to actions taken to mitigate or adapt to environmental damages. Since a policy or project could affect the distribution of costs and benefits, it is important to distinguish the parties who lose and win. It is possible that the major beneficiaries are at the global level, whereas the costs are borne by the local population or vice versa. Such distributional differences in costs and benefits within a generation can be corrected through the application of distributional weights. The use of distributional weights is one of the most controversial aspects of cost-benefit analyses. The common argument for not using distributional weights is that the tax transfer system has the ability to bring about the necessary changes. However, the existence of a tax transfer system is not a guarantee that resources will be set aside to address the needs of the poor.

Ecological Well-Being

The Earth provides a series of ecosystem services – water and air purification, flood control, erosion control, generation of fertile soils, detoxification of waste, resistance to climate change and other environmental changes, pollination, and aesthetic and cultural benefits that derive from nature – without which life cannot exist (MA, 2003). Human well-being evidently depends on ecological well-being. The Earth also has the capacity to tolerate changes and absorb shocks within a certain threshold without collapsing or transforming its state (ibid.). However, failures in current economic growth models and consumer lifestyles to take into account ecosystems' functions are causing these functions to collapse rapidly. Some of the "planetary boundaries," or the levels of change that the Earth can withstand before implications become problematic, are being violated (Rockström *et al.*, 2009). Table 3 shows the planetary boundaries and the thresholds set below which is considered a "safe operating space." Three such boundaries already appear to have been crossed in the pursuit of economic growth – climate change, rate of biodiversity loss and biogeochemical flows – but the world's growth trajectory can still be adjusted to avoid catastrophic collapses.

A considerable part of the problem is that in current economic growth models, many environmental and well-being deficits are considered to be market externalities. Essential ecosystem services, such as climate stabilisation, water regulation and waste absorption, have no direct market value and, thus, no price signals through which to channel the so-called supply and demand feedback that communicates the need to maintain them. In fact, markets cannot produce such services, but some valuation methods that can assign values to them can be used. Meanwhile, environmental costs are often shown in national accounts (e.g. health expenditure due to pollution), highlighting realities and the state of the environment. Notably, economic growth clearly benefits the exploiters and

Table 3: Planetary Boundaries, Proposed Safe Limits and Current Measurements

Earth System Process	Control Variables	Proposed Boundary	Most Recent Measurement
Climate change	- Atmospheric carbon dioxide concentration (parts per million by volume) - Change in radiative forcing (watts per metre squared)	350 ppm +1 W/m^2	393.81 ppm +1.87 W/m^2
Ocean acidification	Global mean saturation state of aragonite in surface sea water	2.75	2.90
Stratospheric ozone depletion	Concentration of ozone (Dobson units)	276 DU	283 DU
Biogeochemical flows: nitrogen cycle and phosphorus cycle	- Amount of N_2 Removed from the atmosphere for human use (millions of tonnes per year) - Quantity of P flowing into the oceans (millions of tonnes per year)	35 Mt 11 Mt	121 Mt 8.5-9.5 Mt
Atmospheric aerosol loading	Overall particulate concentration in the atmosphere, on a regional basis	To be determined	To be determined
Freshwater use	Consumption of freshwater by humans (km^3 per year)	4,000 km^3	2,600 km^3
Land use change	Percentage of global land cover converted to cropland	15%	11.7%
Rate of biodiversity loss	Extinction rate (number of species per million species per year)	10 E/MSY	>100 E/MSY
Chemical pollution	For example, amount emitted to, or concentration of persistent organic pollutants, plastics, endocrine disrupters, heavy metals and nuclear waste in the global environment, or the effect on ecosystem and functioning thereof	To be determined	To be determined

Source: Nykvist *et al.* (2013).

polluters, at the expense of the poorest strata of the current generation, future generations and other species, whose well-being is disproportionately affected by the costs of environmental degradation (Gunawardena, 2010).

The global commons and the trans-boundary nature of ecological well-being also pose challenges for individual countries. Many of the aforementioned planetary boundaries and the protection of Earth's ecological functions are covered by multilateral environmental treaties, though such agreements suffer from lack of implementation and buy-in from world leaders. Global commitment embedded in the post-2015 goals is a must, with the use of Earth sciences to make decisions regarding economic and social activities being vital. Nykvist *et al.*, (2013) indicate that the onus to address over-use of the world's biocapacity has to be on developed countries. Developing countries must be supported to build in the planetary boundaries as a part of national development frameworks, so that the past development mistakes of developed countries related to resource use are not repeated. An example of how to apply the planetary boundaries framework is given in Box 3.

Box 3: The Planetary Boundaries Framework Applied in Sweden

Nykvist *et al.*, (2013) examine how the planetary boundaries framework can be downscaled and applied at a country level by examining the two-way interaction between global environmental pressures and Sweden's performance against its national environmental objectives and environmental policy. The study also looked to compare performance across countries. Data were used to respond to four policy questions.

The first policy question explored if the planetary boundaries framework can be used to identify and measure whether efforts to achieve domestic environmental objectives increased environmental and health problems beyond Sweden. The conclusion was that the planetary boundaries framework can capture many major global environmental challenges better than single-issue approaches (that also require a lot of data) and can establish absolute per capita boundaries and measure absolute performance of countries, rather than just relative performance.

The second involved whether the framework and indicators can help to characterise and quantify Sweden's legal competence deficit in relation to some of its national environmental objectives. The conclusion was that Sweden's contributions to approaching the planetary boundaries are in most cases minor in absolute terms. The framework was deemed suitable to visualise and quantify environmental challenges, but not suited to explore regional challenges, such as eutrophication of a regional sea.

The third examined data of 61 countries with similar challenges and concluded that, although interpretations should be made with care, the framework was more robust when comparing performance across several boundaries/countries. Some general performance patterns indicate that richer countries generally perform worse against the boundaries.

The fourth matched the planetary boundaries with international environmental agreements. The agreements covered all but one boundary (ocean acidification), but with limited progress on existing goals. Greater assertive action is needed to improve performance and cooperation and also go beyond these agreements to realise better bilateral cooperation that improves domestic performance as well as initiatives with non-state actors.

The overarching conclusions state that when using this framework to compare performances of countries, it is vital to work with developed countries and countries with rapidly growing economies, since they have higher absolute and per capita impacts on the environment globally, and therefore bigger responsibilities for progressive action.

For future work, tracking performance over time and more in-depth exploration of equity issues are suggested, while creating complementary consumption-based indicators for each planetary boundary to assess performance on meeting generational goals is recommended.

Enabling Factors

As visualised in the conceptual framework (Figure 8), it is not just the inner circle of facets of sustainability that has to be adhered to – these facets are very much influenced by the enabling factors that surround the core. If they are not aligned, sustainable development does not occur. A short description of each enabling factor is given below.

- **Innovation:** Human ingenuity and ambition coupled with technology and innovation have propelled the production of goods and services to new heights. It has propelled economic growth forward while pushing natural limits back by the substitution of one raw material or resource or process for another or by increasing efficiency. The dominant rationale is that technology or innovation will overcome biophysical limits and can perpetuate current economic growth models. However, this approach would most likely only extend the timeframe for reaching limits, rather than overcome the limits. Using Erhlich's equation, Jackson (2009) shows how the pace of technological advancement cannot keep up with carbon dioxide emissions that are influenced by affluence and population growth. Given these conditions, economic growth will inevitably lead to a slowdown of production with consequences for some people and technology will not be enough to avoid it. A major consequence of technological advancement is that it has fostered a culture of well-being that is dependent on material wealth and physical assets. For a real transformation, it is necessary to recognise and prioritise innovation that supports the ideals of strong sustainability. Such innovation is not merely a technological fix for the status quo, but a behavioural and conceptual shift to gear technology and creativity to build systems and products that maintain the well-being of all on a planet with finite resources.
- **Governance:** Natural resources and ecosystems' functions are global public goods. For instance, a breathable atmosphere, clean water, a stable climate and vibrant biodiversity belong to no one person and benefit us all. However, some resources can be diminished or controlled by some at a cost to others at many scales in society, which violates the concept of the global commons and leads to discrimination and suppression of the well-being of some people. Given this predicament, good governance and strong institutions must be responsive to people's needs. There must be accountable political institutions that allow public participation in decision making and oversight. They must promote non-violent modes of conflict resolution that lead to safety, security and respect of separate identities. They need to ensure transparency, accountability and access to information. They should also respect the interdependence of the individual and collective dimensions of social existence. These principles also need to apply to the private sector and civil society in both developed and developing countries as well as global governance institutions (i.e. multilateral organisations that are responsible for trade, investment, technology, etc.). Sustainable development requires trans-boundary cooperation and collaboration to build a single shared society.
- **Investment:** This enabling factor encompasses monetary and fiscal support and investments in knowledge and capacity to orchestrate a true shift toward sustainable development for people and the planet. Investments must be made in an integrated manner with the intention to achieve all facets of sustainable development. They must be targeted and earmarked to develop specific processes, such as clean energy and low-carbon development processes, sustainable technology and infrastructure, ecological protection, and the achievement of rights, equality and well-being for all. Investments must also spur the ideological momentum and capacity increases for change. This enabling factor is crucial since most attempts to catalyse sustainable development have been faced with limited buy-in along with a lack of finance, capacity and knowledge.
- **Ethics and values:** Sustainability ideology dictates that the current generation has an obligation to conserve natural resources for future generations and ensure them a planet on which to live that does not diminish their rights and opportunities. This ideology also states that people have an obligation to meet the needs of the poorest and protect the integrity of Earth's ecosystems. To achieve these objectives, the current generation needs to increase the prominence of inter-generational rights, value nature beyond its utilitarian uses and not exploit natural resources

with the understanding that they are shared, limited and interconnected resources that must meet the needs of all, even the unborn. Consumerism and materialistic well-being, along with the waste they generate, and the growing human population, whose needs have to be met, are at the core of the environmental and social debacle. Shifting from consumerist lifestyles and living within the means of this planet are humanity's greatest challenges we must challenge our ethics, values and ambitions.

5. The SDGs against the Growth within Natural Limits Framework

The conceptual framework for comparing SDGs outlined above discusses each of the facets that are seen as essential for sustainable development to take root. It has been specifically designed to assess the sustainability of the proposed SDGs, its sub-components, targets and indicators. The logic is that if each facet is covered adequately, the SDG upholds the criteria of sustainability. In this section, the conceptual framework will be used to answer the questions raised in the introduction: Do the SDGs go the distance? Are they transformative enough to protect the Earth's ecological functions, distribute development benefits more equitably and create a more just society? Do they align with a sustainable development model, where economic growth is controlled and managed within natural limits? Will they allow a metric that considers ecological processes to be developed and used?

The analysis is first done against the chapeau of the proposal for SDGs (the introduction of OWG [2014]) for overall orientation of the framework and then against the targets for each goal. Then it presents analysis drawn from assessing all the goals and targets against the three facets of sustainable development.

Overall, the language in the proposed SDGs is supportive of "sustainable development." The chapeau of the proposed SDGs acknowledges that an alternative model is needed and that it should integrate all three facets of sustainable development. It makes an attempt to push for the stabilisation of ecosystem services, calls for action against "dangerous anthropogenic interference with the climate system" and recognises the rights of nature that imply recognition of ecological functions beyond that of serving humanity. It clearly advocates a shift from unsustainable economic processes to a model that is in line with the concept of sustainable consumption and production (SCP), which is a critique of current economic growth models. However, the chapeau prioritises poverty eradication as the main objective and considers other elements (cooperation, technology, good governance, etc.) as the means to this end.

The social domain, particularly the addressing of the distribution facet, prevails in all of the proposed goals. There is a concerted effort across the SDGs to achieve equity through the tenets of better distribution and better sharing of benefits. Table 4 below provides a summary of each goal and some salient points that relate to the distribution facet. There are several explicit goals that address the social domain, specifically multidimensional basic needs (Goals 1 to 7), better access to resources and opportunities (Goals 8 and 9), as well as rights, non-discrimination, and rule of law (Goals 10 and 16). Goals more geared toward the economic and ecological domains also address the needs of poor people (i.e. decent jobs for the poor in Goal 8 on economic growth and small-scale fishers in Goal 14 on marine resources). Evidently, there is much elaboration on the distribution facet. Some targets are specific, such as bringing the number of people living in extreme poverty down to zero, ending all forms of hunger and malnutrition, providing modern energy services for all, sustaining income growth of the bottom 40 per cent at a rate that is higher than the national average, and addressing inequality both within and among countries. Nevertheless, critiques continue to be made that some bars are too low (e.g. the USD 1.25 per day as an extreme poverty threshold) and stronger language is needed (e.g. such as that on reproductive rights, gender-based violence), while some groups have pushed for the explicit inclusion of rights for marginalised groups, such as migrants, youth and the lesbian, gay, bisexual and transgender community.

Table 4: The SDGs' Alignment with the Distribution Facet

Goal 1: End poverty in all its forms everywhere
– Aims to increase coverage of all types of poor people – Aims to end extreme income poverty (USD 1.25 per day) – Provides safety nets, floors and addresses vulnerable people – Addresses rights to economic resources and basic needs, ownership, control and use of natural resources, technology, financial services and supportive policies – Addresses vulnerability to climate change, disasters and economic shocks and increases resilience of poor people
Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture
– Better access for all, especially the poor/children, to safe, nutritious, sufficient food – Double agriculture productivity of small-scale farmers, better access to productive resources and non-farm employment, better investment/cooperation in agricultural research and development, rural infrastructure, capacity development – Better access to and fair and equitable sharing of genetic resources and traditional knowledge – Prevent trade restrictions and distortions, eliminate agriculture subsidies, better commodity markets, reduce food price volatility
Goal 3: Ensure healthy lives and promote well-being for all/ **Goal 4: Ensure inclusive and equitable quality education and promote life-long learning opportunities for all**
– In both areas largely address improved access, wider reach and quality of services for all It aligned to improving learning outcomes for employment to achieve well-being/better quality of life and better health for quality of life
Goal 5: Achieve gender equality and empower all women and girls everywhere
– Addresses ending all forms of discrimination, violence (in public spaces), trafficking, sexual exploitation of all women/girls, as well as addressing child, early and forced marriage and female genital mutilation – Recognises the redistribution of unpaid care/domestic work – Full and effective participation/leadership of women at all levels of decision making – Addresses access to sexual and reproductive health and reproductive rights, women's equal right to own and control assets and productive resources, and access to information and communications technologies – Enforcing and monitoring legislation and policies for the promotion of gender equality at all levels
Goal 6: Ensure availability and sustainable management of water and sanitation for all
– Equitable access to safe, affordable drinking water and sanitation – Addresses water scarcity
Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all
– Access to affordable energy for all
Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
– Advocates decent jobs, reducing youth employment, non-discrimination, eliminating child labour, better working conditions and rights and structural changes to make trade and finance more suited to people at the bottom
Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation
– Infrastructure for human well-being, equity and affordability, employment and GDP spread, more inclusive, small and medium-sized enterprise development, access to services – Access to technology, research and development spending and jobs, and improved access to information and communications technologies for all
Goal 10: Reduce inequality within and among countries
– Sustain income growth of bottom 40 per cent at higher than national average – Reduce discrimination in all spheres (economic, social, political, environmental) for marginalised groups (women, children, etc.) and irrespective of age, ethnicity, disability etc. – Greater "voice" in decision making – Policy, financial and trade management for equality
Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable
– Access to better housing, basic services, public transport for urban poor/women, children, elderly, disabled – Protection from disasters and reduction of economic losses due to disasters

(Table 4 contd.)

(Table 4 contd.)

Goal 12: Ensure sustainable consumption and production patterns
– Increase science and technology capacity to undertake SCP – Also directed at reducing impact/burden on poor people/developing countries
Goal 13: Take urgent action to combat climate change and its impacts
– Has an overall impact on people but not specified – Policies and planning to integrate climate change adaptation
Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development
– Greater share or benefits to small island developing states (SIDS) and least developed countries (LDCs) through better trade negotiations (in terms of subsidies) – Access to small-scale fishers of marine resources
Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
– Equitable sharing of benefits from genetic resources
Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
– Address issues of violence and abuse that marginalise people – especially women and children – including through international cooperation – Equal access to justice, enforcement of non-discriminatory laws and protection of freedoms – Participatory decision making – locally as well as developing country participation in global governance – Reduce bribery and corruption and stop illicit flows, recovery of stolen assets and organised crime – Public access to information

In contrast, the proposed SDGs align far less with the circular economy and ecological well-being facets. As evident in Table 4, in the goals directly related economic development there is no reference to or acknowledgment of managing scarce/non-renewable resources within biophysical limits or changing the limitless growth mindset. Tweaking the existing system to improve its efficiency and manage both resources and waste is the general orientation (with the exception of Goal 12 on SCP). In terms of ecological well-being, there are two specific goals for marine and terrestrial systems (Goals 14 and 15), which means that a huge range of biodiversity issues are generalised. The tone also indicates alignment with sustainable use (e.g. by setting biological limits on marine fisheries, controlling illegal/unreported/unregulated fishing) rather than ecological balance (see Table 5). While some targets such as Goal 7 on energy and Goal 13 on climate change that clearly link to one of the main objectives of the SDGs (to combat climate change) do not set strong quantitative

Table 5: The SDGs' Alignment with the Ecological Well-being Facet

Ecological Well-being	Distribution	Circular Economy
Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all		
– Encourages use of clean energy, renewable energy, efficiency improvements – Phasing out fossil fuels	– Access to secure, affordable energy – Technology geared to produce energy for the poor	– Promotion (technology, cooperation, research and development, use, infrastructure, etc.) for clean energy and cleaner fossil fuel technology – Doubling rate of improvement in energy efficiency – Substantial increase in share of renewable energy
Goal 13: Take urgent action to combat climate change and its impacts		
– Climate change adaptation and mitigating of emissions to control the rise of global temperatures (depend on the UNFCCC outcomes – no specific targets) – Awareness and capacity and finances to deal with climate change and reduce impacts	– Has an overall impact on people but not specified – Policies and planning to integrate climate change adaptation	– Policies and planning to integrate climate change mitigation

(Table 5 contd.)

(Table 5 contd.)

Ecological Well-being	Distribution	Circular Economy
Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development		
– Protect ecosystems (at least 10% of marine and coastal areas) and resources – Deal with acidification – Use scientific data – Increase capacity, science, technology and innovation to protect marine health	– Greater share or benefits to SIDS and LDCs through better trade negotiations (in terms of subsidies) – Access to small-scale fishers of marine resources	– Linked to increasing production – Better control over illegal/ unreported/ unregulated (IUU) fishing, exploitation of resources, – Set sustainable yields based on biological features, science-based planning – Prohibit subsidies that lead to IUU fishing – Manage marine and land-based pollution in development processes – Implementation of international treaties/regional cooperation for mechanisms for sustainable use
Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss		
– Conservation restoration and sustainable use of terrestrial and freshwater ecosystems – according to conventions – Address deforestation, desertification, land degradation, biodiversity loss/extinction, illegal trade – Special reference to mountain ecosystems – to benefit sustainable development	– Equitable sharing of benefits from genetic resources	– Integrate ecosystems and biodiversity values into national and local planning, development processes and poverty reduction strategies, and accounts – Mobilising resource, capacity, finances – Collaboration for sustainable use

targets for managing human impacts. For instance, the renewable energy target is ambiguous, and the temperature targets to manage climate change have been removed completely. This then undermines the emphasis on maintaining ecological balance.

The economic domain is directly represented by three goals that seem similar and do not show a clear path toward a circular economy. These goals promote two concepts: SCP and decoupling (see Box 4)**.**

Box 4: Definitions of Sustainable Consumption and Production and Decoupling

The United Nations Environment Programme defines sustainable consumption and production as "the use of services and related products, which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardize the needs of further generations." Inherent in this definition is how we produce and consumer goods and services.
Source: UNDESA (2015).

Decoupling is defined based on what is being referenced. The United Nations Environment Programme outlines various definitions: "**Resource decoupling** means reducing the rate of use of resources per unit of economic activity. **Impact decoupling** means maintaining economic output while reducing the negative environmental impact of any economic activities that are undertaken. **Relative decoupling** of resources or impacts means that the growth rate of the resources used or environmental impacts is lower than the economic growth rate, so that resource productivity is rising. **Absolute reductions** of resource use are a consequence of decoupling when the growth rate of resource productivity exceeds the growth rate of the economy."
Source: UNEP (2011).

Table 6: Alignment of SDGs and Circular Economy

Goal 12: Ensure sustainable consumption and production (SCP) patterns	Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	Goal 8: Inclusive and sustainable economic growth, full employment and decent work for all
– 10 year framework for SCP – Efficient natural resource use – Halve food wastes at all stages from production to consumption – Manage hazardous waste, chemicals and reduce all waste generation – throughout life cycle and through reuse, prevention, reduction, recycling – Encourage companies, especially multinational corporations (MNCs) to adopt sustainable practices and report against it – Promote public procurement practices – Support to developing countries to move towards SCP – Rationalise inefficient fossil fuel subsidies that encourage wasteful consumption	–Quality, sustainable, reliant – resilient infrastructure for economic growth –Inclusive and sustainable industrialisation – Increase GDP in line with national circumstances, and double its share in LDCs – Retrofit industries to increase resource use efficiency and use of clean/environmentally sound technologies and processes in line with respective capabilities – Scientific research, innovation, upgrade technological capabilities esp. in developing countries – facilitate access, investment and domestic Science Technology and Innovation	–Increases growth targets – in all countries with a 7 per cent GDP increase in LDCs –Supports higher levels of productivity, high value added and labour-intensive sectors, diversification through technology and innovation –Encourages resource efficiency – Supports SCP – 10 year framework calls for decoupling economic growth from environmental degradation and developed countries to lead –Links strongly to social domain with many points supporting decent work, full employment, rights

As demonstrated in Table 6, there are a few goals that are more geared towards the economic domain. Goal 12 on SCP, by definition shares an orientation towards a Circular Economy facet. Goal 12 is mindful of efficient use of resources and managing waste, but while one reference is made in Goal 12, none of these goals emphasise the consumption angle, and none bring in the issue of producing basic needs into these goals. In Goal 8, the specific GDP target then seems to be at odds with a system that is supposed to consider ecological science and social needs before plotting a growth trajectory. This is further confused, as Goal 8 also touches on decoupling and then again not with enough substance or ambition to make it more meaningful. The same can be said of the watering down of the energy targets in Goal 7, where energy is a vital component in any economic and social process.

Compared against the enabling factors, the proposed SDGs have some positives but also notable gaps. Science, technology and innovation are mentioned in some goals and specifically discussed in Goal 17. Targets encourage more research and development, capacity building and financing for the development of clean technologies and industrial processes. However, the emphasis on technology as a means to transform current economic growth models based on consumerism into a sustainability model is not clearly emphasised. The shift to a sustainable development orientation has come from a moral obligation to alleviate poverty and suffering. This point is acknowledged in the chapeau and appears across the goals. However, there is a distinct lack of focus on consumerism and inter-generational responsibility in all the targets. In addition, the goals, targets and indicators concentrate more on raising the bottom, in terms of income levels, rather than managing the top, where the problems of high consumption at the cost to biocapacity are rife. Given that the proposed SDGs are envisioned as a universal set of goals and targets, all types of countries must assume certain roles. Better cooperation, moving beyond country ambitions/boundaries, sourcing financing, and reforming trade and tax regimes are prescribed in some goals, while Goal 17 concentrates solely on these means of implementation. Yet, here too is some disjuncture in conceptualising these roles in consideration of all three facets of sustainability, especially those of the circular economy and ecological well-being.

The compartmentalisation of the proposed goals, alongside each goal being insufficiently explicit in its integration of all three facets, can lead to the sub-optimal performance of

sustainability. It has been agreed that the goals will not be mutually exclusive. Some reinforce each other (poverty, hunger and inequality goals), others are dependent (the energy goal with most other goals along with the goal on peaceful societies) and some can be constraints on other goals (ending hunger and sustaining economic growth may come at a cost to protecting terrestrial and marine ecosystems). However, if the facets of sustainability prevail and an integrated framework is adopted, sustainable food systems can also lead to the protection of terrestrial and marine ecosystems. Such inter-linkages are less obvious when the goals, targets and indicators are compartmentalised, meaning that there is no elaboration on each of the facets. At this stage, it is unclear if the relationships among the three facets of sustainability are comprehensively addressed. Elaboration on the complexity of these relationships is important to increase the robustness of the post-2015 framework and deal with any contradictions in the SDGs overall.

6. Conclusions

The SDGs have emerged as an attempt to "transform" the world's development trajectory. Their proposal is driven by the acknowledgement that current economic models based on unlimited growth and consumerism have not solved the problems of poverty and inequality for millions of people though have led to a state of crisis in terms of the destabilisation of the planet's ecological functions. The search for an alternative has led to the promotion of various sustainability models and the re-emergence of the growth within natural limits ideology.

For a sustainable development approach to work, it requires integration of different theoretical approaches and knowledge tracks – conceptually drawing from economics, social sciences and Earth sciences. So far, exceptional attempts have been made to create such theoretical and analytical frameworks but "sustainability science" still requires further refinement. The SDGs, despite their limitations, offer a chance to do this refining – they open doors to new ways of guiding and assessing development, hence greater efforts are needed to complete a comprehensive overview of where such integration has been explicitly done.

When looking at the focus of each of the domains of sustainability, the social domain is explicitly evident in the SDGs' intentions to eradicate poverty, improve basic conditions of health and education, and create a more equal society in terms of opportunities for jobs, democratic processes and freedoms regardless of age, gender, ethnicity and other factors. The targets related to the social domain have a high degree of ambition and clarity. However, the economic and ecological domains require greater attention in the SDGs. Specifically, the ecological domain – with two of 17 proposed goals covering all of the world's terrestrial and marine ecosystems and biodiversity – should inform better ecological measures. Much stronger targets for ecological areas – on par with social targets – are needed.

The SDGs are least ambitious in terms of achieving sustainability in their attempts to catalyse the transformation of the global economy. They do not clearly subscribe to the fundamentals of biophysical limits and swing between tweaking the existing system and proposing an alternative model. The goals do not address SCP as a cross-cutting theme, which may be the SDGs' greatest weakness.

For developing countries, like the countries of South Asia, the message is clear. The domains of sustainability cannot be addressed separately or in a staggered manner. Having economic growth as the engine will be detrimental without the checks and balances and ambitions of the social and ecological domains. A new sustainable development approach is clearly needed – one that puts aside the current Western economic paradigm and instead reflects the Southern socio-cultural ethos. Developing countries are at an advantage in that they still operate within their biocapacity limits and thus should plot a course to stay within them. This course will require an adjustment of what is understood to be development and well-being – the time is now.

References

CEPA (Centre for Poverty Analysis). 2013. "Making Sustainability the Next Metric: The Outcome of the South Asian Consultation." *Economic Review* 39 (August/November): 4-6.

CSRI (Credit Suisse Research Institute). 2010. *Global Wealth Report*. Zurich: CSRI.

Daly, H. E. 1987. "The Economic Growth Debate: What Some Economists Have Learned But Many Have Not." *Journal of Environmental Economics and Management* 14 (4): 323-36.

Daly, H. E. 2005. "Economics in a Full World." *Scientific American* 293: 100-07

Daly H. E., and J. B. Cobb, Jr. 1989. *For the Common Good: Redirecting the Economy toward Community, the Environment and a Sustainable Future*. Boston: Beacon Press.

Davies, J., S. Sandström, A. Shorrocks, and E. Wolff. 2006. *The World Distribution of Household Wealth*. Helsinki: United Nations University's World Institute for Development Economics Research.

Ellen MacArthur Foundation. 2015a. "Case Studies." Available at: http://www.ellenmacarthurfoundation.org/case_studies (Accessed 19 January 2015).

Ellen MacArthur Foundation. 2015b. "Circular Economy: The Principles." Available at: http://www.ellenmacarthurfoundation.org/circular-economy/circular-economy (Accessed 19 January 2015).

Ewing B., D. Moore, S. Goldfinger, A. Oursler, A. Reed, and M. Wackernagel. 2010. *The Ecological Footprint Atlas 2010*. Oakland: Global Footprint Network.

Farley, J., and H. Daly. 2006. "Natural Capital: The Limiting Factor; A Reply to Aronson, Blignaut, Milton and Clewell." *Ecological Engineering* 28: 6-10.

Gjoksi, N., and M. Sedlacko. 2010. *The 'Beyond GDP' Debate and Measuring Societal Progress in the Context of Sustainable Development*. ESDN Quarterly Report December 2010. Vienna: European Sustainable Development Network (ESDN).

Gunasekera, V. 2013. "Life on the Margins: Putting Inequality at the Heart of the Post-2015 Development Agenda." *Economic Review* 39 (August/November): 26-28.

Gunawardena, U. A. D. P. 2010. "Inequalities and Externalities of Power Sector: A Case of Broadlands Hydropower Project in Sri Lanka." *Energy Policy* 38 (2): 726-34.

Gunawardena, U. A. D. P. 2012. "An Inquiry into Ethical Foundations of Cost Benefit Analysis." *Journal of Environmental Professionals Sri Lanka* 1 (2): 1-15.

Gunawardena, U. A. D. P. 2013. "Economic Growth within Nature's Limits: The Need and the Issues." *Economic Review* 39 (August/November): 15-17.

HLP (United Nations High-Level Panel of Eminent Persons on the Post-2015 Development Agenda). 2013. *A New Global Partnership: Eradicate Poverty and Transform Economies through Sustainable Development*. New York: United Nations.

IPCC (Intergovernmental Panel on Change). 2013. *Climate Change 2013: The Physical Science Basis*. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge and New York: Cambridge University Press.

Jackson, Tim. 2009. *Prosperity without Growth: Economics for a Finite Planet*. London: Earthscan.

Meadows, D. H., D. L. Meadows, J. Randers, W. W. Behrens III. 1972. *The Limits to Growth*. New York: Universe Books.

Meadows, D., J. Randers, and D. Meadows. 2010. *Limits to Growth: The 30 Year Update*. London: Earthscan.

MA (Millennium Ecosystem Assessment). 2003. *Ecosystems and Human Well-being: A Framework for Assessment*. Washington, DC: Island Press.

Munasinghe, M. 2010. *Making Development More Sustainable: Sustainomics Framework and Practical Applications*. Colombo: MIND Press.

Nilsson, M., P. Lucas, and T. Yoshida. 2013. "Towards an Integrated Framework for SDGs: Ultimate and Enabling Goals for the Case of Energy." *Sustainability* 5 (10): 4124-51.

Nykvist, B., Å. Persson, F. Moberg, L. Persson, S. Cornell, and J. Rockström. 2013. *National Environmental Performance on Planetary Boundaries*. Swedish Environmental Protection Agency Report 6576. Stockholm: Swedish Environmental Protection Agency.

OWG (Open Working Group of the General Assembly on Sustainable Development Goals). 2014. *Open Working Group Proposal for Sustainable Development Goals*. New York: United Nations. Available at: https://sustainabledevelopment.un.org/content/documents/1579SDGs%20Proposal.pdf (Accessed 19 January 2015).

Pearce, D. W., and R. K. Turner. 1990. *Economics of Natural Resources and the Environment*. London: Harvester Wheatsheaf.

Raworth, K. 2012. *A Safe and Just Space for Humanity. Can We Live within the Doughnut?* Oxfam Discussion Paper. Oxford: Oxfam.

Raworth, K. 2014. "Will These Sustainable Development Goals Get Us into the Doughnut (AKA a Safe and Just Space for Humanity)?" *From Poverty to Power* (blog), 11 August. Available at: http://oxfamblogs.org/fp2p/will-these-sustainable-development-goals-get-us-into-the-doughnut-aka-a-safe-and-just-space-for-humanity-guest-post-from-kate-raworth (Accessed 19 January 2015).

Rees, W. E. 1992. "Ecological Footprints and Appropriated Carrying Capacity: What Urban Economics Leaves Out." *Environment and Urbanization* 4 (2): 121-30.

Rockström, J., W. Steffen, K. Noone, Å. Persson, F. S. Chapin, III, E. Lambin, T. M. Lenton, M. Scheffer, C. Folke, H. Schellnhuber, B. Nykvist, C. A. De Wit, T. Hughes, S. van der Leeuw, H. Rodhe, S. Sörlin, P. K. Snyder, R. Costanza, U. Svedin, M. Falkenmark, L. Karlberg, R. W. Corell, V. J. Fabry, J. Hansen, B. Walker, D. Liverman, K. Richardson, P. Crutzen, and J. Foley. 2009. "Planetary Boundaries: Exploring the Safe Operating Space for Humanity. *Ecology and Society* 14 (2): 32.

SDSN (Sustainable Development Solutions Network). 2012. *Global Profile of Extreme Poverty*. Background paper for the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda. New York: SDSN.

UN (United Nations). 2012. *The Future We Want*. A/RES/ 66/288. New York: UN.

UN. (United Nations). 2013. *A Life of Dignity for All: Accelerating Progress Towards the Millennium Development Goals and Advancing the United Nations Development Agenda beyond 2015*. A/68/202. New York: UN.

UN (United Nations). 2014. "The Road to Dignity by 2030: Ending Poverty, Transforming All Lives and Protecting the Planet." Advance unedited, 4 December. http://www.un.org/disabilities/documents/reports/SG_Synthesis_Report_Road_to_Dignity_by_2030.pdf.

UNDESA (United Nations Department of Economic and Social Affairs). 2015. "Sustainable Consumption and Production." Available at: https://sustainabledevelopment.un.org/topics/sustainableconsumptionandproduction (Accessed 19 January 2015).

UNDP (United Nations Development Programme). 2014. *Human Development Report 2014; Sustaining Human Progress: Reducing Vulnerabilities and Building Resilience*. New York: UNDP.

UNEP (United Nations Environment Programme). 2011. *Decoupling Natural Resource Use and Environmental Impacts from Economic Growth*. Factsheet. New York: UNEP. Available at: http://www.unep.org/resourcepanel/decoupling/files/pdf/Decoupling_Factsheet_English.pdf (Accessed 19 January 2015).

World Bank. 2015a. "PovcalNet." http://iresearch.worldbank.org/PovcalNet (Accessed 19 January 2015).

World Bank. 2015b. "Poverty and Equity; Regional Dashboard: South Asia." http://povertydata.worldbank.org/poverty/region/SAS (Accessed 19 January 2015).

World Bank. 2015c. "South Asia Overview." Available at: http://www.worldbank.org/en/region/sar/overview (Accessed 19 January 2015).

Southern Voice on Post-MDG International Development Goals (*Southern Voice*) is a network of 48 think tanks from Africa, Latin America and South Asia, that has identified a unique space and scope for itself to contribute to the post-MDG dialogue. By providing quality data, evidence and analyses that derive from research in the countries of the South, these institutions seek to inform the discussion on the post-2015 framework, goals and targets, and to help give shape to the debate itself. In the process, *Southern Voice* aims to enhance the quality of international development policy analysis, strengthen the global outreach capacity of Southern think tanks, and facilitate professional linkages between these institutions and their respective governments. *Southern Voice* operates as an open platform where concerned institutions and individuals from both South and North interact with the network members. *Southern Voice Occasional Papers* are based on research undertaken by the members of the network as well as inputs received at various platforms of the initiative. *Centre for Policy Dialogue (CPD)*, Dhaka works as the Secretariat of the *Southern Voice*.

Southern Voice
On Post-MDG International Development Goals

Website: www.southernvoice-postmdg.org
E-mail: southernvoice2015@gmail.com

Secretariat:

Centre for Policy Dialogue (CPD)
House - 6/2 (7th & 8th floors), Block - F
Kazi Nazrul Islam Road, Lalmatia Housing Estate
Dhaka - 1207, Bangladesh
Telephone: (+88 02) 9141734, 9141703, 9126402, 9143326 & 8124770
Fax: (+88 02) 8130951; E-mail: info@cpd.org.bd
Website: www.cpd.org.bd