Sustainable Wellbeing and the United Nations Sustainable Development Goals

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INTRODUCTION

In this chapter, we investigate alternative methods to relate the United Nations Sustainable Development Goals (SDGs) to overall measures of sustainable wellbeing that can motivate and guide the process of global societal change. We first discuss the evolution and content of the SDGs. We then discuss alternative methods to relate the SDGs to sustainable wellbeing, including objective and subjective indicators of wellbeing, and an integrated approach. We then investigate what an aggregate Sustainable Wellbeing Index (SWI) that connects with the SDG dashboard might look like. Here, we first analyse several options for how to construct such an index and then propose a way forward that builds a hybrid approach. Finally, we propose linking the SDGs and our SWI to a comprehensive, nonlinear, systems dynamics model that can track both stocks and flows of built, human, social, and natural capital and make projections into the future under different policy scenarios.

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THE UN SUSTAINABLE DEVELOPMENT GOALS

The SDGs were agreed to at the UN 2030 Agenda for Sustainable Development (United Nations, 2015). They are an improvement and expansion on the previous UN Millennium Development Goals (MDGs). They address some of the systemic barriers to sustainable development and contain a more extensive coverage of and balance between the three dimensions of sustainable development—social, economic, and environmental—and their institutional/governance aspects. In addition, the SDGs apply to all countries, not just developing countries, as the MDGs did. The SDG process provides an opportunity to trigger systemic change to build a sustainable future in an increasingly interconnected world. However, with 17 goals supported by 169 targets and more than 200 indicators, the SDG process provides diluted guidance at best since the goals have limited capacity to be translated into concrete and measurable policies at the national or local level. This is to be expected, given the complex political negotiations that led to the SDGs.

The SDG measurement process is still at an early stage, with additional work needed to elaborate on (1) the complex interconnections between the goals, (2) the means–ends continuum toward achieving an overarching goal, and (3) a 'narrative of change' to describe the societal shifts needed to achieve the goals. Policy reforms to achieve the SDGs, and a better understanding of how this may happen within the existing socioeconomic and geopolitical circumstances, are required (Costanza, 2014; Ostrom, 2014).

At present, the SDGs are still a list of objectives. They lack an overarching goal with clear metrics of progress toward that goal and ways to integrate all the subgoals (Costanza, McGlade, Lovins, & Kubiszewski, 2014a). Table 21.1 shows the 17 proposed SDGs clustered according to the three subgoals originally proposed by Daly (1992) of sustainable scale, fair distribution, and efficient allocation. These are embedded in the 'means–ends' spectrum presented in Figure 21.1, which shows the relationship between the 'ultimate end' of sustainable, equitable, and prosperous wellbeing and the intermediate means of the economy, society, and the environment as opportunities to achieve it.

One important point of clarification is that sustainability is impossible to measure directly. It can only be assessed after the fact. Therefore, any measure of 'sustainability' is a prediction of which characteristics of the system might ultimately be sustainable (Costanza & Patten 1995; Garnåsjordet, Aslaksen, Giampietro, Funtowicz, & Ericson, 2012). The requirement for 'sustainable scale' is based on the idea that a sustainable system cannot deplete natural capital or damage ecosystem services beyond a certain 'safe operating space' (Rockström et al., 2009). We need a system that is both sustainable and desirable, including the contributions of natural, social, human, and built capital assets (Costanza et al., 2013). Ultimately, to properly assess sustainability and desirability will require both (1) a better, more integrated understanding of what contributes to individual, community, national, and global wellbeing (see other chapters in this volume); and (2) an integrated system-dynamics modelling approach to understand the complex interactions of these contributions and the possible futures of the system. The

Table 21.1 THE 17 SUSTAINABLE DEVELOPMENT GOALS (SDGs) (UN 2015) CLUSTERED UNDER THE THREE ELEMENTS OF SUSTAINABLE WELLBEING SHOWN IN FIGURE 21.1.

Efficient allocation: Building a living economy

Goal 7.   Ensure access to affordable, reliable, sustainable, and modern energy for all

Goal 8.   Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Goal 9.   Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Goal 11.   Make cities and human settlements inclusive, safe, resilient and sustainable

Goal 12.   Ensure sustainable consumption and production patterns

Fair distribution: Protecting capabilities for flourishing

Goal 1.   End poverty in all its forms everywhere

Goal 2.   End hunger, achieve food security and improved nutrition, and promote sustainable agriculture

Goal 3.   Ensure healthy lives and promote well-being for all at all ages

Goal 4.   Ensure inclusive and equitable quality education and promote life-long learning opportunities for all

Goal 5.   Achieve gender equality and empower all women and girls

Goal 10.   Reduce inequality within and among countries

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

Goal 17.   Strengthen the means of implementation and revitalize the global partnership for sustainable development

Sustainable scale: Staying within planetary boundaries

Goal 6.   Ensure availability and sustainable management of water and sanitation for all

Goal 13.   Take urgent action to combat climate change and its impacts[*]

Goal 14.   Conserve and sustainably use the oceans, seas and marine resources for sustainable development

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

SDGs represent an important step in building global consensus on what kind of world is desirable. Sustainability, in the sense of longevity, is certainly one of the characteristics of a desirable world, but it can only be predicted, not measured directly.

ALTERNATIVE METHODS TO RELATE THE SDGS TO SUSTAINABLE WELLBEING

The SDGs provide a detailed dashboard or list of 17 goals and associated targets and the indicators to guide the transition to sustainable development. Some argue that
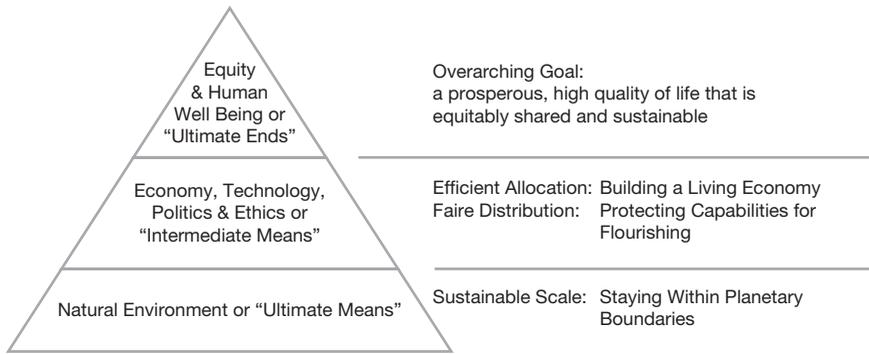
Figure 21.1 The 'means–ends' spectrum showing the three elements of sustainable wellbeing used to cluster the Sustainable Development Goals (SDGs) in Table 21.1. From Costanza et al. (2014a).

a dashboard approach is sufficient and the only feasible option. We disagree and contend that dashboards and aggregate indicators are *not* mutually exclusive—in fact, they are both essential. For example, having a well-instrumented dashboard in your car is essential, but so is knowing where you are going and whether you are making progress toward your destination. As baseball star Yogi Berra once quipped: 'If you don't know where you're going, you end up somewhere else'. We must first decide where we are going—that is, our overarching goal—in order to measure progress toward it. The 17 SDGs are best seen as subgoals, or means to this larger end (Table 21.1). We are certainly not recommending throwing out the dashboard, but merely recognising that the dashboard and an aggregated indicator of overall progress toward our shared goal are *both* necessary if we hope to achieve our goal. The SDGs acknowledge this need in Target 17.19, which states: 'By 2030, build on existing initiatives to develop measurements of progress on sustainable development that complement gross domestic product, and support statistical capacity-building in developing countries'.

Objective Versus Subjective Indicators

Examinations of wellbeing often fall under two headings, objective and subjective indicators. Objective indicators of wellbeing include, for example, indices of economic production, literacy rates, life expectancy, and other data that are gathered without a subjective evaluation by the individual being assessed. However, we must acknowledge that the subjective judgement of the researcher is involved in the process of defining and gathering objective indicators. Objective indicators may be used independently or in combination to form summary indexes, such as the UN's Human Development Index (HDI-UNDP, 1998) or the OECD Better Life Index (Durand, 2015). Objective indicators help us gather standardised data less affected by social comparison and local adaptation (e.g., minimising

the degree to which wellbeing is largely a function of comparing one's life to others, which is vulnerable to adaptive preferences and cultural bias).

Subjective indicators typically rely on survey or interview tools to gather respondents' own assessments of their lived experiences in the form of self-reported overall life satisfaction, happiness, wellbeing, or some other near synonym. Rather than presume the importance of various life domains (e.g., life expectancy or material goods), subjective measures can tap the perceived significance of the domain (or 'need') to the respondent. Diener and Suh (1999) provide convincing evidence that subjective indicators are valid measures of what people *perceive to be* important to their happiness and wellbeing. Nevertheless, there are individuals who cannot provide subjective reports or whose subjective reports may not be as trustworthy in reflecting their true wellbeing because of the influence of transient mood, recent remembered events, cultural norms, personality, framing, priming, and a multitude of other factors that cannot be fully controlled for in a survey (Campbell, Converse, & Rodgers, 1976; Kahneman 2011; Schwarz & Strack, 1991; see also Chapter 15, this volume). Also, individuals may have limited information and cognitive capacity to understand what objectively contributes to their sustainable wellbeing. Many ecosystem services fit into this category since most people are unaware of the complex relationships involved (see later discussion).

An Integrated Approach to Wellbeing

What seems best, then, is to attempt an approach to wellbeing that combines objective and subjective indicators. An integrative definition of wellbeing would be as follows (Costanza et al., 2007a): wellbeing is the extent to which objective human needs are fulfilled in relation to personal or group perceptions of subjective wellbeing (Figure 21.2). Humans have basic needs for subsistence, reproduction, security, affection, etc. (see Table 21.1). Such wellbeing is assessed by individuals' or groups' responses to questions about happiness, life satisfaction, utility, or welfare. The relation between specific human needs and perceived satisfaction with each of them can be affected by mental capacity, cultural context, information, education, personality, inequality within society, and the like, often in quite complex ways. Moreover, the relation between the fulfilment of human needs and overall subjective wellbeing is affected by the (time-varying) weights individuals, groups, and cultures give to fulfilling each of the human needs relative to the others.

With this definition, the role of policy is to create opportunities for human needs to be met, understanding that there exists a diversity of ways to meet any particular need (Figure 21.2). Built, human, social, and natural capital (Costanza et al., 1997, 2014b, 2014c, 2014e; Costanza, Hart, Kubiszewski, & Talberth, 2014d) represent one way of categorising those opportunities. Time is also an independent constraint on the achievement of human needs. Social norms affect both the weights given to various human needs when aggregating them to overall
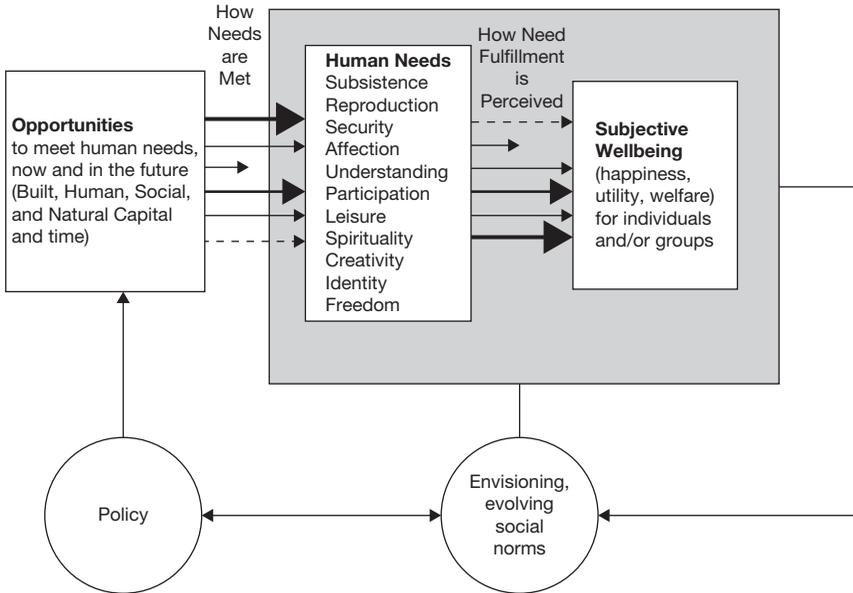
Figure 21.2 Wellbeing as the interaction of human needs and the subjective perception of their fulfilment, as mediated by the opportunities available to meet the needs.

individual or social assessments of subjective wellbeing and also policy decisions about social investments in improving opportunities. Social norms evolve over time due to collective population behaviour (Azar, 2004). The evolution of social norms can be affected by conscious shared envisioning of preferred states of the world (Costanza, 2000; Costanza et al., 2014e).

In this chapter, we investigate what an aggregate SWI that connects with the SDG dashboard might look like. We first analyse several options for how to construct such an index and then propose a way forward that builds a hybrid approach. Finally, we propose linking the SDGs and our SWI to a comprehensive, nonlinear, systems dynamics model that can track both stocks and flows of built, human, social, and natural capital and make projections into the future under different policy scenarios. This is an essential and often overlooked step in the process. The gross domestic product (GDP) has been so widely accepted partly because of its links to the System of National Accounts (SNA) and the underlying static, linear input–output model of the economy. We need a new, integrated, dynamic systems model to underlie and integrate the SDG goals and aggregate wellbeing indicators.

EXISTING GENERAL APPROACHES

Many alternative approaches to aggregate indicators of societal wellbeing and progress have been developed over the years. Three basic approaches have been

used in developing these indicators. We first discuss these basic approaches and then discuss how these approaches might be applied to the SDGs.

Consumption, Production, and Wealth Indicators

Conventional measures of national progress, like GDP, are based on production and consumption of goods and services exchanged in markets (with the occasional imputed value). GDP was never designed as a measure of societal wellbeing. However, a popular assumption, derived from utilitarian philosophy, is that—all else being equal—more consumption leads to higher wellbeing and that therefore GDP per capita and its growth can be used as proxies for national wellbeing (Costanza et al., 2014d). This assumption has been challenged for decades, and the problems with using GDP as an indicator of national wellbeing are well known (Costanza et al. 2014b; Fioramonti, 2013, 2017; Fleurbaey & Blanchet, 2013; Stiglitz, Sen, & Fitoussi, 2009). For example, the United Nations Development Programme (1996) identified five types of GDP growth that are actually negative indicators: (1) jobless growth (the economy gets bigger with more buying and selling of goods and services, but without creating more jobs), (2) voiceless growth (an apparently successful economy rides on the back of the suppression of civil rights, union membership, and democracy), (3) ruthless growth (accompanying high or rising inequality), (4) rootless growth (culturally destructive effects of economic globalisation), and (5) futureless growth (that steals our collective future by depending on the unsustainable consumption of finite natural resources).

Several alternatives have been devised that attempt to correct some of the problems with GDP. These include Green GDP (Boyd, 2007; Li & Lang, 2010), Genuine Savings (Hamilton & Clemens, 1999; Pillarisetti, 2005), the Inclusive Wealth Index (UNU-IHDP and UNEP, 2014), and the Index of Sustainable Economic Welfare (ISEW; Daly & Cobb, 1989), also known as the Genuine Progress Indicator (GPI; Talberth, Cobb, & Slattery, 2007). For example, the GPI is calculated by starting with personal consumption expenditures, a measure of all spending by individuals and a major component of GDP, weighting it by income distribution to recognise the impacts of inequality on societal welfare (Wilkinson & Pickett, 2009; see also Chapter 16, this volume) and making more than 20 additions and subtractions to account for 'goods' and 'bads' which are not included in conventional measures of income. 'Goods' include volunteer work and work in the family, and 'bads' include the costs of divorce, crime, pollution, and the depletion of natural capital. The GPI has been estimated for several countries and has been formally adopted by the states of Maryland and Vermont in the United States. Results show that when growing inequality and environmental costs are incorporated, GPI has not been growing at all in many countries over the past several decades (Kubiszewski et al., 2013).

The SDGs include some costs and benefits not incorporated in the GPI (e.g., gender equality, urban resilience, and accountable institutions). One could create a 'GPI SDG' that incorporated these factors as well as other changes that have

been suggested. One characteristic of GPI is that it is denominated in monetary units, making it directly comparable with GDP but also requiring that all the elements be assessed in monetary units. These valuations can be quite difficult and imprecise. But one should keep in mind that GDP itself is not as precise as often assumed, especially due to technological transformations in our economy (e.g., the digital revolution) and the partial and patchy data behind it (especially but not exclusively in developing countries) which therefore requires a growing number of imputations (Fioramonti, 2013, 2014, 2017).

Aggregation of all the SDG Indicators into a Unitless Index

One could build an aggregate, unitless indicator from the 232 SDG indicators (or more than 650 indicators, if all the subdivisions are included). The well-known problem with this approach is how to weight the different indicators. There are several examples of this approach (Costanza et al., 2014a). One example that builds on the 'ends–means' spectrum is the 'degrowth accounts' proposed by O'Neill (2015). Another example, the OECD Better Life index (http://www.oecd betterlifeindex.org/), is built from 11 elements, each with one or two indicators. These elements are housing, income, jobs, community, education, environment, civic engagement, health, life satisfaction, safety, and work–life balance. In the default mode, each element is ranked on a 1–10 scale. The scores are displayed as a flower diagram (i.e., with the strength of the different elements represented by petals of different sizes) so one can quickly see which elements are high and low for each country. To get an overall score, the elements are averaged together, initially weighted equally. However, one can change the weights on the website and observe the effects on the rankings. The OECD is collecting a survey of user weightings, and this could be used to construct a weighted index. But weighting all the SDG indicators via surveys seems too ambitious, while a simple unweighted average seems arbitrary and not in line with different national priorities. Furthermore, for many of the SDGs and associated goals and indicators, data will not be available for all countries in the short and medium term. Similar concerns can be raised with respect to new indices—such as the Social Progress Index (recently adopted in Massachusetts and Paraguay) and the Legatum Prosperity Index—which aggregate various dimensions of wellbeing, social capital, and prosperity.

Contributions to Subjective Wellbeing

Another approach to weighting is to construct a regression model with all indicators as the independent variables and some existing independent approximation of wellbeing—for example, subjective life satisfaction scores—as the dependent variable (Kubiszewski et al., 2022). This would provide statistically derived weights in terms of degree of correlation with the dependent variable. The main challenge here is what to choose as the dependent variable. Subjective wellbeing,

from international/national public opinion surveys, has been suggested by some as the most appropriate dependent variable and the most appropriate national policy goal (Layard, 2005). There has been some research with statistical models that include subjective wellbeing as the dependent variable and built, human, natural, and social capital indicators as the independent variables (Abdallah et al., 2007; Kubiszewski, Zakariyya, & Costanza, 2018; Kubiszewski et al., 2022; Vemuri & Costanza, 2006). These approaches successfully predict more than 70% of the variation in subjective wellbeing across countries. As an example, the World Happiness Report (Helliwell et al., 2016) developed regressions of subjective wellbeing against a range of independent variables that explained 73% of the variation across countries. Even more impressively, a study showed that a mere 8 of the 232 SDG indicators for which sufficient data were available can explain 84% of the variation in subjective wellbeing across countries (Kubiszewski, Mulder, Jarvis, & Costanza, 2021).

However, it is also well known that individuals' perceptions are limited in that they may be influenced by cultural factors, thus making international comparisons difficult. For example, studies comparing levels of happiness and depression in China and the United States showed that, although the Chinese seem less happy (Spencer-Rodgers, Peng, Wang, & Hou, 2004) and optimistic (Lee & Seligman, 1997) than their American counterparts, people living in the United States are more depressed than the Chinese (Demyttenaere, 2004). This may show the greater operation of mental illness stigma in some cultures which results in the underreporting of symptoms such as depression. Measures of subjective wellbeing are also limited by the fact that people may be unaware of some of the factors that contribute to their wellbeing (Kahneman, 2011). For example, the contributions of natural capital and ecosystem services may not be well perceived by individuals and may not show up in life satisfaction surveys, even though studies indicate that these services contribute far more to sustainable wellbeing than does GDP (Costanza et al., 1997; 2014c). Individuals do not directly perceive the climate regulation benefits of forests or the storm protection benefits of coastal wetlands, although these may be critical contributors to their sustainable wellbeing.

A HYBRID APPROACH

All the approaches mentioned above have positive and negative aspects. So the question becomes: Can we construct a hybrid indicator that incorporates most of the positive aspects and minimises the negative aspects of these various measurement approaches? As Costanza et al. (2014b) conclude,

> The successor to GDP should be a new set of metrics that integrates current knowledge of how ecology, economics, psychology, and sociology collectively contribute to establishing and measuring sustainable wellbeing. The new metrics must garner broad support from stakeholders in the [UN SDG] conclaves. (p. 285)

Against this backdrop, one potential hybrid SWI could be a combination of three basic parts, each covering the contributions to sustainable wellbeing from the dimensions of the economy, nature, and society, respectively. In the following section, we elaborate on each of these in turn before integrating them as our proposed hybrid measure.

Net Economic Contribution: E

The GPI can be thought of as a measure of the *net* contribution of economic (production and consumption) elements to wellbeing. As we have seen, it weights personal consumption by income distribution, adds some positive economic elements left out of GDP, and subtracts a range of costs that should not be counted as benefits. Although some costs to natural and social capital are included in GPI, many others are missing (e.g., loss of community cohesion due to the social disruptions caused by economic growth), and we also need a way to measure and include the positive benefits to wellbeing from natural and social capital. We therefore need to supplement the current GPI with additional cost estimates (from the SDGs or elsewhere, including its targets and proposed indicators) as well as measurements of the positive contributions of natural and social capital.

Natural Capital/Ecosystem Services Contribution: N

The positive contributions of natural capital and the ecosystem services it provides have been estimated in spatially explicit form and can be valued in different units, including monetary units (Costanza et al., 1997, 2014c; Sutton & Costanza, 2002). These can be estimated at the country level as well as at subnational and regional scales. For example, the Wealth Accounting and Valuation of Ecosystem Services (WAVES) project of the World Bank (https://www.waves partnership.org/) is actively pursuing this agenda, as are several other initiatives, including the new Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES; http://www.ipbes.net/), the Economics of Ecosystems and Biodiversity (TEEB; http://www.teebweb.org/), the Economics of Land Degradation (ELD) initiative (http://eld-initiative.org/), and the Ecosystem Services Partnership (ESP; http://www.fsd.nl/esp).

Social Capital/Community Contribution: S

The positive contributions to wellbeing from social capital could be captured via surveys of the various components of life satisfaction and measures of community health as described in other chapters in this volume. For example, the World Values Survey as well as regional barometers (e.g., Eurobarometer and Afrobarometer) ask questions about trust and other aspects of social capital.

However, we will need to add additional survey questions that ask explicitly about the value of community and social capital in addition to individual life satisfaction. Objective measures of community physical and mental health like infant mortality, life expectancy, access to healthcare, and rates of depression could also be incorporated into this component.

Figure 21.3 shows the 17 SDGs and how they contribute to each of the three categories mentioned above. These categories correspond to the three basic goals outlined in the framework of *ecological economics* (Costanza, 1991; Costanza et al., 2013, 2014d; Daly, 1990) and the three basic components of sustainability. Note that many of the SDG subgoals contribute to more than one category.

Ultimately, a pluralistic approach that allows several options to be investigated will be required in the short term, and a consensus-building process will be needed to narrow down the possibilities to those that are most useful in assessing overall progress toward sustainable wellbeing. But, for a start, we propose the following:

$$SWI = f(E, N, S), \tag{1}$$

where:
SWI = Sustainable Wellbeing Index
E = Net economic contribution
N = Natural Capital/Ecosystem Services contribution
S = Social capital/Community contribution.

How these three elements combine to produce SWI is important. They are not linear combinations since the absence of any one of these factors would lead to zero SWI. At the same time, they are not purely multiplicative with the possibility for infinite SWI. For example, it is clear that increases in material standards make a very major difference to wellbeing in poorer countries where many people lack basic necessities. But as countries get richer, further increases in material standards make less and less difference to wellbeing. In richer countries, social capital and community may be the limiting factors. We therefore propose that a 'limiting factor' approach might be a better option. For example, an equation like the following might work:

$$SWI = L_{max} * (E / (k_e + E)) * (N / (k_n + N)) * (S / (k_s + S)), \tag{2}$$

where:
L_{max} = the maximum achievable SWI when all factors are simultaneously at their maximum.
k_e = the 'half-saturation constant' of E—the value of E where the result of this term achieves half its maximum value
k_n = the 'half-saturation constant' of N
k_s = the 'half-saturation constant' of S.

In this equation, each of the terms approaches 1 as the variable approaches infinity. As all the terms approach 1, SWI approaches L_{max}. The larger the half-saturation constant relative to the size of the variable, the slower is the approach
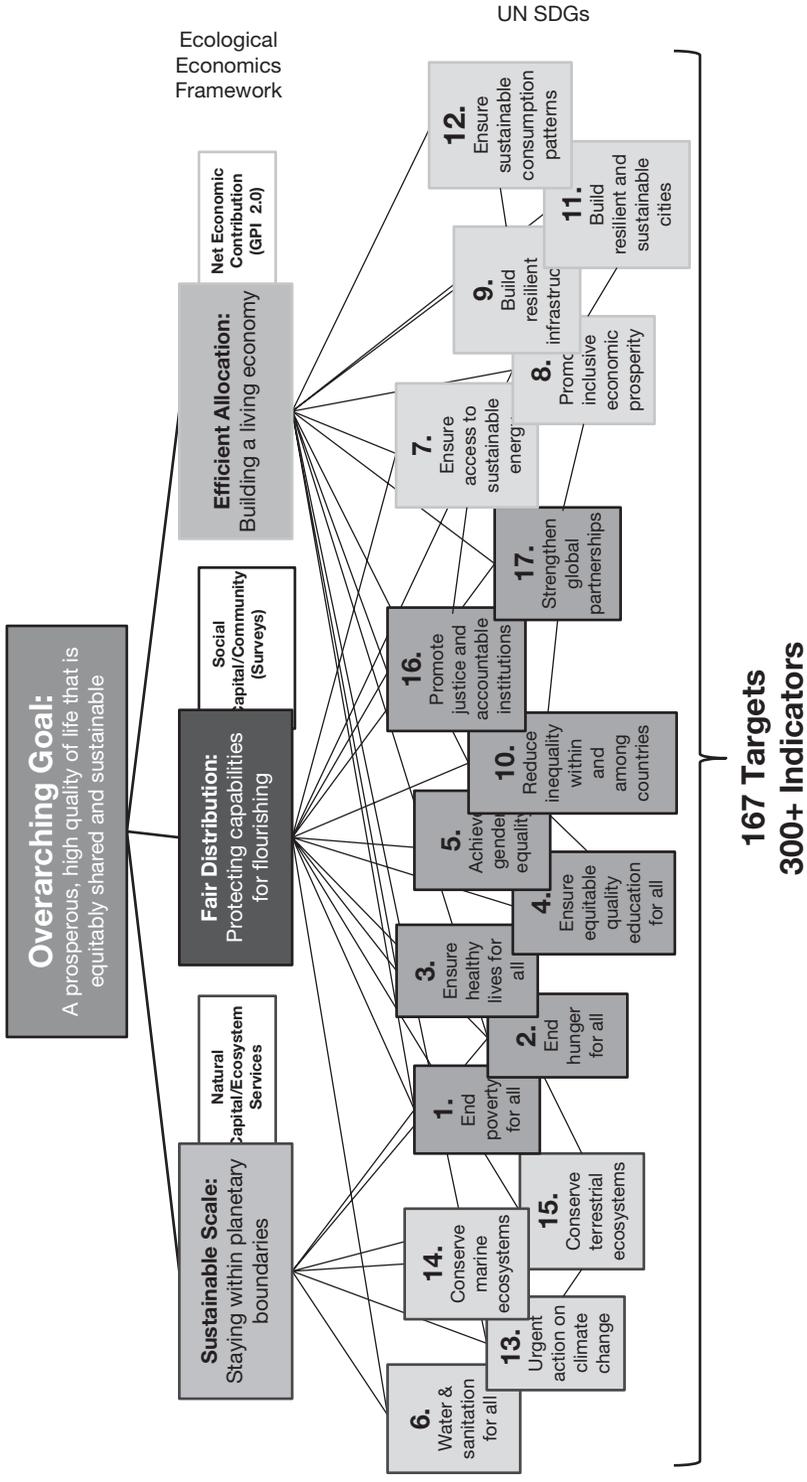
Figure 21.3 The relationship of the 17 UN Sustainable Development Goals (SDGs) to the framework of ecological economics and the overarching goal of a sustainable, equitable, and prosperous system.
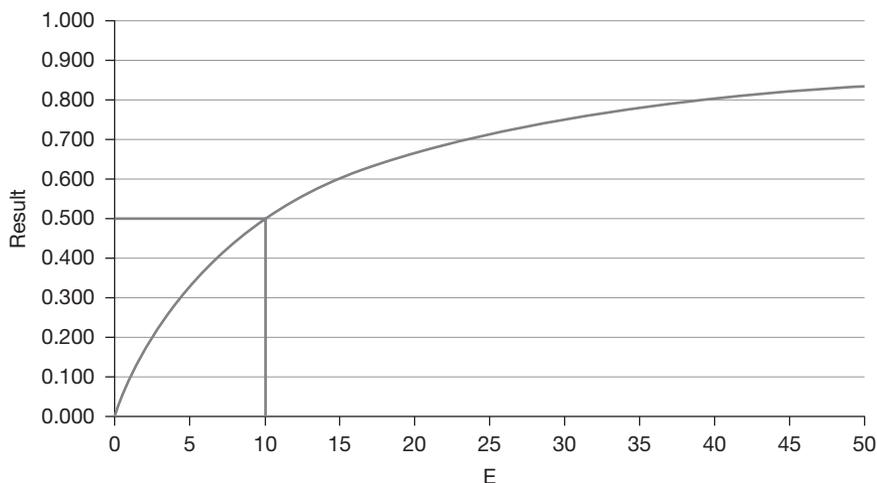
Figure 21.4 Example of limiting factor type curve, where: Result = E/(k_e + E) for a value of k_e =10. k_e is the 'half-saturation constant' or the value of E where Result reaches 50% of its maximum value.

to 1. Any one of the variables can be the 'limiting factor.' For example, if E is very large, its term in the equation will be close to 1. But if S is small, its term will be a small fraction that will reduce and limit SWI. Figure 21.4 is an example of the relationship for (E/((k_e +E)).

This approach is based on the idea that the best system is one that achieves the overarching goal of a *simultaneously* prosperous, high quality of life that is equitably shared and sustainable (Figure 21.1). The goal is not infinite growth but balanced sufficiency, equity, and sustainability.

Many countries have words that encapsulate this overarching goal as the essence of the 'good life'. For example, the Swedish term *lagom* means roughly 'just the right amount, equitably shared' (Costanza, 2015). In parts of Latin America, this concept is encapsulated in terms such as *buen vivir* and *pura vida*, while in Africa it connects with collective welfare traditions like *ubuntu*. We are searching for a way to quantify and guide progress toward the goals that many cultures implicitly share.

COMPREHENSIVE SYSTEMS DYNAMICS MODELLING

One of the reasons that GDP has achieved such dominance as an indicator of national progress is that it is integrated with an underlying model of the economic system. The model used is the basic linear input–output structure originally developed by Leontief (1941). It is a linear accounting model of monetary flows from sector to sector in the economy and to 'final demand'—the output to households, government, capital formation and net exports—which is GDP. In this accounting model, the inputs and outputs from each sector of the economy (such

as agriculture, manufacturing, services, etc.) have to balance. It does not account for stocks of capital assets except as a flow of 'capital formation' that is part of final demand. It is the basis of the SNA that all countries currently use.

We need to replace the misuse of GDP as a measure of national success with not just an alternative indicator of wellbeing, but also with a dynamic, nonlinear, systems model of the entire system of the economy-in-society-in-nature that keeps track of both stocks and flows, and one that can deal with nonmonetary stocks and flows. Figure 21.5 is a simplified example. The input–output structure of the economy could be embedded in this model, but it would have to go far beyond that to account for the costs and benefits from natural and social capital and the dynamics of capital formation and decline. Versions of such models exist (Boumans et al., 2002; Costanza, Leemans, Boumans, & Gaddis, 2007b; Victor, 2018), and several are currently in further development. This approach could help to build better assessments of progress toward sustainable wellbeing. These models can also span several time scales, including past, present, and future scenarios, allowing us to make better predictions of what sets of policies are actually sustainable and desirable and overcome the short-termism that afflicts much of current policy.

SUMMARY

The agreed UN SDGs are a major achievement in the development of shared goals for all of humanity. The SDGs have been agreed to by all UN Member States, and they include economic, social, and environmental elements. However, they lack an overarching goal and an effective aggregate indicator of progress toward that goal. One could argue that such an aggregate indicator is not necessary (or possible) and that the pursuit of the individual goals will be sufficient to achieve sustainable development. That might be true if the goals were independent of each other and they all contributed to the overarching goal equally. This is obviously not the case, especially in the context of the widely different situations in each country. We need an aggregate indicator that can assess the relative contribution of each of the SDGs and their interactions with each other in order to assess overall progress. We have suggested three fundamental categories that could make up a hybrid indicator and how these categories could be combined, but we also propose the development of an underlying systems dynamics model to assess interactions and synergies over space and time, including both stocks and flows, causes and effects. It is also necessary to develop a framework of policy reforms and societal change that make the achievement of the SDGs possible at both national and global levels. In today's interconnected world, the SDGs cannot be achieved unless there is sustainable wellbeing globally. We hope that the SDG process will continue in the direction we have proposed in order to speed the approach to a sustainable and desirable future.
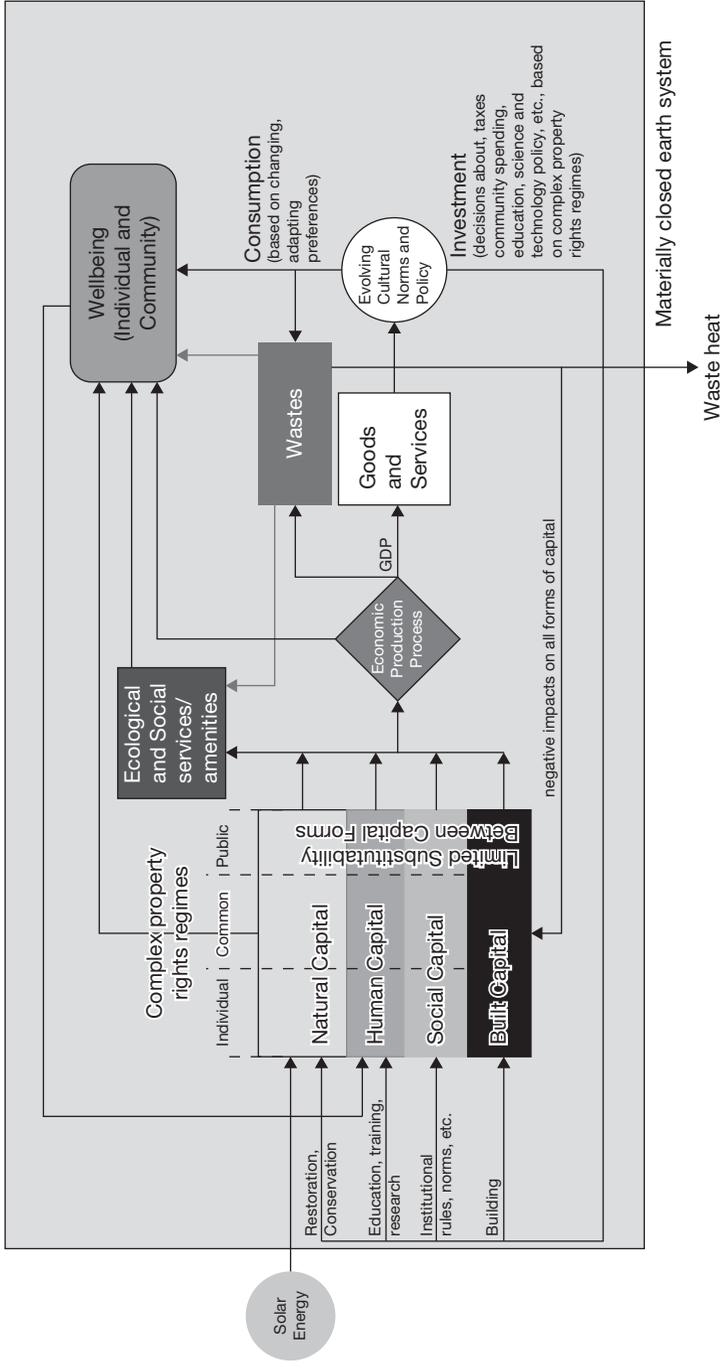
Figure 21.5 'Full world' model of the whole system.
From Costanza et al. (2014e).

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