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Compared to what? A three-tiered typology of sustainable development performance indicators from incremental to contextual to transformational

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United Nations Research Institute for Social Development

Working Paper 2019-5

Compared to What?
A Three-Tiered Typology of Sustainable Development Performance Indicators

From Incremental to Contextual to Transformational

Bill Baue

prepared for the UNRISD project
Sustainable Development Performance Indicators

October 2019

The United Nations Research Institute for Social Development (UNRISD) is an autonomous research institute within the UN system that undertakes multidisciplinary research and policy analysis on the social dimensions of contemporary development issues. Through our work we aim to ensure that social equity, inclusion and justice are central to development thinking, policy and practice.

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Introduction to Working Papers on Sustainable Development Performance Indicators

This paper is part of a series of outputs from the research project on Sustainable Development Performance Indicators.

The project seeks to contribute to assessing and improving methodologies and indicator systems that measure and evaluate the performance of a broad range of economic entities in relation to the vision and goals of the 2030 Agenda. It assesses the adequacy of existing methods and systems for gauging the contribution of enterprises to achieving the Sustainable Development Goals (SDGs); expand the scope of sustainability measurement, disclosure and reporting beyond for-profit enterprises to encompass enterprises and organizations that make up the social and solidarity economy; identify data points and indicators related to SSE that may inform conventional approaches to sustainability measurement associated with for-profit enterprises; identify and test a set of sustainable development impact indicators that can address the 21st century challenges.

Financial support for this project is provided by the Center for Entrepreneurship Studies, Republic of Korea, and UNRISD institutional funds.

Series Editor: Ilcheong Yi

Working Papers on Sustainable Development Performance Indicators

Compared to What? A Three-Tiered Typology of Sustainable Development Performance Indicators: From Incremental to Contextual to Transformational
Bill Baue, October 2019

Sustainable Development Impact Indicators for Social and Solidarity Economy: State of the Art
Gabriel Salathé-Beaulieu with Marie J. Bouchard and Marguerite Mendell, October 2019

Summary

Compared to what? That's the key question this report asks, when it comes to assessing sustainable development performance. So-called sustainable development indicators abound, but do they actually *do* what they *purport* to do? *Not really*, argues Bill Baue in this report: almost no current sustainable development indicators, that is, actually indicate sustainable development.

Why not? To answer this question, it helps to ask, *compared to what?* Current sustainable development indicators typically compare performance to incremental goalposts – *less this, less that* – which, of course, doesn't actually tell us anything about the *sustainability* of the impacts. To remedy this, the report invokes the Sustainability Quotient (S = A/N), which compares *actual* impacts (in the numerator) to *normative* impacts (in the denominator) to calibrate *sustainability*.

To illustrate this distinction, the report introduces a multi-tiered typology of sustainable development performance indicators. The first tier encompasses "numeration" indicators, which look at *actual* impacts (and sometimes compare them to other companies, or past performance, or incremental goals); a second tier adds a denominator to compare actual impacts to *normative* impacts, to determine if performance is indeed sustainable – or not. The typology adds a third tier, which steps beyond asking *if* to ask *how* sustainable development is achieved – specifically by indicating transformation from existing unsustainable systems.

- **Tier One: *Incrementalist Numeration***

  Numeration indicators focus on actual impacts, which include absolute indicators as well as "intensity" indicators that describe performance relative to a non-normative counterpart (such as unit of production), and are therefore incrementalist by definition.

- **Tier Two: *Contextualized Denomination***

  Denomination indicators contextualize actual impacts against normative impacts. Also known as "Context-Based" indicators, denominator indicators take into account sustainability thresholds in ecological, social, and economic systems, as well as allocations of those thresholds to organizations and other sub-system entities such as sectors, portfolios, or bioregional habitats.

- **Tier Three: *Activating Transformation***

  Transformation indicators add transcontextual elements of implementation practices and policies (as well as more ephemeral emergence) to normative indicators in order to instantiate sufficient change within complex adaptive systems.

The report also identifies specific shortcomings in current practice, and recommends solutions for improved practice. This Three-Tiered Typology sets the stage for identifying specific indicators on each tier that are most promising for tracking progress toward achieving sustainable development.

The report ends with a set of Recommendations:

- All entities that have impacts on vital capital resources that stakeholders rely on for their wellbeing have duties and obligations to measure, manage, and report on these impacts using **Tier Two** (*Contextualized Denomination*) indicators that allocate their fair-share impacts on these common capital resources within the thresholds of their carrying capacities.

- Multilateral organizations (such as UN bodies) should collaborate to create a global governance body of scientists, academics, business practitioners, NGOs and other stakeholders to provide guidance on methodologies for determining ecological and social thresholds, as well as guidance on approaches to allocations, all of which are readily and broadly applicable in practice by business, investment, and governing organizations, among others.
- Organizations with purview over reporting and accounting should embrace Context-Based mindsets by integrating **Tier Two** (*Contextualized Denomination*) indicators more explicitly into their frameworks, for example by applying the concept of carrying capacities to multiple capitals-based frameworks.
- All relevant organizations and bodies should promote research and development as well as broad incubation and implementation of **Tier Three** (*Activating Transformation*) indicators.

Bill Baue, an internationally recognized expert on Thriveability, Sustainability Context, and Online Stakeholder Engagement, is a co-founder of r3.0, Sustainability Context Group, Sea Change Radio, and Currnt. He currently serves as Senior Director of r3.0, where he oversees the Blueprint Projects that are crowdsourcing redesign templates for the fields of reporting, accounting, data, new business models, sustainable finance, and value cycles. He is also currently leading the establishment of the Global Thresholds & Allocations Council, and is undertaking research for the International Integrated Reporting Council (IIRC) in addition to UNRISD. Bill Baue has worked with organizations across the sustainability ecosystem, including Audubon, Cabot Creamery Coop, Ceres, GE, Harvard, United Nations Environment Programme, Walmart, and Worldwatch Institute. He serves on the Technical Advisory Group of the Science Based Targets initiative, and as a Senior Advisor to Preventable Surprises.

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I would like to thank:

- The UNRISD team – particularly Ilcheong Yi and Paul Ladd – for launching this Sustainable Development Performance Indicators project, and specifically for conceiving of the three tiers that this report fleshes out;
- Mark McElroy of the Center for Sustainable Organizations, a member of the Advisory Group of this Project, for his pioneering work in Context-Based Sustainability and Multicapitalism;
- Ralph Thurm of r3.0 for his unflagging behind-the-scenes support for this report and project;
- Allen White, Co-Founder of the Global Reporting Initiative, for his visionary coining of the Sustainability Context Principle, and his determined advocacy for it ever since – including as an ambassador of the Global Thresholds & Allocations Council that r3.0 is incubating;
- Kate Raworth of the Doughnut Economics Action Lab, for proposing the meme that has popularized the concept of inner and outer limit thresholds;
- Joe Brewer of the Capital Institute's Regenerative Communities Network for pointing me to a variety of key resources, including Steve Waddell;
- Steve Waddell of the SDG Transformation Forum for a brief conversation at the Transform Series Conference in San Francisco in May 2019 confirming the lack of transformation indicators;

- The Late Dana Meadows, most importantly, for writing the “bible” on indicators, and for marrying science and ethics so gracefully in her writing and lived life; and
- Johan Rockström, Kate Raworth, Rylan Dobson and Alexis Morgan, Forum for the Future, Dana Meadows, Mark McElroy, Unilever, Global Footprint Network, Water Footprint Network, Etica SGR, Eco-Products/Novolex, Science Based Targets, Shift, Anders Bjørn, Steve Waddell, Sean Esbjörn-Hargens, and Ken Wilber for permission to reproduce figures from their previously published work.

Many thanks to these folks and many others for enhancing the strength of this report; any weaknesses remain my responsibility.

Contents

Acronyms

CBS	Context-Based Sustainability
CDP	Carbon Disclosure Project
CO2	Carbon dioxide
ERM	Enterprise risk management
FTE	Full-time equivalent
GDP	Gross domestic product
GHG	Greenhouse gas
GRI	Global Reporting Initiative
GTAC	Global Threshold & Allocation Council
H1	Horizon One
H2	Horizon Two
H3	Horizon Three
IIRC	International Integrated Reporting Council
IPCC	Intergovernmental Panel on Climate Change
LSC	Large Systems Change
MCS	MultiCapital Scorecard
S=A/N	Sustainability = Actual Impacts / Normative Impacts
SASB	Sustainability Accounting Standards Board
SDG	Sustainable Development Goal
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environment Programme
UNRISD	United Nations Research Institute for Social Development

Figures

Introduction

> Tryin' to make it real, compared to what? (Sock it to me!)
>
> – Eddie Harris, Les McCann, and Gene McDaniels (1969), *Compared to What?*[1]

> Indicators are leverage points. Their presence or absence, accuracy or inaccuracy, use or non-use, can change the behavior of a system, for better or worse. In fact, changing indicators can be one of the most powerful and at the same time one of the easiest ways of making system changes — it does not require firing people, ripping up physical structures, inventing new technologies, or enforcing new regulations. It only requires delivering new information to new places.
>
> – Donella Meadows, *Indicators and Information Systems for Sustainable Development* (1998 p. 5)

"Indicator" is a noun that begs an adjective: indicate what?

The *what* that sustainable development indicators seek to indicate represents a monumentally ambitious (yet existentially necessary) task: measuring the dynamic balance between the *expanding* force of social development and the *constraining* force of ecological sustainability. The ultimate goal underpinning such measurement is to actually *achieve* sufficient social development *for all*, within the earth's biocapacity of renewable resources. "Indicator," in this performative sense, indicates both *progress toward* and, ultimately, *achievement of* sustainable development.

As this explanation suggests, an indicator can indicate a singular, static reality, but sustainable development indicators need to do more than that: they need to compare *current* reality to *desired* reality. Many indicators that purport to indicate sustainability, or sustainable development, do apply comparison, but as Eddie Harris, Les McCann, and Gene McDaniels ask in their jazz classic: *compared to what?*

This report seeks to answer this fundamental question, enabling understanding of just what it is that sustainable development indicators need to indicate in order to *both* progress toward *and* achieve sustainable development. Accordingly, the report proposes a **Three-Tiered Typology** of sustainable development performance indicators, starting with the **First Tier** of what might be called "pre-indicators" that set the foundation with *current reality* data, moving to the **Second Tier** of indicators that contextualize current reality against normative thresholds for *desired reality*, and finally a **Third Tier** of indicators for tracking the transformation from *current reality* to *desired reality*.

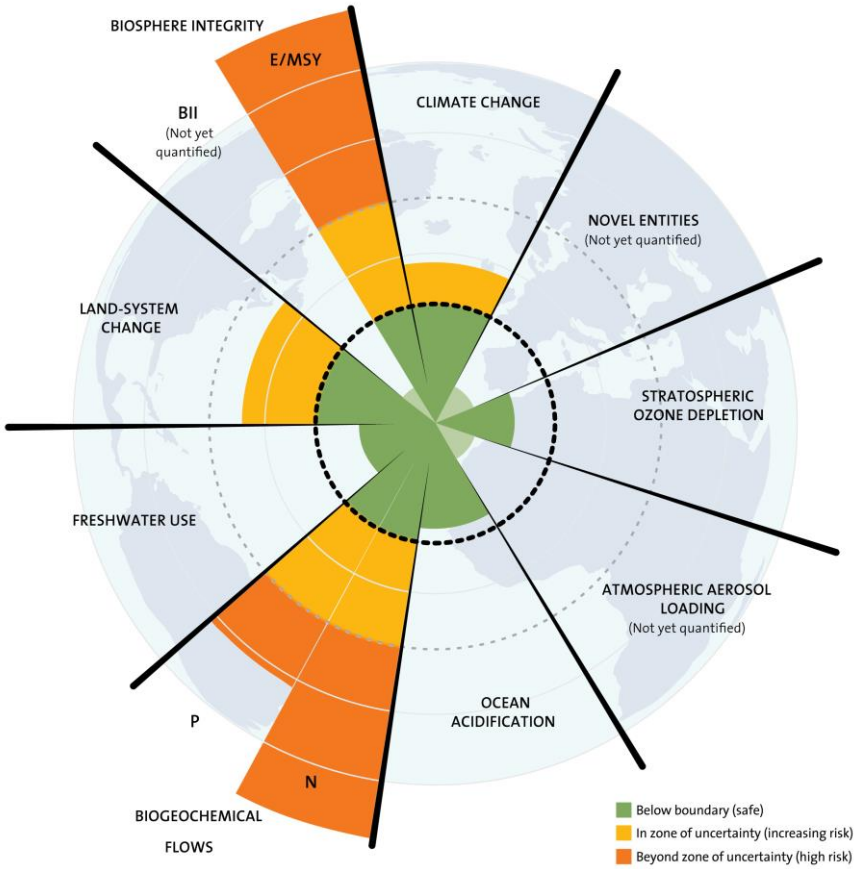
Thresholds

The 1974 UNEP/UNCTAD *Cocoyoc Declaration* captures the dynamic tension between development and sustainability succinctly, by identifying the need to transcend the "'inner limit' of satisfying fundamental human needs" while respecting the "'outer limits' of the planet's physical integrity" (UNEP and UNCTAD 1974). Three-and-a-half decades later, Johan Rockström of the Stockholm Resilience Centre and scientific colleagues globally identified a set of nine *planetary boundaries* defining these outer limits of ecological health; Kate Raworth of Oxfam (at the time) built on these *ecological ceilings* by adding *social*

[1] Listen to the famous 1969 performance by Les McCann and Eddie Harris at the Montreux Jazz Festival on Youube.

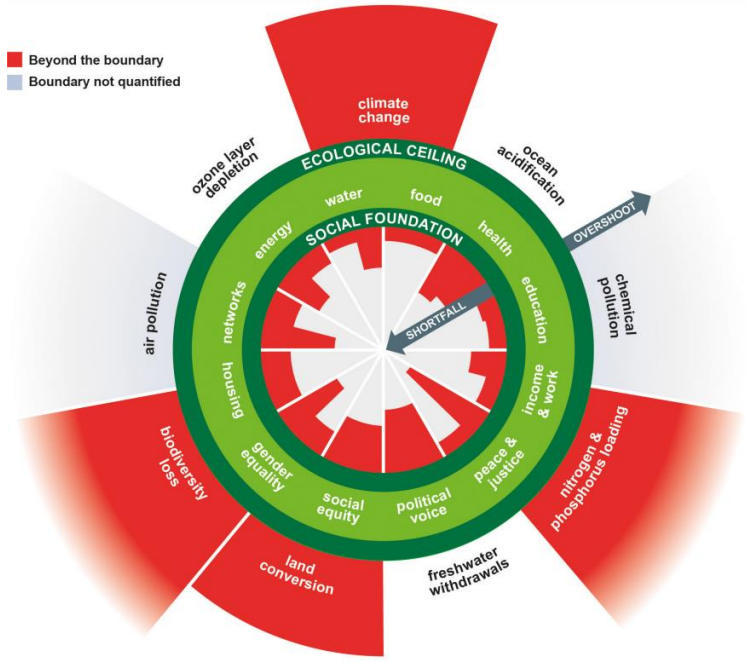
foundations to complete the idiosyncratic image of a doughnut, with the goal of living inside the "safe and just operating space" between these outer and inner limits (Rockström et al. 2009; Steffen et al. 2015; Raworth 2012) (see **Figures 1** and **2**).

Figure 1: Planetary Boundaries



Source: J. Lokrantz/Azote based on Steffen et al. (2015). Reproduced with permission.

Figure 2: Doughnut of Social Foundations and Ecological Ceilings



Source: Raworth (2018). Reproduced with permission.

Sustainability Context

"Sustainability requires contextualization within thresholds; that's what sustainability is all about," said Allen White, co-founder of the Global Reporting Initiative (GRI), which he established in 1997 (with Bob Massie) to create a framework and indicators for disclosing organizational sustainability performance (Baue and White 2014). In its second generation of *Sustainability Reporting Guidelines,* GRI introduced the *Sustainability Context* Principle on applying sustainable development thresholds to organizations:

> [S]ustainability reporting draws significant meaning from the **larger context** of how **performance at the organisational level affects economic, environmental, and social capital formation and depletion at a local, regional, or global level**… [S]imply reporting on the trend in individual performance (or the efficiency of the organisation) leaves open the question of an **organisation's contribution to the total amount of these different types of capital**… [P]lacing performance information in the broader biophysical, social, and economic **context lies at the heart of sustainability reporting**…
>
> [R]eporting organisations should consider their individual performance in the contexts of economic, environmental, and social sustainability. This will involve discussing the **performance of the organisation in the context of the limits and demands placed on economic, environmental, or social resources at a macro-level** (GRI 2002) (Emphasis added).

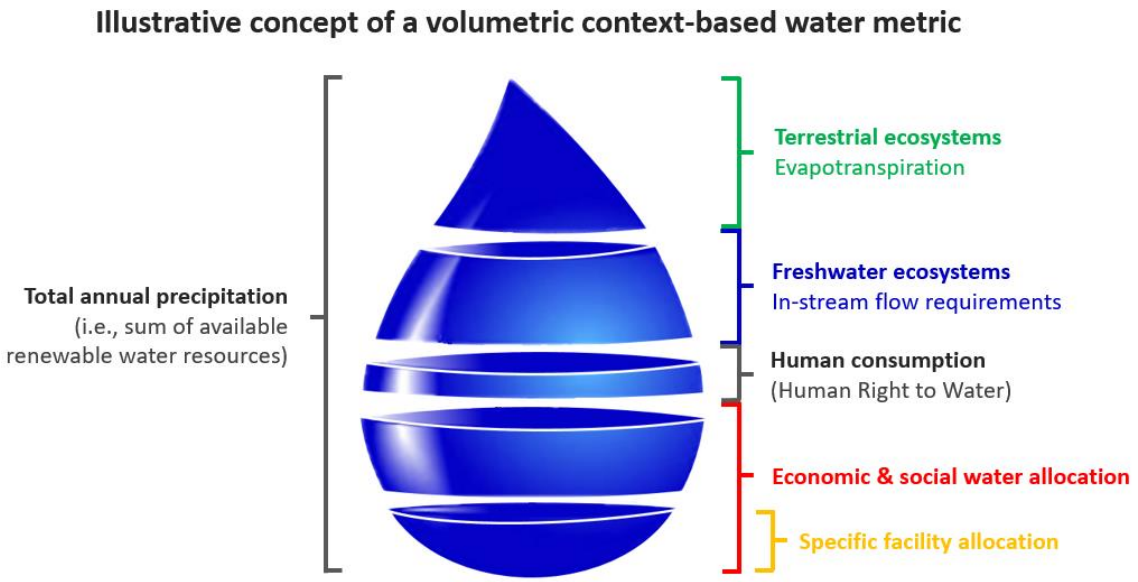
Applying the *Sustainability Context* Principle enables organizations to assess their role in contributing to the overarching achievement of sustainable development – or, conversely, their contribution to underdevelopment and unsustainability. Indicators that identify this performance integrate both thresholds ("limits and demands") and allocations ("performance of the organization").

Allocations

"The part can never be well if the whole is not well," wrote Plato in 380 BCE, succinctly encompassing the dynamic interdependency between the micro and macro levels that the *Sustainability Context* Principle articulates (Plato 1927). Measuring impacts on systemic thresholds at sub-system levels –particularly the organizational level of companies (which represent "leverage points" as influential actors with clear ethical accountability) – adds yet another layer of complexity to the "doughnut" equation: it requires allocation of fair share "slices" of the overall pie (to mix metaphors ever so slightly). Sustainable development indicators can best monitor systemic health (or "illth") by measuring organizational impacts on broader systems, with the goal that aggregate social impacts raise all of humanity above a sufficient level of social development, while the sum total of environmental impacts respect the earth's biocapacity.

Allocating water at the bioregional watershed level illustrates this pie-slicing, with entitlements to the earth's stocks and flows first, then human use, and only thereafter is market consumption divvied up fairly, justly, and proportionately. See **Figure 3.**

Figure 3: Water Allocations



Source: Dobson and Morgan (2017), adapted from McElroy (2016). Reproduced with permission.

Context-Based Sustainability

Activating *Sustainability Context* requires an implementation framework, which emerged in the form of *Context-Based Sustainability*, conceived by Mark McElroy for his doctoral dissertation at the University of Groningen and subsequently articulated in the book he co-authored with Jo van Engelen, *Corporate Sustainability Management* (McElroy 2008; McElroy and van Engelen 2012). Enacting CBS enables organizations to practically apply the notion of thresholds and allocations to track their performance. The most concise definition of CBS comes from its Wikipedia page:

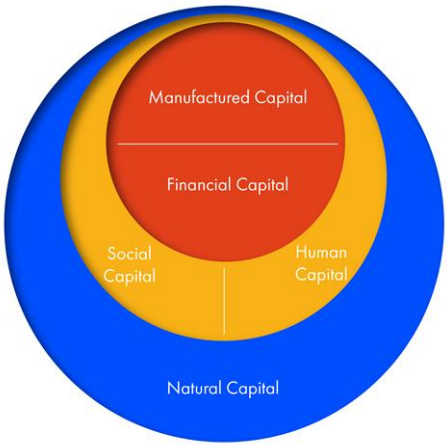
> Context-Based Sustainability (CBS) is a performance accounting method that measures and reports the impacts of organizations (and other human social systems) against norms, standards or thresholds for what they (the impacts) would have to be in order to be sustainable. As such, CBS is a performance accounting system that views and interprets performance through a sustainability lens, according to which impacts are sustainable if and only if, when generalized to a broader population, they have the effect of contributing to the maintenance of vital capital resources in the world at levels required to ensure human well-being. Impacts that have the opposite effect are unsustainable, just as the activities that produce them are (Wikipedia N.d.).

CBS thus provides a framework for sustainable development performance indicators that compares *current reality* to *desired reality*.

The Multiple Capitals

CBS takes a "multiple capitals" approach to defining resource stocks and flows, expanding the concept of "capital" beyond finance to also encompass natural capital, social capital, human capital, and "built" (or "constructed" or "manufactured") capital popularized by Paul Ekins and Forum for the Future founder Jonathon Porritt, among many others (Ekins 1992; Porritt 2005) (see **Figure 4** and **Box 1**).

Figure 4: Five Capitals Model



Source: Forum for the Future (2005). Reproduced with permission.

Box 1: Definition of 'the Capitals' by Forum for the Future:

Natural Capital is any stock or flow of energy and material that produces goods and services. It includes:

- Resources - renewable and non-renewable materials
- Sinks - that absorb, neutralize or recycle wastes
- Processes - such as climate regulation

Natural capital is the basis not only of production but of life itself!

Human Capital consists of people's health, knowledge, skills and motivation. All these things are needed for productive work. Enhancing human capital through education and training is central to a flourishing economy.

Social Capital concerns the institutions that help us maintain and develop human capital in partnership with others; e.g. families, communities, businesses, trade unions, schools, and voluntary organizations.

Manufactured Capital comprises material goods or fixed assets which contribute to the production process rather than being the output itself – e.g. tools, machines and buildings.

Financial Capital plays an important role in our economy, enabling the other types of Capital to be owned and traded. But unlike the other types, it has no real value itself but is representative of natural, human, social or manufactured capital; e.g. shares, bonds or banknotes (Forum for the Future 2005).

Capital Integration: The Daly Triangle

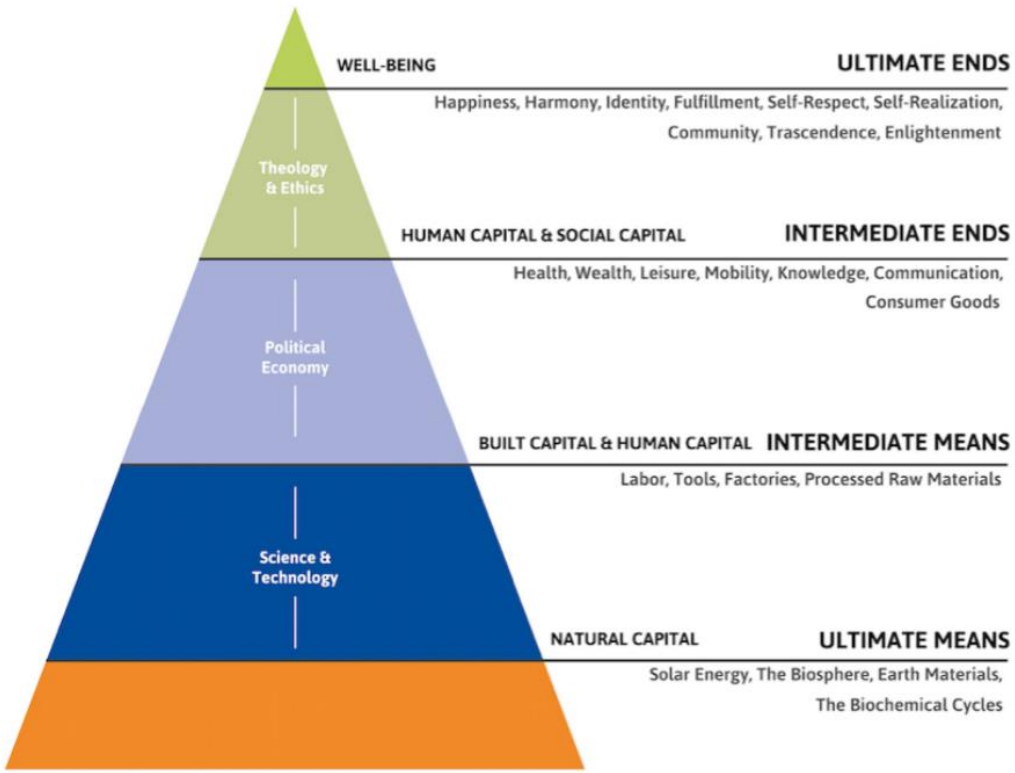
Limits to Growth Co-Author Donella Meadows harnessed the thinking of former World Bank Chief Economist and Ecological Economics Co-Founder Herman Daly to integrate the multiple capitals into the "Daly Triangle."

> The "Daly Triangle," which relates natural wealth to ultimate human purpose through technology, economy, politics, and ethics, provides a simple integrating framework. Sustainable development is a call to expand the economic calculus to

> include the top (development) and bottom (sustainability) of the triangle… Extending the definition of capital to natural, human, and social capital could provide an easily understood base for calculating and integrating the Daly triangle… The information system from which these central indicators can be derived will measure capital stocks at every level and the flows that increase, decrease and connect these stocks. There are systematic schemes for assessing the total viability of a system. These schemes can serve as checklists for sustainable development indicators (Meadows 1998).

So, the Daly Triangle serves as a conceptual framework for sustainable development indicators to measure the stocks and flows of vital capital resources. See **Figure 5.**

Figure 5: Daly Triangle



Source: Adapted from Meadows (1998), in Baue (2017). Reproduced with permission.

Integration of the capitals, as visualized in the Daly Triangle, calls for dynamic balancing systems. Meadows continued:

> Integration of the triangle from bottom to top requires good science and just and efficient political and economic systems and a culture that illuminates the higher purposes of life. The focus of such a society would be wholeness, not maximizing one part of the system at the expense of other parts. The goal of perpetual economic growth would be seen as nonsensical, partly because the finite material base cannot sustain it, partly because human fulfillment does not demand it. The focus would be on quality, not quantity, and yet quantity sufficient for the physical needs of all would not be lacking (Meadows 1998).

The Carrying Capacities of Capitals

Later in her seminal *Indicators and Information Systems for Sustainable Development* report, Meadows asserted that

> sustainability indicators should be related to carrying capacity or to threshold of danger or to targets. Tons of nutrient per year released into waterways means nothing to people. Amount released relative to the amount the waterways can absorb without becoming toxic or clogged begins to carry a message (Meadows 1998).

CBS originator Mark McElroy applies the notion of carrying capacities to the multiple capitals, thereby essentially integrating thresholds and capitals. It stands to reason that if capitals are stocks and productive flows of resources that are vital to the well-being of the global biome (including humans), then they must be managed to their carrying capacities, in order to ensure continual regeneration of available resources (McElroy 2008). As McElroy and colleagues put it:

> Of particular importance to … Context-Based Sustainability … is the concept of carrying capacity – the size of the load or degree of demand a resource can support without degrading – and the idea that the carrying capacities of vital resources (capitals) must be maintained at desired levels in order to ensure stakeholder or human well-being – anything less is unsustainable (Thomas and McElroy 2016; McElroy and van Engelen 2012).

The tricky thing about integrating the capitals is the need to treat them separately when considering the sustainability of a capital stock (i.e. maintaining flows within the carrying capacity of the capital), while also considering how the capitals integrate dynamically.

This question has been addressed in the sustainability literature, resulting in the distinction between "weak sustainability" and "strong sustainability" that pivots on the question of "substitutability." Thus writes Simon Dresner in *The Principles of Sustainability:*

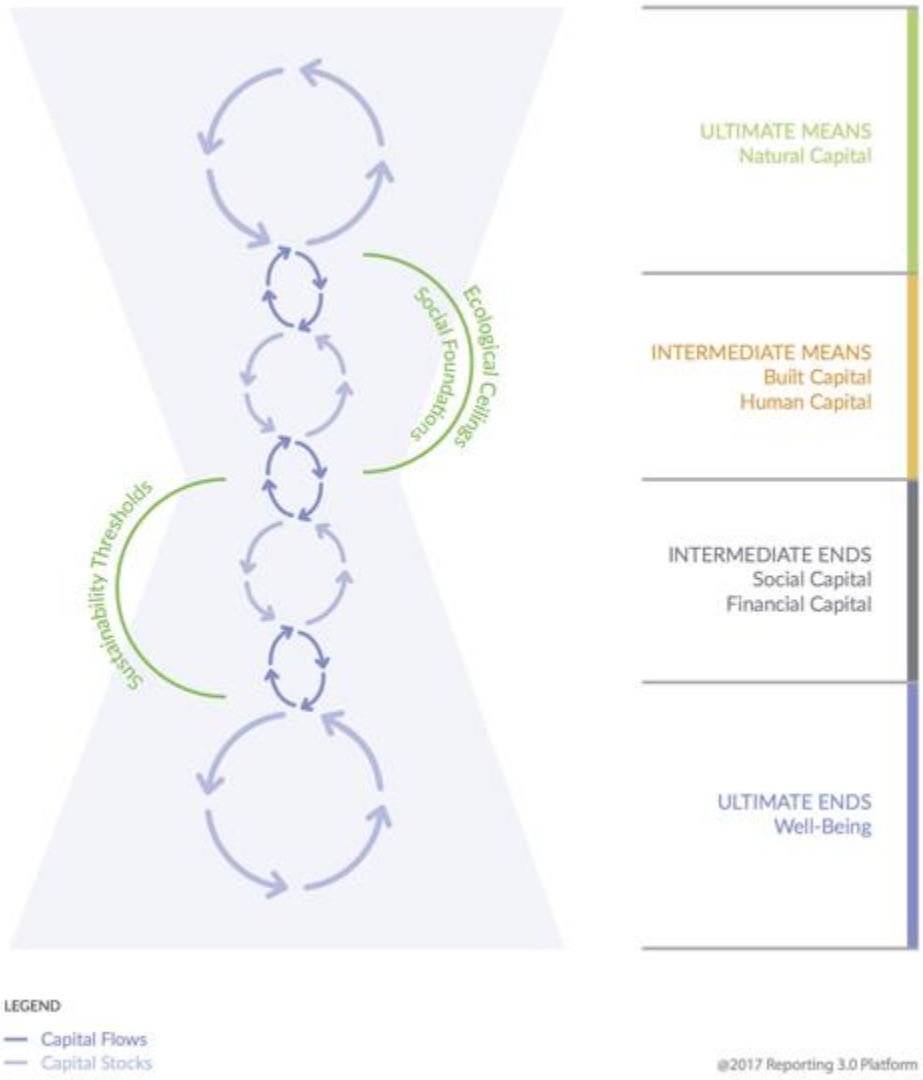
> There is controversy about whether to consider human-made capital and natural capital together (weak sustainability) or separately (strong sustainability). If they are counted together then increases in human-made capital can compensate for running down natural capital. Is that legitimate? Are the two kinds of capital substitutable in that way? (Dresner 2002)

CBS is predicated on a "strong sustainability" approach, making the case that the capitals must be treated separately when assessing their carrying capacities. Of course, a strong sustainability stance still recognizes and appreciates that the capitals are interrelated and synergistic, so it considers cross effects between and amongst the capitals. It simply maintains integrity of the capitals when assessing carrying capacities.

The Daly Hourglass

In the 12-month development process of the Reporting 3.0 *Data Blueprint*, Working Group members noted that the Daly Triangle doesn't actually represent thresholds or carrying capacities, despite the fact that Meadows stresses their importance for sustainable development indicators (Baue 2017). In the terms put forth in the *Data Blueprint*, the Daly Triangle enacts *Integration* of the capitals, but not *Contextualization* within their carrying capacities. Accordingly, Reporting 3.0 reconceived the Daly Triangle into the Daly Hourglass, adding sustainability thresholds (among other things) to the mix. See **Figure 6**.

Figure 6: The Daly Hourglass



Source: Baue (2017). Reproduced with permission.

In addition to flipping around so the "sands" of the ultimate means of natural capital flow down the hourglass into the ultimate ends of well-being (and making the ultimate means and ultimate ends equivalent in size), the Daly Hourglass also importantly adds cyclical capital stocks and flows, with "doughnut" thresholds inserted to manage the capital flows within their carrying capacities.

The Sustainability Quotient

To track micro-level organizational impacts on macro-level capitals against the thresholds of their carrying capacities, McElroy conceived the Sustainability Quotient as a general specification for implementing Sustainability Context (McElroy 2008; McElroy and van Engelen 2012). The Sustainability Quotient holds that *Sustainability* equals *Actual Impacts* (on the Carrying Capacities of Vital Capital Resources) over *Normative Impacts* (on the Carrying Capacities of Vital Capital Resources) (see **Figure 7**). For example, the Sustainability Quotient would compare a company's carbon footprint (actual impact in the numerator) to its share of the overall carbon budget (normative impact in the denominator) (more on "footprints" later).

Figure 7: The Sustainability Quotient

Source: McElroy (2008); McElroy and van Engelen (2012). Reproduced with permission.

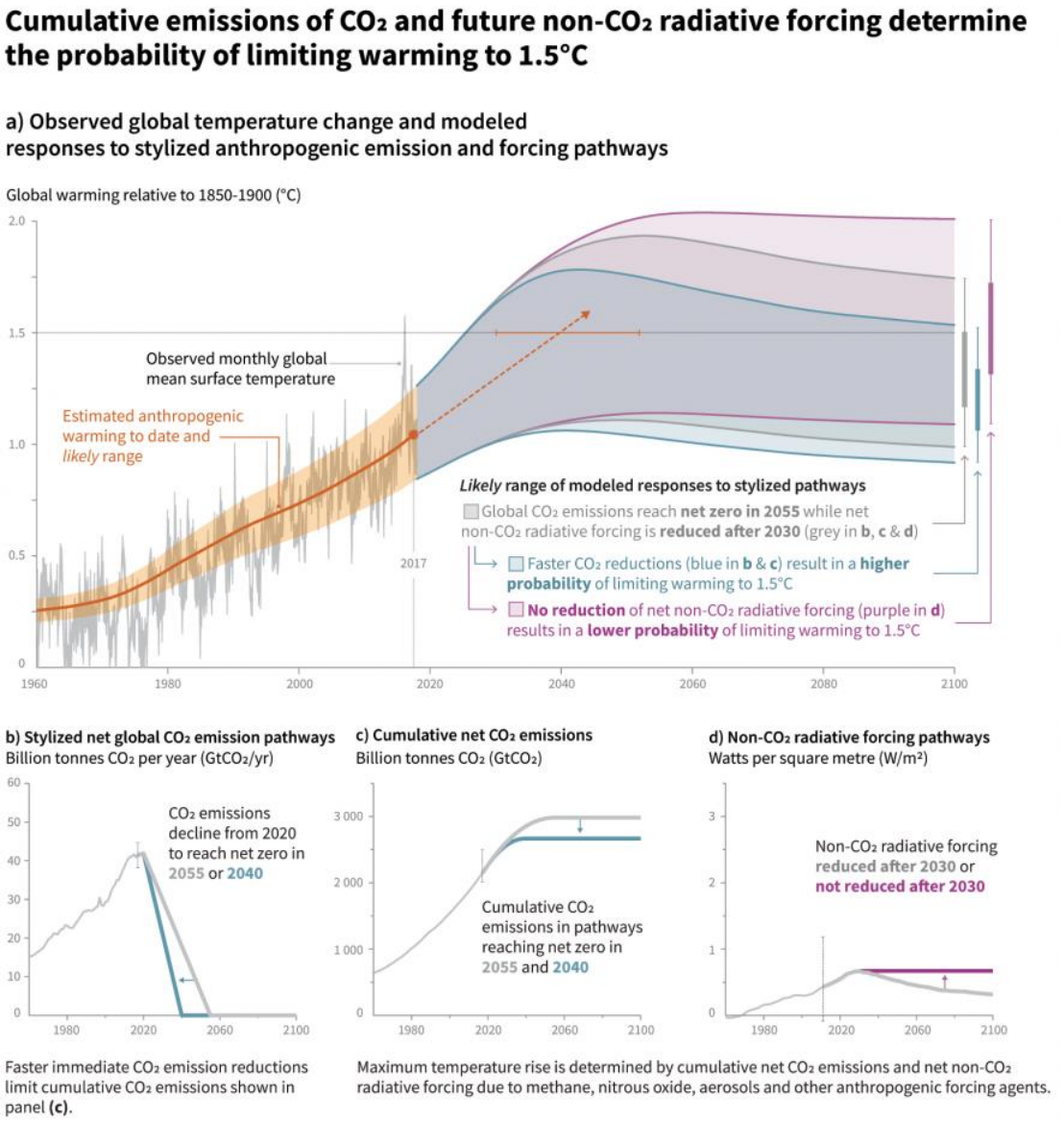
Systemic Transformation

Finally, if humanity's societal systems readily met the lower and upper boundary conditions of sustainable development by design, sustainable development indicators would be moot, unneeded. The need for sustainable development indicators arises precisely because our social systems are misaligned with the organic dynamic balance of natural systems. Therefore, sustainable development indicators must also gauge the transformation of existing unsustainable systems into systems that sufficiently mimic Gaian self-regulatory dynamics (Lovelock 1979). Indeed, humanity is not separate from, but rather a functional component of Gaia, so human systems *must* adopt dynamic balance. In other words, transformation is not the end-goal; dynamic balance is.

Current societal (and particular economic) systems exacerbate entrenched unsustainability and derail development, thus requiring systemic transformation to achieve the dynamic balance of sustainable development. The Intergovernmental Panel on Climate Change 1.5°C Report stresses in no uncertain terms the need for transformation (as illustrated in **Figure 8**):

> Limiting global warming to 1.5° Celsius would require **rapid, far-reaching and unprecedented changes in all aspects of society** … a 'whole systems' approach would be needed for the type of **transformations** that could limit warming to 1.5°C. This means that **all relevant companies, industries and stakeholders would need to be involved**... (IPCC 2018 – emphasis added).

Figure 8: 1.5°C Scenarios



Source: IPCC (2018, p.6)

Enno Schröder and Servaas Storm of the Delft University of Technology extend this logic to point out that our current economic system, in particular, structurally impedes achievement of sustainable development, due to climate change:

> The key insight is that **marginal, incremental improvements in energy and carbon efficiency cannot do the job** and that **what is needed is a structural transformation**—and establishment economics lacks the instruments and approaches to analyze exactly this state (Storm 2015; Wade 2018).
>
> Based on these assumptions, we conclude that realizing the radical carbon emission reductions demanded by COP21 and IPCC (2018) does compromise economic growth: 'green' growth predicated on carbon decoupling is impossible if we rule out (as is done by the IEA and OECD) truly game-changing technological progress and revolutionary social change.
>
> But **available solutions happen to go against the economic logic** and the corresponding value system that have dominated the world economy for the last

half decade — a logic to scale back (environmental) regulations, pamper the oligopolies of big fossil-fuel corporations, power companies and the automotive industry, give free reign to financial markets and prioritize short-run shareholder returns (Speth 2008; Klein 2014; Malm 2016; Storm 2017; Schröder and Storm 2018).

This suggests that transformation itself needs its own set of indicators, in order to distinguish between insufficient incrementalist change and necessary levels of true transformation, to achieve sustainable development within the "safe and just operating space" of the "doughnut." The challenge of such indicators is that they do not measure mechanistic change, but rather non-linear, complex, adaptive, systemic change, requiring what Nora Bateson calls "Warm Data," which she defines as "transcontextual information about the interrelationships that integrate a complex system" (Bateson 2017). So, identifying the appropriate referents to measure transformational dynamics that by definition defy mechanistic reductionism will prove challenging.

In sum, then, sustainable development indicators encompass at least three dynamically interacting elements that 1) balance social expansion for development with ecological contraction for sustainability within thresholds 2) extrapolated to organizational allocations, while 3) assessing transformational change to dynamic balance of systems.

The Three Tiers

Therefore, this paper from the UNRISD Sustainable Development Performance Indicators project sets forth a three-tiered "pyramid" of indicators:

- **Tier One:** ***Incrementalist Numeration***

  Numeration indicators focus on actual impacts, which include absolute indicators as well as "intensity" indicators that describe performance relative to a non-normative counterpart (such as unit of production), and are therefore incrementalist by definition.

- **Tier Two:** ***Contextualized Denomination***

  Denomination indicators contextualize actual impacts against normative impacts. Also known as "Context-Based" indicators, denominator indicators take into account sustainability thresholds in ecological, social, and economic systems, as well as allocations of those thresholds to organizations and other sub-system entities such as sectors, portfolios, or bioregional habitats.

- **Tier Three:** ***Activating Transformation***

  Transformation indicators add transcontextual elements of implementation practices and policies (as well as more ephemeral emergence) to normative indicators in order to instantiate sufficient change within complex adaptive systems.

Further, this paper seeks to set forth typologies for **Tier One** and **Tier Two** indicators. **Tier Three** indicators remain in the seminal stage, so it's premature to propose a typology, though we will certainly suggest elements indicative of transformation. As well, the paper will identify both limitations and opportunities for further development of methodologies and applications.

Tier One Indicators: Incrementalist Numeration

> Incrementalism alone, at the end of the day, was insufficient to [measure and report] sustainability... We would have to take a further step [by] assessing — in addition to disclosures on backward-looking benchmarks, peer group comparisons, and improvements against a company's own goals — performance against thresholds and limits.
>
> – Allen White, *Co-Founder, Global Reporting Initiative,* 2014 (Baue and White 2014)

At their essence, **Tier One** indicators assess *actual* impacts. Numeration indicators are thus *empirical* – they represent "observable," objective data about literal performance. And by the most basic typological distinction, there are essentially two lenses through which to view actual impacts: Absolute, and Relative (or Intensity).

- **Absolute indicators** measure the actual impact itself. For example, a carbon footprint is the amount of carbon an entity emits over a distinct period of time (more on footprints below).
- **Relative / intensity indicators** do exactly what their name suggests – they *relate* the actual impact to an independent variable that provides a comparative view to widen understanding. For example, a standard relative indicator is actual impact compared to a unit of output: carbon emitted per widget produced.

It is important to note that the comparison of relative / intensity indicators contains no explicit or implicit goal in the normative sense, and thus is incrementalist by definition. So, while numeration indicators might seem to imply progress, they don't answer the question, *progress toward what?*

Think of relative indicators as metaphors, which harness energy through comparison, via analogy. In his masterwork *Writing with Power,* Peter Elbow notes that "every metaphor is a force-fit, a mistake, a putting-together of things that don't normally or literally belong together" (Elbow 1981). His point: metaphors are powerful precisely because they lack literal precision – an exact replica of an idea has no power – nor does a completely distinct idea, on the other hand. It is the dynamic tension between proximity and distance that provides power to metaphors. Likewise, with relative indicators – they need to have "proximate distance" to be useful.

Drilling down a few more layers reveals the following typology of **Tier One** indicators:

Tier One *Incremental Numeration* Indicator Typology	
Absolute	**Intensity**
Economic Social Environmental	Financial Per Capita Physical
"Footprints"	Progress Percentage

Tier One Absolute Indicators

Absolute indicators fall into three main categories aligned to the three legs of the Triple Bottom Line: economic, social, and environmental (Elkington 1997).

- **Economic**: Absolute economic indicators can be financial in nature, covering both internal and external finance, as well as more broadly economic issues, addressing non-financial economic issues.

  Examples: For individuals, gross income is an absolute economic indicator. For businesses, gross revenue and expenses are the most basic examples of absolute economic indicators. At the macro level, some consider Gross Domestic Product (GDP) to be an absolute indicator.

- **Social**: Absolute social indicators provide information about basic social circumstances, at the individual but more often at the collective level.

  Examples**:** The number board members and senior management that are female and male (as an indicator of gender equity) and people of color (as an indicator of cultural diversity). On the number of human rights complaints issued, and the number resolved.

- **Environmental**: Absolute environmental indicators address issues such as climate change, water (quantity and quality), and waste, as well as harder-to-quantify-and-attribute issues such as biodiversity.

  Examples**:** Gross greenhouse gas emissions – from company operations (scope 1), purchased electricity (Scope 2), and across the full value cycle, from upstream supply chain to downstream product use phases; gross amount of water used by a facility; gross amount of waste produced by a facility.

Tier One Intensity Indicators

Intensity Indicators make comparative connections with three variables: financial, per capita, and physical.

- **Financial:** the absolute actual impact is compared to an economic benchmark, such as unit of sales or revenue.
- **Per Capita:** the absolute actual impact is compared to a human group, typically the full time equivalent (FTE) employee base.
- **Physical:** In other words, the comparison is made between absolute performance and a physical referent, such as overall production (for example, a company's market share of production in a specific sector).

To exemplify the relationship between Tier One Absolute and Intensity Indicators, consider the most recent sustainability report from Unilever (**Figure 9**), a multinational corporation that has a very strong reputation on sustainability. In it, the company states: "We report our CO2 emissions with reference to the latest Greenhouse Gas (GHG) Protocol Corporate Accounting and Reporting Standard (GHG Protocol) to calculate emissions of carbon dioxide from the combustion of fuels (Scope 1) and from purchased electricity, heat, steam and cooling (Scope 2, market-based method)" (Unilever 2018).

Figure 9: Carbon Dioxide Emissions (Absolute and Intensity)

EMISSIONS OF CO_2 FROM MANUFACTURING, 1 OCTOBER 2016 TO 30 SEPTEMBER 2017 (1 OCTOBER 2015 TO 30 SEPTEMBER 2016)

Scope 1	773,856 tonnes CO_2 (840,633 tonnes CO_2)
Scope 2 (market-based method)	793,472 tonnes CO_2 (864,936 tonnes CO_2)
Total Scope 1 & 2	1,567,328 tonnes CO_2◊ (1,705,569 tonnes CO_2Φ)
Intensity ratio	76.77 kg CO_2 per tonne of production◊ (83.52 kg CO_2 per tonne of production Φ)

◊ PricewaterhouseCoopers (PwC) assured in 2017. For details and 2017 basis of preparation see www.unilever.com/ara2017/downloads.

Φ PwC assured in 2016. For details and 2016 basis of preparation see www.unilever.com/sustainable-living/our-approach-to-reporting/reports-and-publications-archive.

Source: Unilever (2018). Reproduced with permission.

Note that Unilever includes both Absolute and Intensity Indicators in its reporting, with Absolute Scope 1 emissions for direct combustion of fuels and Scope 2 emissions from purchased electricity, heat, steam, and cooling reported in tonnes of CO2. It also includes an intensity calculation in kilograms of CO2 per tonnes of production – a relative indicator in the *physical* category.

Unilever paints a very accurate picture for its audience. However, this tells the audience *absolutely nothing* about the sustainability of the company's impacts. In fact, this can be said of all **Tier One** indicators. In this sense, they are not sustainable development performance indicators at all; **Tier One** indicators are necessary pre-conditions for formulating sustainable development performance indicators, because the Sustainability Quotient requires actual impact data in the numerator.

Tier One Progress Percentage

In addition to these relatively straightforward forms of intensity indicators, there also exists another form of relative comparison: progress toward an incremental goal or target, expressed as a percentage. In **Tier One**, this goal / target is non-normative, or what we might call *arbitrary*, in that the goals are not directly tied to sustainability thresholds or norms. For example, Unilever seeks to halve the environmental footprint of the making and use of its products, while growing its business (see **Figure 10**). Will halving its footprint result in sustainable performance? Who knows? It is theoretically possible that, by pure dumb luck, this performance would end up qualifying as sustainable. But the point is that there is no way to know one way or the other without explicitly integrating sustainability thresholds into the indicators.

Figure 10: Unilever Percentage to Incremental Targets

UNILEVER SUSTAINABLE LIVING PLAN

	2017	2016	2015
IMPROVING HEALTH & WELL-BEING BIG GOAL: By 2020 we will help more than a billion people take action to improve their health and well-being. See page 13			
HEALTH & HYGIENE Target: By 2020 we will help more than a billion people to improve their health and hygiene. This will help reduce the incidence of life-threatening diseases like diarrhoea.	601 million	538 million$^{\Phi}$	482 million$^{\Delta}$
NUTRITION Target: By 2020 we will double the proportion of our portfolio that meets the highest nutritional standards, based on globally recognised dietary guidelines. This will help hundreds of millions of people to achieve a healthier diet.	39%$^{\diamond}$	35%	34%$^{\Delta}$
REDUCING ENVIRONMENTAL IMPACT BIG GOAL: By 2030 our goal is to halve the environmental footprint of the making and use of our products as we grow our business. See pages 13 and 14			
GREENHOUSE GASES Target: Halve the greenhouse gas impact of our products across the lifecycle by 2030 (greenhouse gas impact per consumer use).	9%$^{\diamond}$	8%	7%$^{\theta}$
Target: By 2020 CO_2 emissions from energy from our factories will be at or below 2008 levels despite significantly higher volumes (reduction in CO_2 from energy per tonne of production since 2008).**+	(47%)$^{\diamond}$	(43%)$^{\Phi}$	(39%)$^{\Delta}$
WATER Target: Halve the water associated with the consumer use of our products by 2020 (water impact per consumer use).	(2%)$^{\diamond}$	(7%)	(1%)$^{\Delta}$
Target: By 2020 water abstraction by our global factory network will be at or below 2008 levels despite significantly higher volumes (reduction in water abstraction per tonne of production since 2008).**	(39%)$^{\diamond}$	(37%)$^{\Phi}$	(37%)$^{\Delta}$
WASTE Target: Halve the waste associated with the disposal of our products by 2020 (waste impact per consumer use).	(29%)	(28%)$^{\Phi}$	(26%)$^{\theta}$
Target: By 2020 total waste sent for disposal will be at or below 2008 levels despite significantly higher volumes (reduction in total waste per tonne of production since 2008).**	(98%)$^{\diamond}$	(96%)$^{\Phi}$	(97%)$^{\Delta}$
SUSTAINABLE SOURCING Target: By 2020 we will source 100% of our agricultural raw materials sustainably (% of tonnes purchased).	56%	51%	60%^

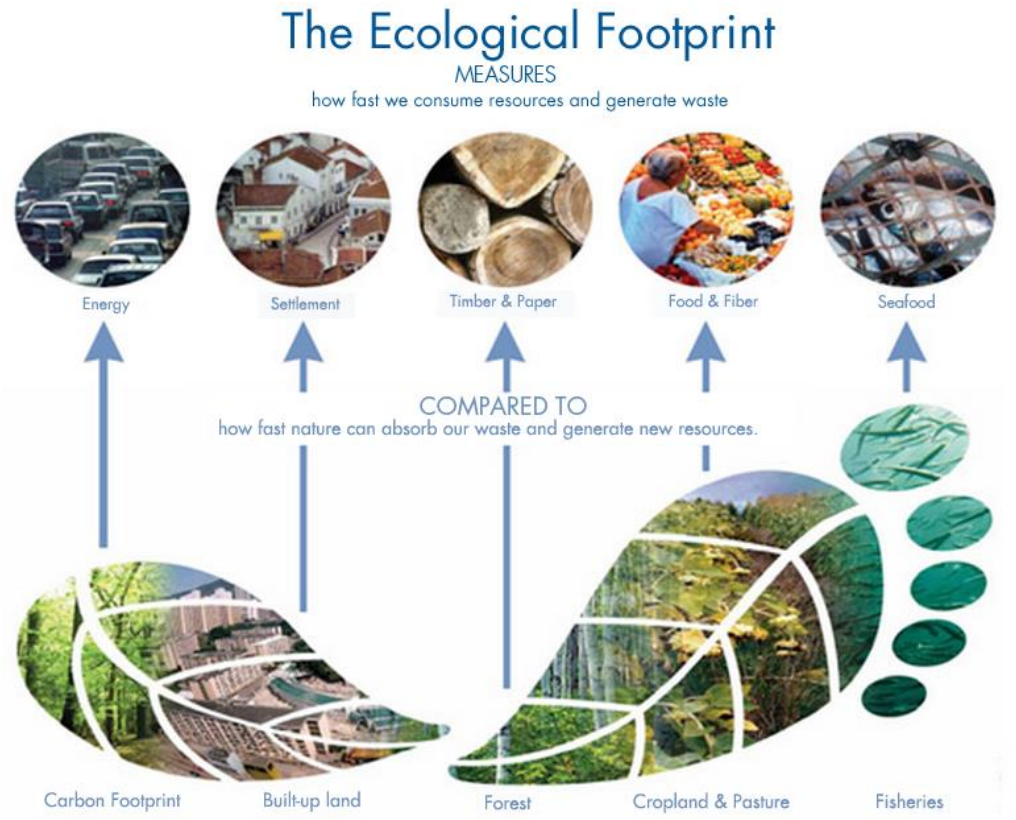
Source: Unilever (2018). Reproduced with permission.

Box 2: Footprints

Unilever's use of the term "environmental footprint" points to an interesting linguistic (and actual) development (or more precisely, devolution) that illustrates the limiting power of incrementalism. In this instance, the company indicates that it seeks to apply a similar kind of dynamic counterbalancing as mentioned at the outset of this paper: shrink its ecological impact while growing its financial heft – not (lest it escape notice) social development. Note that the environmental footprint itself is an absolute indicator: the literal size of the impact. This is how the concept of a footprint has (d)evolved – to pertain only to the size of the impact, devoid of normative reference.

Compare this to the original concept of the *Ecological Footprint*, which measured humanity's actual ecological impact against Gaia's biocapacity to assimilate that impact (Wackernagel and Rees 1996). Borrowing the newly coined term "footprint" for the space a computer takes up on a desk, *Ecological Footprint* conceivers William Rees and Mathis Wackernagel embedded contextual thresholds into the notion of "footprint," comparing actual to normative impacts on the carrying capacities of the capitals (Safire 2008). See **Figure 11**.

Figure 11: The Ecological Footprint



Source: Global Footprint Network (N.d.). Reproduced with permission.

Unfortunately, as the "meme" of the "footprint" migrated to other uses, it lost the threshold-based anchoring. The first prominent migration applied to water: when Dutch academic Arjen Hoekstra established the concept of a "water footprint" in 2002, it lost the tie-in to thresholds, and instead focused only on the absolute amount of water consumed / polluted (Water Footprint Network N.d.). See **Figures 12**.

Figure 12: Water Footprint

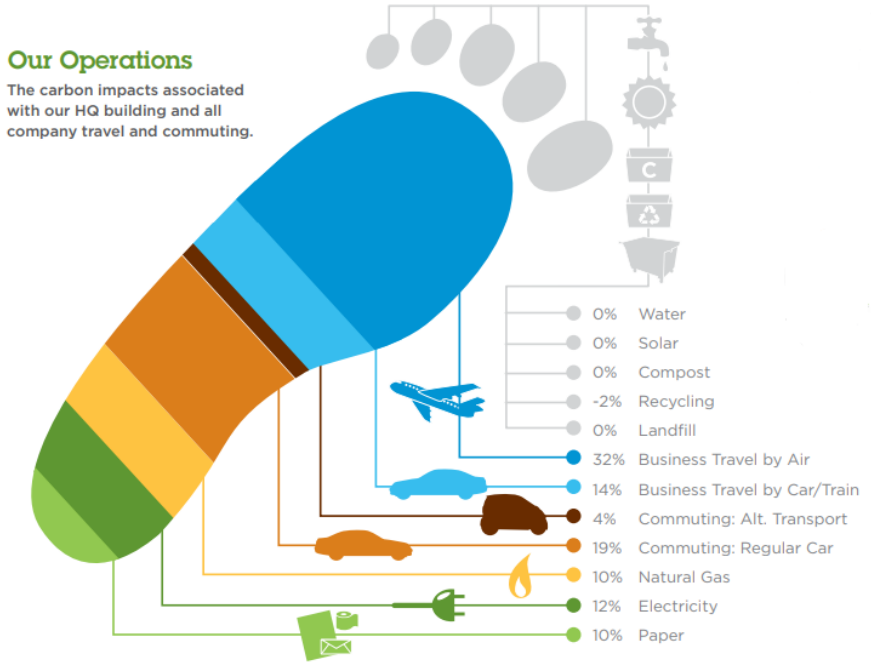
Source: Water Footprint Network (N.d.). Reproduced with permission.

The same elision occurred when the term migrated to carbon dioxide (in the context of climate change), with the notion of a "carbon footprint" applying to the absolute amount of carbon dioxide (and related greenhouse gases, often converted into "CO2 equivalent") emitted by an entity – such as a company or even the portfolio of companies held in an investment fund, as called for by the Montreal Pledge (Etica SGR 2019). See **Figure 13** for a standard definition of carbon footprints, and **Figure 14** for a specific corporate example of a carbon footprint.

Figure 13: Carbon Footprint Definition

Source: Etica SGR (N.d.), Image courtesy of Etica SGR, artwork by Gramma Comunicazione. Reproduced with permission.

Figure 14: Eco-Products Carbon Footprint



Source: Eco-Products (N.d.). Reproduced with permission.

It is telling that, once the term was applied more broadly, "footprint" lost its contextual sense: thresholds disappeared, essentially decoupling the concept of "footprints" from *bona fide* sustainability, which is inherently normative. This points to the "mindset" challenge of thresholds thinking, which clearly requires a more advanced level of consciousness (if not, the concept would have been retained in the migration process,

right?) **Tier One** is at the bottom of the pyramid precisely because it is an "easier" concept to understand and apply. Luckily, it also serves as the foundation for **Tier Two**, so these numerator indicators are not for naught.

Tier Two Indicators: Contextualized Denomination

> Sustainability indicators must be more than environmental indicators; they must be about time and/or thresholds.
>
> Development indicators should be more than growth indicators; they should be about efficiency, sufficiency, equity, and quality of life.
>
> – Donella Meadows, *Indicators and Information Systems for Sustainable Development* (1998, p. viii)

Dana Meadows (as she was commonly known) encapsulates the distinction between **Tier One** and **Tier Two** indicators through the key "dividing line" of *thresholds* for sustainability indicators, and *sufficiency* for development indicators. **Tier One** indicators are essentially incrementalist in nature: in other words, they lack a normative "bar" against which to measure if performance is satisfactory – or not. **Tier Two** indicators, on the other hand, provide a clear normative benchmark against which to judge performance as satisfactory by applying *sufficiency thresholds*.

In this sense, **Tier Two** indicators are "relative," but not in the same way as **Tier One** intensity indicators. To understand this difference, we can re-invoke the Harris / McCann / McDaniels *Compared to What?* test. The *what* that **Tier Two** indicators are compared to is a norm or threshold that defines a desirable and enduring state of being. This formulation hearkens back to the Sustainability Quotient, which places **Tier One** indicators in the quotient's numerator, and relates these actual impacts (in absolute terms) to externally defined norms or thresholds that contextualize the carrying capacities of vital capital resources in the denominator to arrive at **Tier Two** indicators.

The ultimate desirable state, according to Meadows, is well-being, as she explains here regarding development indicators:

> Development indicators must begin to reflect quality, equity, efficiency, and sufficiency. They must shift emphasis from money to physical units and from quantity of material throughput to quality of life. These distinctions begin to point to the real purpose of economic development, which is **not to have money but to have better lives**. This sort of rethinking can also create openings for concepts not only of under-development but of **over-development**, and therefore for concepts of "enough" …
>
> If the system orients itself around indicators that do not reflect **real well-being**, then it will produce whatever those indicators do measure (money flow, size of the economy, personal material possessions) rather than **real well-being**…
>
> Well-being requires a basic amount of material throughput to sustain life, but **after that point, more wealth is only loosely associated, if at all, with more happiness** (Meadows 1998 pp. 15; 66).

The underlying theme here is *Compared to What?* You get what you measure, Meadows points out. Indicators tied to money (or material) yield financial (and material) outcomes. She calls into question the prevailing logic that monetary (or material) indicators serve as

proxies for yielding well-being, satisfaction, fulfillment, happiness. In order to achieve these outcomes, indicators need to measure the actual desired outcomes, not the purported proxies (Meadows 1998).

The impact of misdirected indicators is the opposite of innocuous: Meadows points to the dangers of "over-development" that surpasses healthy thresholds of monetary / material possessions, as a clear and present danger. More stuff does not mean more happiness, satisfaction, or fulfillment. Indeed, less may be "more" when it comes to stuff. Meadows drives this point home in contrasting the ideal holistic society with our actual divided society.

> The focus of such a society would be wholeness, not maximizing one part of the system at the expense of other parts. The goal of perpetual economic growth would be seen as nonsensical, partly because the finite material base cannot sustain it, partly because human fulfillment does not demand it. The focus would be on quality, not quantity, and yet quantity sufficient for the physical needs of all would not be lacking (Meadows 1998, p. 46).

Meadows similarly distinguishes environmental indicators from sustainability indicators:

> An environmental indicator becomes a sustainability indicator (or unsustainability indicator) with the addition of **time, limit, or target**. The central questions of sustainability are: How long can this activity last? ***How long do we have to respond before we run into trouble? Where are we with respect to our limits?...***
>
> [S]ustainability indicators should be related to **carrying capacity** or to **threshold of danger**... Tons of nutrient per year released into waterways *means nothing to people*. Amount released relative to the amount the waterways can absorb without becoming toxic or clogged **begins to carry a message** (Meadows 1998, pp. 12, 14).

"Carry a message" and "respond" are the vital ideas here. At their core, indicators indicate the need for action, if they identify unsustainability – or not, if they indicate sustainability (the desired end-state). In this way, **Tier Two** indicators point toward **Tier Three** indicators, which track transformation to sustainability.

Typologically, **Tier Two** indicators distinguish themselves via *thresholds* and *allocations*. On the thresholds front, there are three basic approaches: science-based, ethics-based, and context-based. And one layer deeper, trajectory targets indicate progress toward thresholds (as distinct from Tier One percentage progress indicators that lack normative grounding).

On the allocations front, there are also three primary orientations: physical, per capita, and economic / financial. And there is also a distinction between shared allocations, where all the actors share commensurately, as compared to instances where organizations take full responsibility for their own impacts.

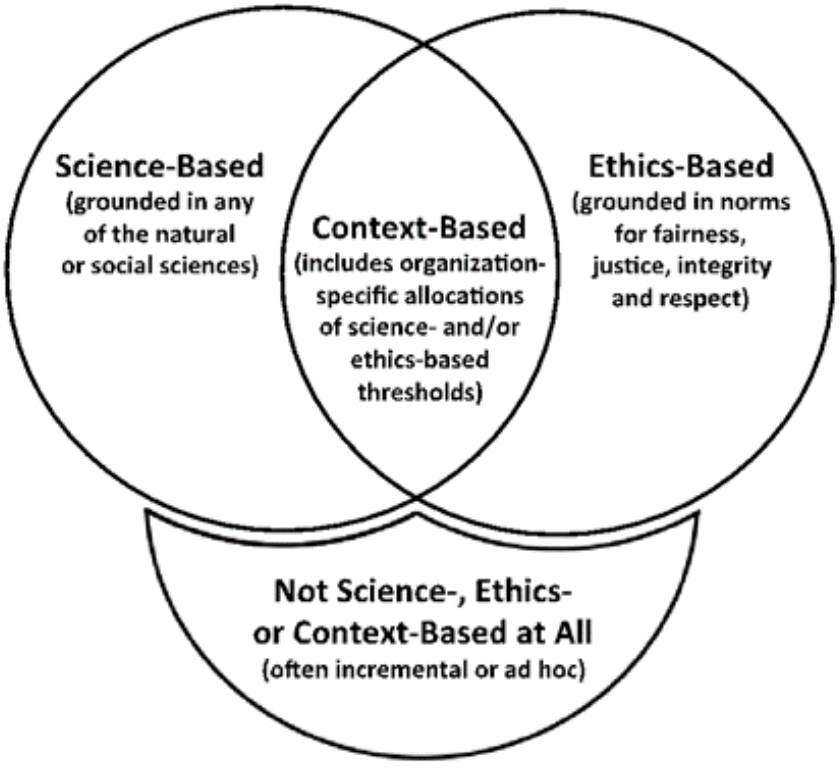
Tier Two *Contextual Denomination* Indicator Typology	
Thresholds	**Allocations**
Science-Based Ethics-Based Context-Based	Physical Per Capita Economic
Trajectory Targets	Shared v Full

Tier Two Thresholds

Mark McElroy defined three approaches to thresholds (as graphically displayed in **Figure 15**):

- **Science-Based** Goals/Metrics – Grounded in scientific knowledge of how human impacts affect vital resources in the world (capitals) and human well-being, but which do not prescribe organization-specific allocations of the shared or exclusive burdens to preserve or produce them, accordingly;
- **Ethics-Based** Goals/Metrics – Grounded in norms of fairness, justice, integrity and respect, but which, again, do not prescribe organization-specific allocations of the shared or exclusive burdens to preserve or produce them, accordingly;
- **Context-Based** Goals/Metrics – Science- and ethics-based goals or metrics that also prescribe organization-specific allocations of the shared or exclusive burdens to preserve or maintain vital capitals at levels required to ensure stakeholder well-being (McElroy 2015).

Figure 15: Science-, Ethics-, and Context-Based Indicators



Source: McElroy (2015). Reproduced with permission.

Tier Two Trajectory Targets

Just as incremental indicators have progress percentages, threshold-based indicators have trajectory targets that similarly measure distance-to-target. Progress percentages and trajectory targets are essentially synonymous; what distinguishes them is how the overarching goal is defined: progress percentages are tethered to "arbitrary" goals, in the sense that they are not tied to an externally defined norm; oppositely, trajectory targets are specifically linked to meeting externally defined norms that align to sustainability.

What trajectory targets essentially provide are interim milestones to track performance on the way to an overarching goal, enabling microadjustments *en route*.

Tier Two Allocations

Whenever there is collective use of a shared resource, allocations are happening, whether consciously or not. Often, power is the mechanism employed to divvy up resources, but this does not necessarily result in fair, just, or proportionate shares of resources. Free market capitalism puts its trust in the "invisible hand" of the market to yield wise distribution of resources – but the laws of supply and demand have failed to protect vital capital resources at levels that ensure well-being for all. In fact, capitalism has resulted in a significant misallocation of resources, with wealth concentrated into the hands of a relative few, while multitudes are deprived access to even basic levels of capital resources that are vital for survival (and thriving).

So, allocations are happening all the time, just not necessarily fairly, justly, or proportionately. If we wish to achieve fair, just, and proportionate distribution of vital capital resources, then we need to go about allocation consciously.

When it comes to Allocations indicators, the distinctions mirror those for incrementalist intensity indicators:

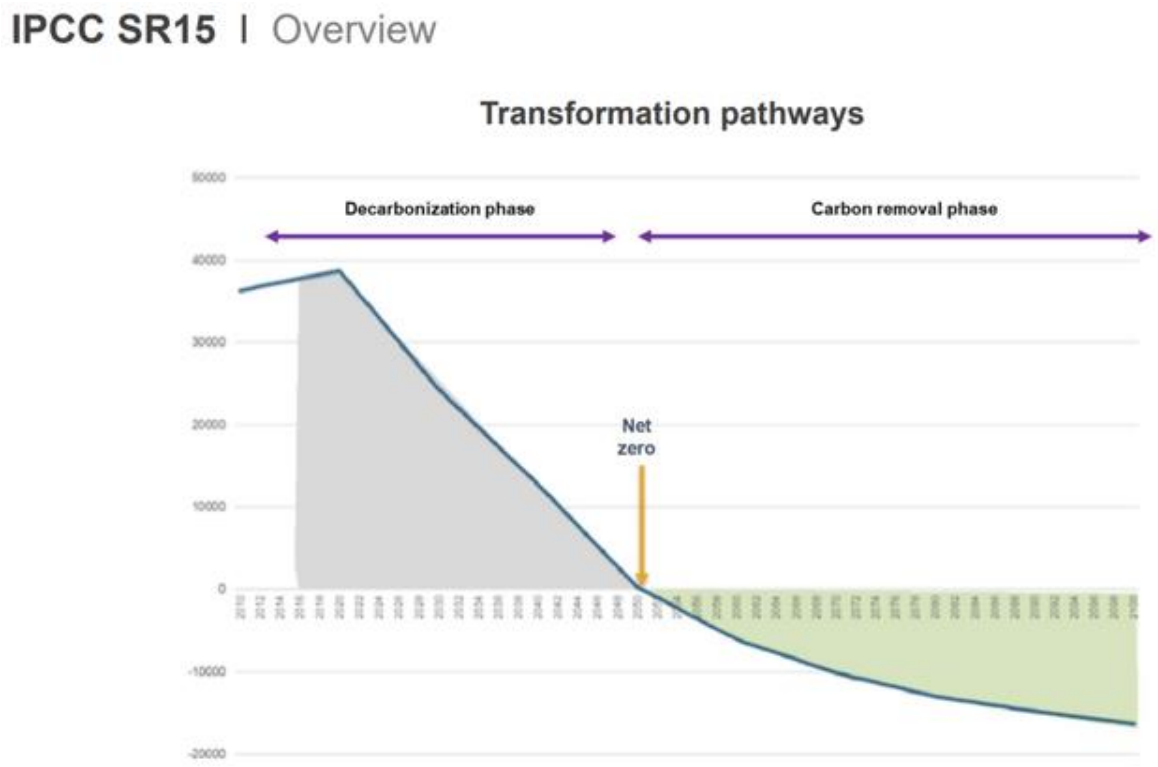
- **Physical** allocations divvy up a resource based on an organization's productive use of it – think of shares of the cement market;
- **Per Capital** allocations compare an organizational population to that of a reference community – such as a watershed, bioregion, state, nation, or world.
- **Economic** allocations slice the pie according to the percentage of value an organization produces compared to the broader system – for example, a company's contribution to GDP.

The Science-Based Targets initiative (SBTi), a collaboration between four prominent nongovernmental organizations (NGOs) – CDP (formerly Carbon Disclosure Project), United Nations Global Compact (UNGC), World Resources Institute (WRI), and World Wide Fund for Nature (WWF) – was the first major initiative in the corporate sphere to apply a thresholds-and-allocations approach. SBTi provides an umbrella framework encompassing a number of methodologies for aligning organizational carbon footprints with their fair share of humanity's overall carbon budget.

For thresholds, all the methodologies appeal to IPCC scenarios that identify decarbonization pathways based on scientific determinations (see **Figure 16**) For allocations, the methodologies primarily apply an economic allocation or a (sector-based) physical allocation. SBTi also applies what it calls an "Absolute-Based Approach" that "requires all companies to reduce their own emissions by the same percentage of absolute emission reductions … which requires at least a 49% reduction by 2050 from 2010 levels to stay under 2C. This equates to at least a 1.23% absolute reduction per year. Mars was

one of the first companies to use this method to determine its science-based target" (Science Based Targets N.d.).

Figure 16: Science Based Targets



Source: Science Based Targets (2018). Reproduced with permission.

Tier Two Allocations: Shared versus Full

In a plenary panel discussion on the Sustainable Development Goals (SDGs) at the GreenBiz Conference in February 2019, GreenBiz writer Heather Clancy asked Global Reporting Initiative Chief Executive Tim Mohin: "a lot of organizations are also working through the Science Based Targets exercise and in some cases [applying] context-based [approaches]. How can they use that exercise as a way to get more forward on the SDGs — is there a linkage there we can start promoting?" Mohin, whose organization established the Sustainability Context Principle, astonishingly responded:

> The context based argument is a good one, but it has its limitations, right. As we look at the Science Based Targets, which is probably the best known of the context-based movement, it applies to climate, and it makes a lot of sense — so you get an allocation as a company, and that's what you should do to reduce climate [change] or keep climate at no more than 2°C. It kind of breaks down as you go into the human rights. What's the appropriate allocation for child labor, for work hours and those kinds of things? And the SDGs are quite broad. So, I would caution about overusing it with regard to the SDGs (GreenBiz 2019).

Three months later, at the International Integrated Reporting Council (IIRC) Conference, Lauren Muusse of ING presented a counter-perspective. She pointed out that in ING's recent Human Rights Report, it implemented the UN Guiding Principles on Business and Human Rights (UNGPs), which she considers a thresholds-based norm, seeing as it

resulted from robust multistakeholder engagement to arrive a global consensus position (Baue 2019a). See **Figure 17**.

Figure 17: United Nations Guiding Principles for Business and Human Rights

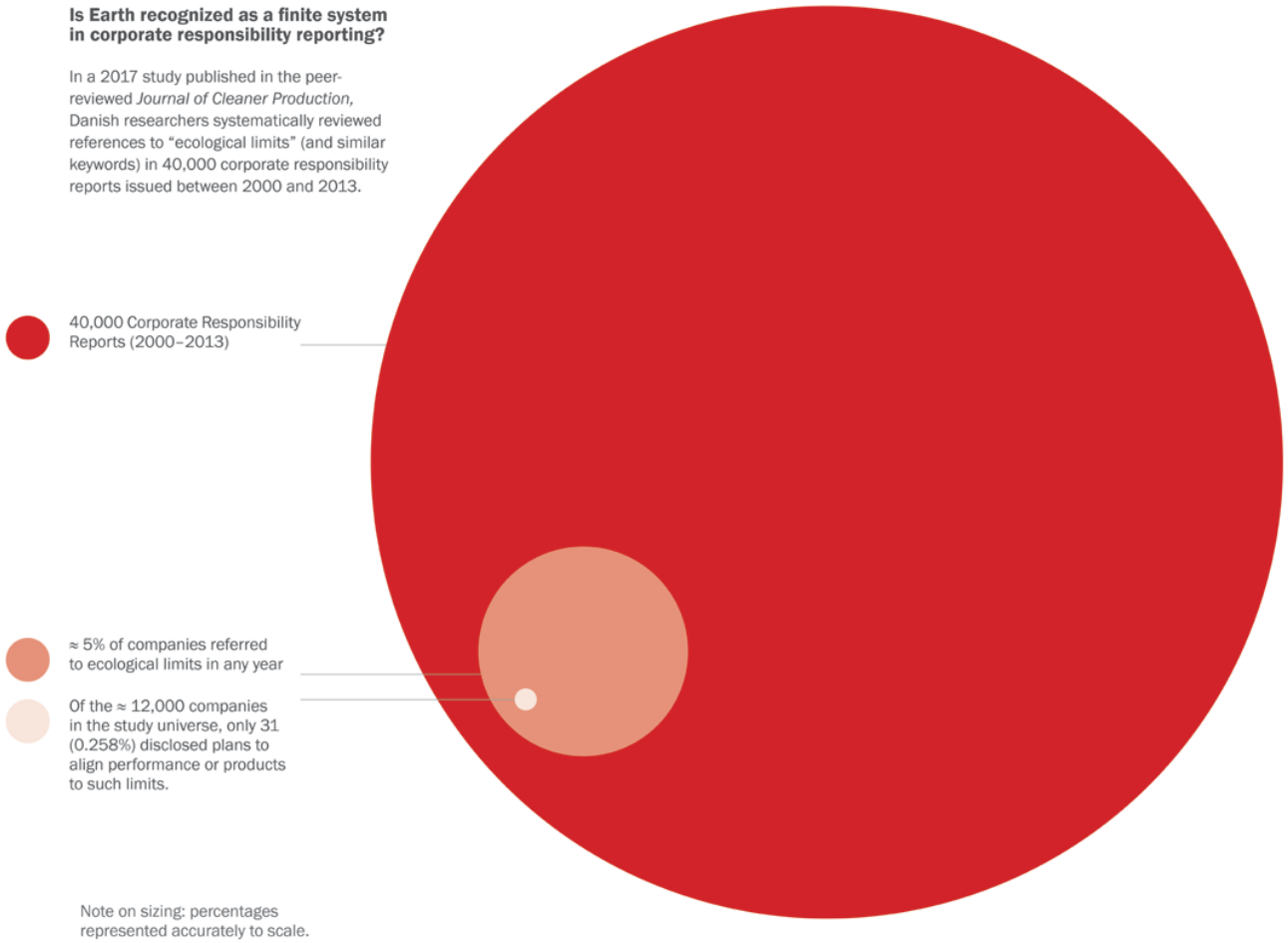
Source: Shift (2019). © Shift. Reproduced with permission.

The UNGPs illustrate the Shared versus Full Allocation question, as respecting human rights do not require allocation: companies are fully responsible for all of their human rights impacts. Human rights are not an allocated obligation, as they are not a shared resource. So Mohin's caution against applying context-based approaches due to supposed limitations actually does not make logical sense. It is unclear why the chief executive of the organization that originated the Sustainability Context Principle would hold such a profound misunderstanding of how to implement its own Principle.

Limitations: Where Are Tier Two Indicators to be Found?

How prevalent are **Tier Two** indicators? A recent study found an appalling paucity. A 2017 study by Danish researchers found that only 5 percent of the 40,000 so-called "sustainability" reports issued since 2000 make *any* mention of ecological thresholds, limits, or boundaries. What's more, only 31 of 9,000 reporters – a scant 0.3 percent – apply thresholds to their product development or corporate strategy (Bjørn et al. 2017). **See Figure 18**.

Figure 18: Is Earth recognized as a finite system in corporate responsibility reporting?



Source: Own illustration, based on Bjørn et al. (2017). Reproduced with permission.

This research finds that **Tier Two** approaches are practically non-existent – which is alarming, given the existential threat humanity faces from climate change and other crises. These results align with similar findings in a 2015 United Nations Environment Programme report, *Raising the Bar: Advancing Environmental Disclosure in Sustainability Reporting*, which found that only 8 per cent of 108 surveyed companies had established greenhouse gas emissions reduction targets in accordance with Paris Climate Agreement of well below 2°C (UNEP 2015).

So, while companies have been producing so-called "sustainability" reports for almost two decades, with the *Sustainability Context* Principle directing them to report on their organizational impacts on vital capitals in the context of the "limits and demands" on these economic, social, and environmental resources at the systems level, only a pittance of companies are doing this at all, with a few handfuls translating these limits to development and strategy. Clearly, a major explosion of scaling up **Tier Two** indicators is sorely needed.

Tier Three Indicators: Activating Transformation

> We need to press courageously to discuss well-being and define indicators that reflect it, even if we suspect that this process will shake up our worldviews and challenge our power structures and our lives. If those power structures and lives are in fact creating well-being, then they won't be challenged. If they are not, then they should be shaken.
>
> – Donella Meadows (1998, p. 66)

Given the persistent march away from our well-being, ever deeper into the minefields of unsustainability, ever closer to the cliffs of societal and planetary collapse, transformation is clearly needed (IPCC 2018) – but as Les McCann, Eddie Harris, and Gene McDaniels might likely ask: transformation *to what*? To that, add our overarching question in this report: transformation *indicated by what*?

These questions point to a deeper level of inquiry wrapped up in the question of transformation, which focuses our attention not only on *what* but perhaps more importantly on *how.* Indeed, **Tier Three** indicators – and more broadly, activity at the Third-Tier level – begins to transcend the reductionistic, mechanistic paradigm of measurement embedded in indicator thinking, embracing a more holistic, systemic approach that looks more for interconnected, mutually reinforcing triggers. **Tier Three** starts to direct our attention to indications of change other than only those that are quantifiable numerically.

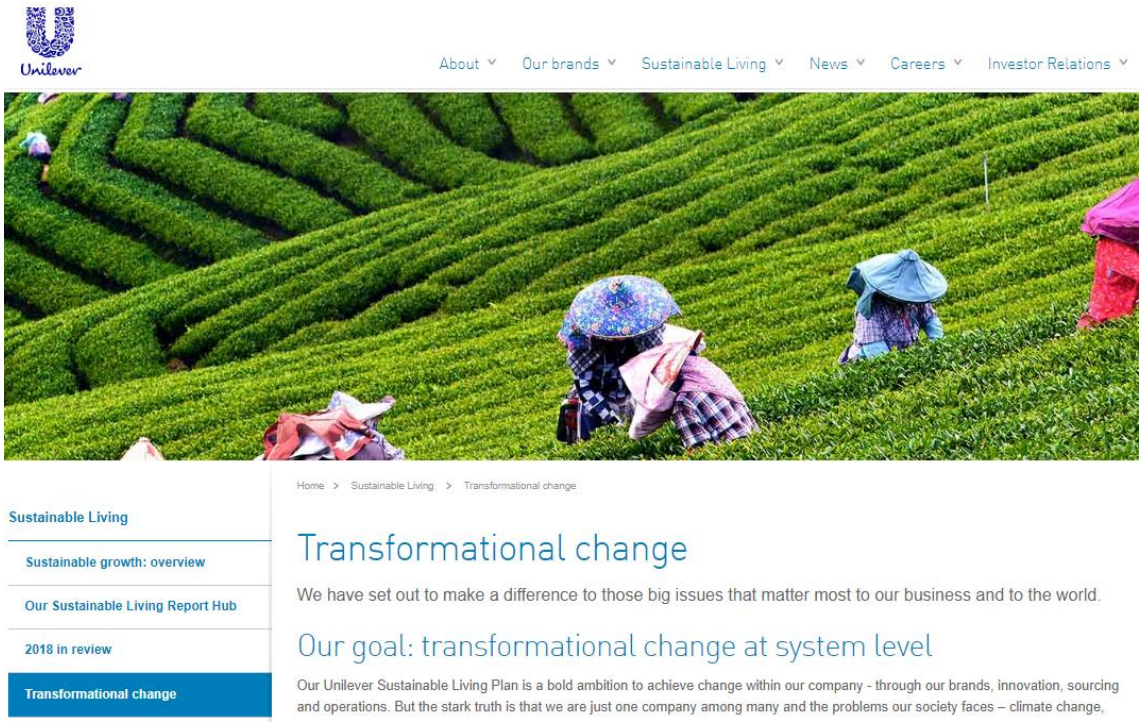
From What to How?

So, this chapter adds the how to the what. Given that indicators are predominantly oriented toward the what, this Third Tier necessarily starts to step beyond the traditional quantitative space of indicators, into the more qualitative space of policy, process, practice – and even deeper, perception. This is largely uncharted territory, which presents both challenges (in terms of appealing to pathbreakers who have already done the work for us) and opportunities (to propose approaches that fulfill the job of indication in ways that encompass this broader, more holistic scope). Accordingly, this chapter is by necessity more tentative and exploratory, identifying lines of thinking and activity that point toward ways to indicate transformation.

Transformational Change at the Systems Level

Returning to the case example of Unilever, we find that the company acknowledges the need for transformational change at the systems level (see **Figure 19**), even if our earlier inquiry revealed that the indicators employed by this poster child of corporate sustainability are firmly rooted in Tier One incrementalism. In other words, Unilever recognizes the need for radical change in the external world, but it has yet to measure its own impacts relative to the externals thresholds of necessary change to align with sustainability.

Figure 19: Unilever – Transformational Change



Source: Unilever (N.d.). Reproduced with permission.

The fact that Unilever is broadly perceived as a corporate sustainability leader underlines the gap in understanding and practice between company-level impacts and systems-level sustainability. Unilever acknowledging the need for systems-level transformation is, of course, welcome, but the company's general failure to apply contextual (i.e. **Tier Two**) indicators shows that the company lacks understanding of the micro-macro link between company-level impacts and aggregate systems-level results.

Leverage Points: Places to Intervene in a System

In her seminal 1998 *Indicators and Information Systems for Sustainable Development* report, Dana Meadows pointed out (as quoted in our *Introduction*) that "indicators are leverage points" (Meadows 1998, p. 5). A year later, sitting in a high-level meeting proposing new global systems, she engaged in an internal conversation with herself on the blind spots of what were being proposed.

> "This is a *huge new system* people are inventing!" I said to myself. "They haven't the slightest idea how this complex structure will behave," myself said back to me. "It's almost certainly an example of cranking the system in the wrong direction—it's aimed at growth, growth at any price!! And the control measures these nice, liberal folks are talking about to combat it—small parameter adjustments, weak negative feedback loops—are *way too puny*!!!" (Meadows 1999, p. 2)

In response, she rose and spontaneously brainstormed 9 signposts (which she subsequently expanded to 12, upon reflection) pointing toward ever-more powerful leverage points for catalyzing transformation. Her "places to intervene in a system" are in increasing order of effectiveness:

12. Constants, parameters, numbers (such as subsidies, taxes, standards);
11. the sizes of buffers and other stabilizing stocks, relative to their flows;

> 10. the structure of material stocks and flows (such as transport networks, population age structures);
> 9. the lengths of delays, relative to the rate of system change;
> 8. the strength of negative feedback loops, relative to the impacts they are trying to correct against;
> 7. the gain around driving positive feedback;
> 6. the structure of information flows (who does and does not have access to what kinds of information);
> 5. the rules of the system (such as incentives, punishments, constraints);
> 4. the power to add, change, evolve, or self-organize system structure;
> 3. the goals of the system;
> 2. the mindset or paradigm out of which the system – its goals, structure, rules, delays, parameters – arises;
> 1. the power to transcend paradigms (Meadows 1999, p. 3).

For the purposes of this report, it is instructive to note that her leverage points start in indicators' comfort zone ("numbers" at #12; "information flows" at #6). Each step she takes leads further from this zone, though, going deeper and deeper into the realm of transformative leverage, to structures of systems and the underlying cognition ("mindsets") that invents systems, finally to the overarching zeitgeist out of which systems arise ("paradigms").

Thresholds can be understood to fall on the weaker end of Meadows' continuum: "parameters" sits atop the list, at #12. However, the failure of Unilever – and the corporate and investment fields broadly – to integrate thresholds-based (i.e. **Tier Two**) indicators suggests that the problem runs deeper. Indeed, perhaps thresholds-based thinking is a "mindset," and maybe even a "paradigm."

It is perhaps not surprising that Meadows did not identify the number one "place to intervene in a system" in her original improvised list. It was only after reflection that she stepped back another layer to add "the power to transcend paradigms." It is worth quoting her at length to understand this paramount point:

> There is yet one leverage point that is even higher than changing a paradigm. That is to keep oneself unattached in the arena of paradigms, to stay flexible, to realize that no paradigm is "true," that every one, including the one that sweetly shapes your own worldview, is a tremendously limited understanding of an immense and amazing universe that is far beyond human comprehension. It is to "get" at a gut level the paradigm that there are paradigms, and to see that that itself is a paradigm, and to regard that whole realization as devastatingly funny. It is to let go into Not Knowing, into what the Buddhists call enlightenment...
>
> It is in this space of mastery over paradigms that people throw off addictions, live in constant joy, bring down empires, found religions, get locked up or "disappeared" or shot, and have impacts that last for millennia (Meadows 1999, p. 19).

But how does one *indicate* paradigms, much less transcendence of paradigms? That's the challenge this chapter poses.

Typologies of Transformation

First things first: as with the previous chapters on Tier One and Tier Two indicators where we provided typologies, let's now map the landscape of transformation. Steve Waddell,

Sandra Waddock, and colleagues start the job, in a 2015 paper where they "put forward a theory of large systems change (LSC)," first proposing a "typology of change" that closely aligns with our three tiers (Waddell et al. 2015):

- Incremental change focuses on reinforcing or reducing systems, while allowing it to gradually shift in a more or less continuous way, such as when a retail company expands by opening stores in new locations, and when wind turbine technology is replicated as an emerging innovation
- Reform happens when there is a shift of power or dominance among linked system components, again within a given system, such as when laws move regulation from government to business (self-regulation)
- Transformational change occurs when there is fundamental systemic change resulting from new ways of understanding what is possible and acting on them, such as South Africa's movement from preto post-apartheid, or the reconfiguration of physical and ecological processes in the natural environment resulting from human-driven climate change (Waddell, 2011).

The first bullet aligns with our Tier One incrementalism, and the final bullet aligns with our Tier Three transformation; it is less clear whether Tier Two aligns with Waddell et al.'s "Reform," as contextualization vis-à-vis thresholds is less a question of reformation, and more a question of re-orientation to the true system boundaries and parameters that is a precondition for transformation (the what to transform to).

Next, Waddell, Waddock, and colleagues walk us a few steps forward in the quest for understanding how transformation happens by examining the quality of actions that trigger transformation (see **Figure 20**):

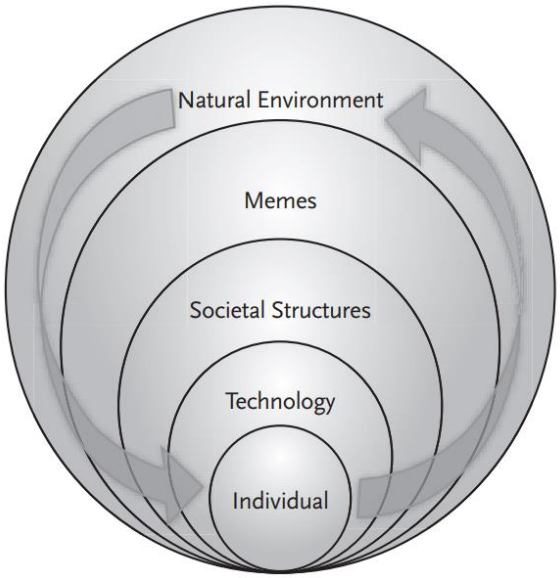
Figure 20: Change strategies: The four basic approaches to societal change

Source: Waddell (2018). Reproduced with permission.

This typology essentially actualizes Martin Luther King, Jr's dynamic relationship between the connectivity of love and the drive of power: "power without love is reckless and abusive and love without power is sentimental and anemic" (Waddell et al. 2015). Waddell et al. validate that each of these change actions have their place, though they note that compelled change tends to be "thin" – it doesn't take hold as deeply as co-created change resulting from generative collaboration. So, for the purposes of this report, "generative collaboration" can serve as an indication of transformative potential.

Finally, Waddell et al. turn their attention back to the what question: what changes in Large Systems Change (LSC)? See **Figure 21**:

Figure 21: What Changes in Large Systems Change



Source: Waddell et al. (2015). Reproduced with permission.

Note that the nestled between the third layer of Societal Structures (think "social foundations") and the fifth layer of Natural Environment (think "ecological ceilings") is a fourth layer – Memes – that brings us back to the beginning of this report, where the memes of Planetary Boundaries and the Doughnut leveraged graphical visualization as a means of "socializing" the concept of thresholds in ways that activated a "viral" spreading. The concepts were far from new – remember that Barbara Ward had posited the notion of "inner" and "outer" limits as early as 1974 – but the concept didn't take hold until accompanied by compelling memes that "greased the wheels" of their broad dissemination.

In her book Doughnut Economics, Kate Raworth describes the "Power of Pictures" in re-conceptualizing systems:

> If we want to rewrite economics, we need to redraw its pictures because we stand little chance of telling a new story if we stick to the old illustrations (Raworth 2017, p. 11)

Raworth cites cognitive linguist George Lakoff on framing, noting that "simply rebutting the dominant frame will, ironically, only serve to reinforce it [so] it is absolutely essential to have a compelling alternative frame…" (Raworth 2017, p. 20). (Replacing the term "frame" with the term "mindset" or "paradigm" reiterates the earlier point about thresholds being more than simply parameters, but rather overarching patterns.) So, the question for our inquiry is: how to indicate memes. How do we measure the fitness and success of a meme for spurring necessary transformation?

Waddell, Waddock, and other colleagues have recently launched the SDG Transformations Forum to focus on just these kinds of questions, and they sit on its first Working Group focused on "Transformational Evaluation for Transformational Development (TE-TD)" (SDG Transformations Forum 2019). For example, in the Working Group's Manifesto and First Initiatives, the third initiative listed is "Connecting with Blue Marble Evaluation," which "tracks and documents global systems changes, including transformational

developments… Blue Marble thinkers see the interconnections between the global and local, the macro and the micro, and the relationships between worldwide patterns and area-specific challenges" (SDG Transformations Forum 2019). Waddell (personal conversation, 24 May 2019) has confirmed that transformation indicators are largely non-existent currently, but that Blue Marble is working on transformational indicators in a report due out later in 2019 (Utilization-Focused Evaluation N.d.).

Pace / Scale / Scope

This link between the micro scale and the macro scale is such a persistent theme (remember, it undergirds the GRI Sustainability Context Principle) that it warrants explicit focus in search for transformational indicators. In fact, scale is one of three elements that undergird potential indicators of transformation: pace, scale, and scope.

Pace

When a current system is in crisis and collapsing, transformation to a new, viable system needs to transpire at a rate sufficient to retain the foundations of the existing system upon which to build the new system. Therefore, **pace** is a key element of transformation around which indicators can be oriented. Essentially, pace indicators could take a contextual approach of comparing *current* (actual) pace of change to *necessary* (normative) pace of change. IPCC decarbonization pathway scenarios bake in pace – for example with the imperative of reaching net zero carbon emissions by 2050 in order to have a 66 percent chance of averting catastrophic climate change.

Scale

Transformation requires scalability, as systemic change needs to occur across all scales – from the nano (individual) to the micro (organizational) to the meso (corporate industry, investment portfolio, or bioregional habitat) to the macro (economic, social, and ecological systems) levels (or scales). In particular, this involves what is called scale-linking as well as multilevel selection, which are both explained in some depth below (Wahl 2007; Wilson 2019). The key element of scale as an indicator of transformation is to indicate synergies between and amongst multiple scales simultaneously. Ideal transformation indicators would enable an understanding of how the multiple scales interact dynamically to trigger transformation.

Scope

Scope addresses the sufficient breadth of consideration for necessary transformation. Again, using the example of climate change, carbon emissions are typically parsed along the value chain (or value cycle in circular models) into three Scopes:

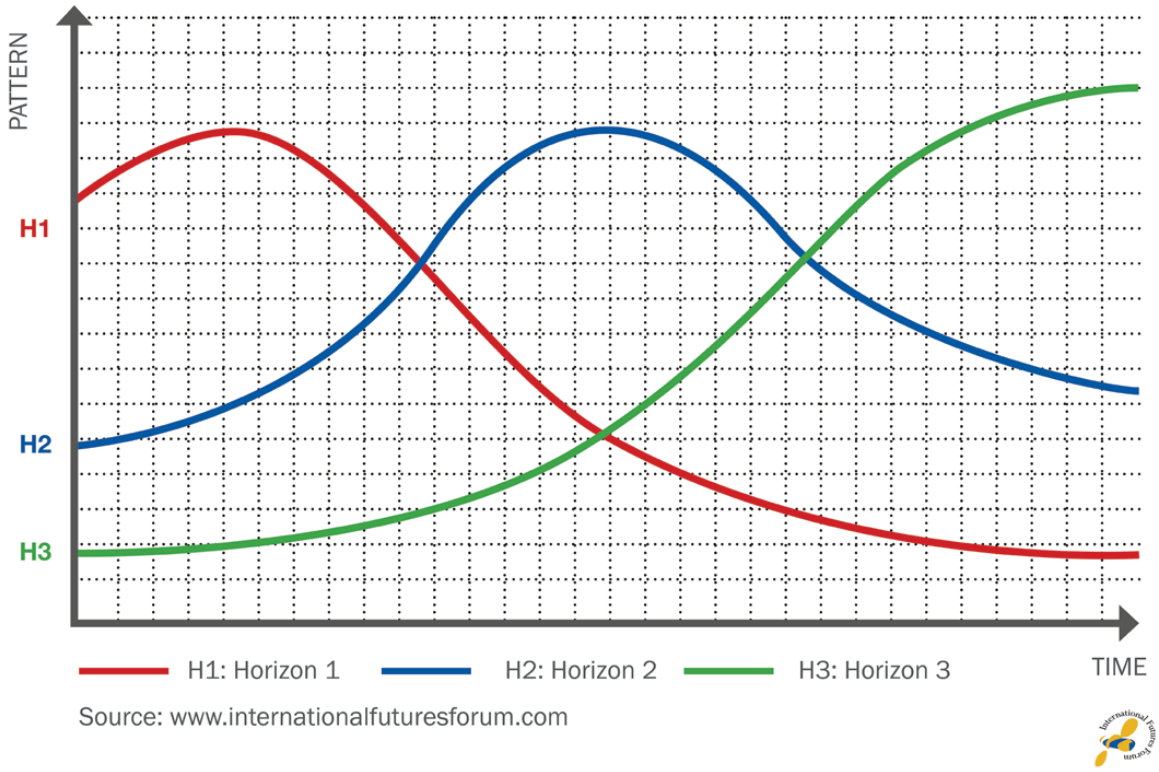
- Scope One is an organization's own direct emissions;
- Scope Two is its indirect emissions from purchased electricity and other forms of energy provision; and
- Scope Three is upstream supply chain emissions and downstream product / service use emissions (Greenhouse Gas Protocol N.d.).

And, scope can apply to many other elements as well. For example, it can apply across all the multiple capitals, and it can be combined with scale to look at first person (subjective), second person (intersubjective), and third person (objective) perspectives (and indicators) (Esbjörn-Hargens and Zimmerman 2011).

Pace: Three Horizons

"Sustainability indicators must be more than environmental indicators; they must be about time and/or thresholds," states Donella Meadows in her seminal Indicators and Information Systems for Sustainable Development report (Meadows 1998 p. viii). The rate of time is measured by "pace." Bill Sharpe and colleagues at the International Futures Forum conceived an expansive means of tracking transformation through the lens of "three horizons" that looks at the world in crisis (Horizon 1, or H1, in red below in **Figure 22**), the world in turbulent transition (Horizon 2, or H2, in blue) and the world in transformation to ongoing viability through regenerative culture (Horizon 3 or H3, in green) (Sharpe 2013).

Figure 22: Three horizons framework applied to the transition towards a regenerative culture



Source: Own illustration, adapted from Sharpe (2013). Reproduced with permission.

What is instructive about the Three Horizons Framework for our Three-Tiered approach to Sustainable Development Performance Indicators is that all three horizons are always present simultaneously, with different levels of prevalence. Extrapolating this to our Framework, we see that the Three Tiers also coexist with different prevalence.

Tier One indicators track incremental progress, and are insufficient for transformation in-and-of-themselves. But by the same token, they are necessary preconditions for Tier Two indicators, which require a numerator to be "normalized" by a denominator. And Tier Three indicators focus on the how, but still need Tier Two indicators to identify the what.

The other useful aspect of Sharpe's Three Horizons Framework is its distinction between H2- (or "sustaining" innovation that serves to entrench H1) and H2+ (or "transformative" innovation that spurs the emergence of H3). Similarly, Tier One indicators alone can enact what Alex Steffen calls "predatory delay" that acts like molasses, slowing the progress of

inevitable transformation in order to continue profiting from the status quo regime in the meanwhile (Steffen 2016).

Scale: Scale-Linking and Multilevel Selection

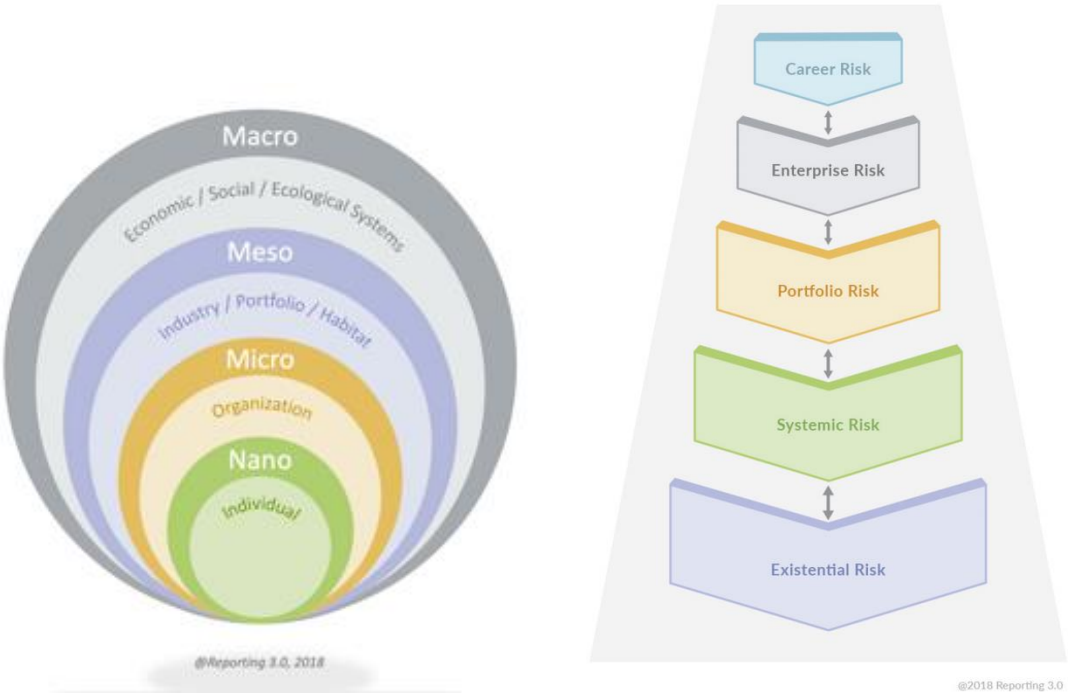
Designing Regenerative Cultures author Daniel Christian Wahl introduces the notion of "scale-linking":

> John Tillman Lyle proposed, 'We need to recognize that every ecosystem is a part—or subsystem—of a larger system and that it in turn includes a number of yet smaller subsystems. It also has necessary linkages to both the larger and the smaller units' (p. 17). In doing so, Lyle described the holarchical, after Arthur Koestler, structure of healthy and sustainable processes. Lyle explained: 'Our range of design scales forms a hierarchy that corresponds to the concept of levels of integration in nature or in any organized system.' He believed: 'Certain principles of organization link the levels of this hierarchy and provide guidance for design at any given level' (p. 17). Lyle was one of the pioneers of scale-linking design for systemic health, which he explored in his insightful book Design for Human Ecosystems (Wahl 2007, p. 238).

r3.0 (formerly known as Reporting 3.0) represents these nested and interconnected scales at the nano (individual), micro (enterprise), meso (corporate industry, investment portfolio, and bioregional habitat), and macro (economic, social, and ecological systems) levels. To illustrate these scale interlinkages in practice, r3.0 poses the case of risk, extending the traditional scope of consideration from the traditional micro scale of Enterprise Risk Management (ERM) down to the nano scale of Career Risk that can be incurred when raising issues that fall outside this traditional scope – particularly when it calls into question the status quo by proposing the need for transformative change.

In the other direction, r3.0 extends from the traditional meso level of Portfolio Risk to consider macro level Systemic Risk (which emerged as a field of study focused on the economy after the 2008 Global Financial Crisis, but also applies to Climate Systemic Risk) as well as at the supra level to consider Existential Risk – for example, the clear and present danger that climate change will trigger societal, civilizational, and planetary collapses. Scale-linking suggests that these risks are not isolated and independent, but rather intimately interlinked. For example, advocating for addressing climate change commensurate with the challenge – and pointing out shortcomings at the institutional level – creates tangible Career Risk at the individual nano level that aggregates to the highest supra level of Existential Risk. See **Figure 23**.

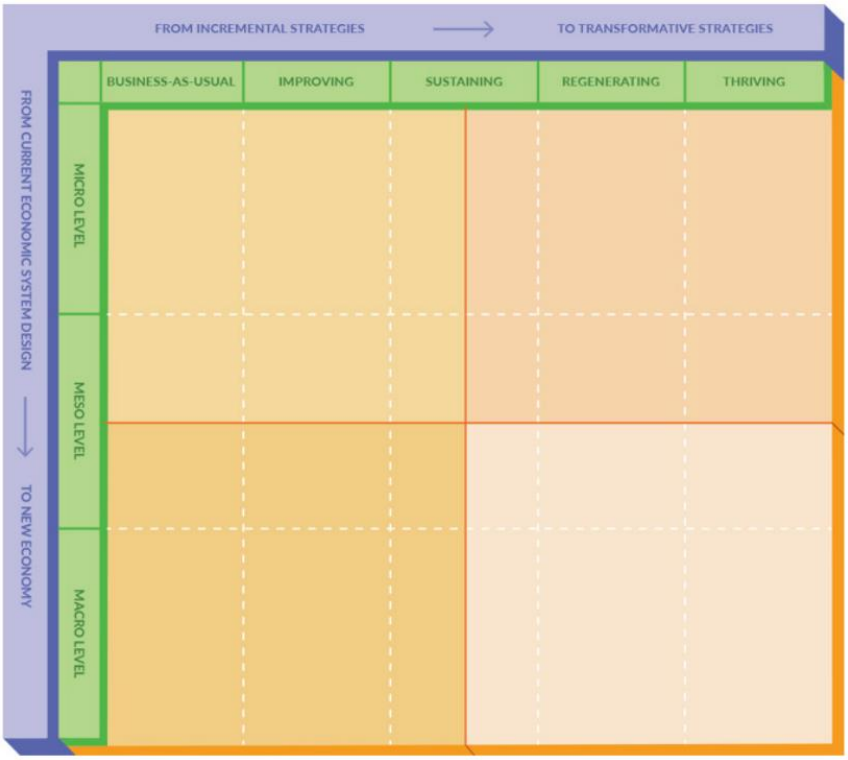
Figure 23: Nested Scales and Risk Continuum



Source: Thurm et al. (2018). Reproduced with permission.

R3.0 also applies scale-linking in its Strategy Continuum, which poses five phases of transformation – from business-as-usual to incremental improving to break-even sustaining to net positive regenerating to gross positive thriving – on the horizontal axis. More importantly, on the vertical axis, r3.0 poses a scale spectrum from the micro enterprise level to the meso industry / portfolio / habitat level to the macro economic, social, and ecological systems level. See **Figure 24**.

Figure 24: Reporting 3.0 Strategy Continuum



Source: Thurm et al. (2018). Reproduced with permission.

Scale-linking holds that transformation at one scale can trigger transformation at other (lower and higher) scales in dynamic mutually reinforcing synergies. As r3.0 Co-Founder and Managing Director Ralph Thurm says:

> There is no such thing as a sustainable business in an unsustainable society and economy (Thurm et al. 2018).

Transformation to sustainability and beyond to regeneration and thriving requires action at all levels / scales. The biological sciences reinforce this notion of scale-linking through application of the principles of Darwinian evolution, according to evolutionary biologist David Sloan Wilson. After dispelling the myth of "Social Darwinism" (a misapplied term, as it never links specifically to Darwinian principles), Wilson notes the peculiar research finding that natural selection tends to favor self-interest at the individual scale, but *not* at the group scale (Wilson 2019). In a 2007 article with famed evolutionary biologist Edward O. Wilson, he summarized Darwin's theory of two-way selection thus:

> Selfishness beats altruism within groups. Altruistic groups beat selfish groups. Everything else is commentary (Wilson 2019).

Wilson notes that this interlinked dynamic applies not only at these dual levels, but rather at *all* levels, from genes to Gaia, prompting him to propose the notion of "multilevel selection" (MLS) (Wilson 2019). In 2009, a pair of academics from Harvard and Stanford collaborated with an IBM executive to demonstrate how his company applied MLS to enact conscious evolution. Specifically, they first establish the empirical evidence that companies live no more than 40 years on average, despite the fact that they are typically sufficiently well resourced to last longer. The problem: institutions tend to engineer themselves for survival based on existing circumstances, and are not well suited to project future circumstances that diverge from their DNA coding (O'Reilly et al. 2009).

To solve this problem, IBM employed MLS via "organizational ambidexterity" by tapping into both natural selection (the predominant focus of existing research) *and*

adaptation (a less examined strategy). Specifically, the company enacted adaptations by employing the Emerging Business Organization (EBO) approach that fosters innovation by spinning off small organizations to incubate new business models, outside the orbital pull of the parent organization's DNA. The authors note that

> …multi-level selection has been explicitly designed and implemented by IBM to develop new businesses. This is a deliberate, repeatable process that the company uses to ensure ecological fitness in changing markets and technologies. New businesses are designed to maximize their contribution to the organization's gene pool by developing and extending dynamic capabilities (O'Reilly et al. 2009).

While this process is promising from a traditional financial perspective (it added $15.2B to IBM's top line between 2000 and 2005), the implications are significant for this kind of cultural evolution to address rising societal pressures and crises by transforming organizations – and higher level entites – using multilevel selection

The key question for this report is: how to *indicate* multilevel selection. In other words, how do we create indicators that represent change at multiple levels – from nano (individual) to micro (organizational) to meso (sector, portfolio, and habitat) to macro (systemic) – that align with evolutionary selection dynamics.

Scope: MultiCapital Scorecard and MetaImpact Framework

Scope addresses the breadth of consideration – from a **Tier Three** perspective, transformation requires holistic change across the full breadth of scope. Take vital capital resources, for example. Mark McElroy (and his colleague Jo van Engelen) defines capital as "a stock of anything that produces a flow of valuable goods or services that people need and use in order to ensure their own well-being." (McElroy and van Engelen 2012) McElroy and van Engelen embrace the multiple capitals (Natural, Human, Social, Financial, etc…) established by Ekins, Porritt, and many others. The multiple capitals thus expand across a broad scope of inquiry. Systemic transformation therefore requires attention to impacts on vital capitals across their full spectrum.

To operationalize this full-scope focus, McElroy collaborated with former Unilever finance executive Martin Thomas to conceive the MultiCapital Scorecard (MCS), which extends a thresholds-based approach to apply to economic and financial capital as well as the other vital capitals already covered by the concept of Context-Based Sustainability (McElroy and van Engelen 2012; Thomas and McElroy 2016). See **Figure 25**.

Figure 25: MultiCapital Scorecard

Sample MultiCapital Scorecard

Vital capitals*

- Natural
- Constructed
- Human
- Social & Relationship
- Internal Economic–Financial
- Internal Economic–Nonfinancial
- External Economic–Financial
- External Economic–Nonfinancial

BOTTOM LINE	AREAS OF IMPACT	CAPITAL IMPACTS	A Progression score	B Weight	C Weighted score (AxB)	D Fully sustainable score (Bx3)	Gap to fully sustainable (D-C)	Area of impact (AoI) bottom line (C/D)	TRIPLE BOTTOM LINE SCORES
SOCIAL	Product safety		3	5	15	15	0	100%	43%
	Workplace safety		-1	5	-5	15	20	-33%	
	Gender equity		2	4	8	12	4	67%	
ECONOMIC	Living wages		1	1	1	3	2	33%	79%
	Equity		2	5	10	15	5	67%	
	Debt		3	5	15	15	0	100%	
ENVIRONMENTAL	Climate system		-2	4	-8	12	16	-66%	0%
	Water		2	3	6	9	3	67%	
	Solid waste		1	2	2	6	4	33%	
		OVERALL PERFORMANCE			44	102			43%

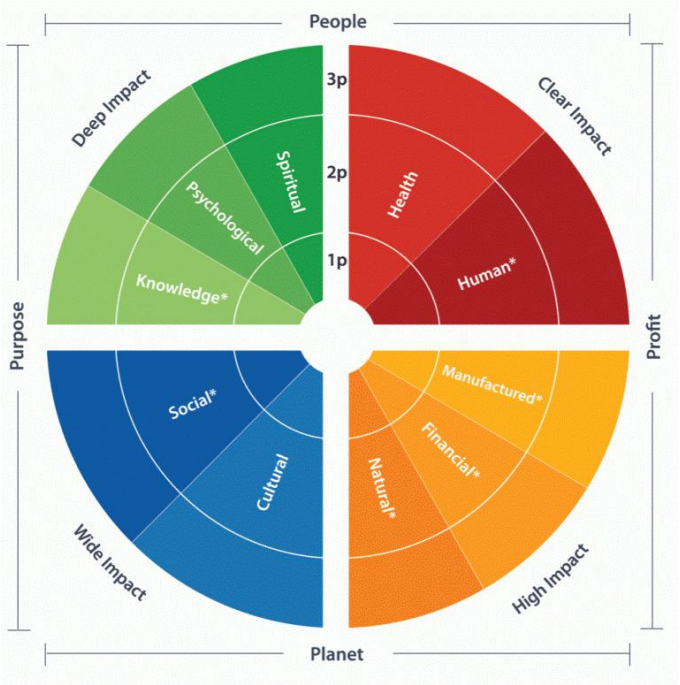
Note: Areas of impact shown here are purely illustrative and are always organization-specific.
*Intellectual Capital is typically embedded in most of the others.

Source: Thomas and McElroy (2016). Reproduced with permission.

In addition to covering scope, the MCS also applies trajectory targets in its Progression Score to track the pace towards meeting sustainability norms and performance standards. The methodology is oriented toward application at the enterprise scale, though it has also been applied at the national scale in a study of the fourth industrial revolution conducted by Ernst & Young for presentation at the World Economic Forum (Ernst & Young 2017; Baue 2019b). It is therefore conceivable that the methodology could be applied across scales to enable scale-linking, and ultimately fuel the shift from what McElroy calls monocapitalism (focused exclusively on financial capital) to what he calls multicapitalism (focused on the carrying capacities of the multiple capitals) (Thomas and McElroy 2016).

Intrigued by the multicapital approach, Sean Esbjörn-Hargens of MetaIntegral conducted a study of all multiple capital approaches he could find, which he synthesized into a 10-capitals approach called the MetaImpact Framework (see **Figure 26** for the 10 capitals). This approach extends the multiple capital approaches by also looking at first person (subjective), second person (intersubjective), and third person (objective) data. The Framework is organized across four bottom lines, adding "purpose" to the traditional "people," "planet" and "profit."

Figure 26: MetaIntegral Framework



Source: Esbjörn-Hargens (2019). Reproduced with permission.

Esbjörn-Hargens notes that traditional "monocapitalist" indicators and metrics focus only on quatitative data about one form of capital (financial) through one perspective (objective third person); triple-bottom line indicators and metrics extend the purview to more capitals, but still limit their scope to quantitative data via objective third person measures. He advocates for a full multicapitalist approach that extends the scope of inquiry not only across all 10 capitals but also across all three perspectives (first, second, and third person) to blend both quantitative and qualitative data (though as of now the MetaImpact Framework does not integrate thresholds) (Esbjörn-Hargens 2019). See **Figure 27**.

Figure 27: From Single Value Monocapitalism to Blended Value Multicapitalism

Traditional "financial only" capitalism is a harmful liquidation of all other capitals/values to produce profit.

Social impact investing expanded this to additional types of capitals/values (e.g., social, natural, health) but remains largely focused on quantitative and some qualitative metrics.

Now we need to be bolder, think bigger, and be audacious – taking things to the next level by creating blended values across 10 distinct types of capital using quantitative and qualitative metrics.

Source: Adapted from Esbjörn-Hargens (2019). Reproduced with permission.

This approach enables tracking across four realms of impact (deep, clear, high, and wide) that align with the four quadrants of Integral Theory, which address the continuums between individual and collective and between interior and exterior (Wilber 2014), see **Figure 28**.

Figure 28: The Four Quadrants of Integral Theory

Source: Wilber (2014). Reproduced with permission.

The MetaImpact Framework, which is developing a software implementation in partnership with Holochain and its Commons Engine application, is structured to provide data on the following transformation across the four impact realms:

- **Deep Impact** (Upper Left – Subjective): transforming the hearts and minds of the people involved;
- **Clear Impact** (Upper Right – Objective): transforming the behaviors of the individuals involved;
- **High Impact** (Lower Left – Interobjective): transforming the various natural and social systems involved with the effort;
- **Wide Impact** (Lower Right – Intersubjective): transforming the relationships among members of the communities involved (Esbjörn-Hargens 2019).

Accordingly, this multicapitalist, multiperspectival framework shows promise for demonstrating transformation indicators operating in these four impact realms – not only *what* but also *how*. **See Figure 29**.

Figure 29: Four Impact Realms of Transformation

Source: Esbjörn-Hargens (2019). Reproduced with permission.

The blending of quantitative and qualitative data in the MetaImpact Framework starts to move toward what Nora Bateson of the International Bateson Institute calls "Warm Data," which she defines as "transcontextual information about the interrelationships that integrate a complex system" (Bateson 2017):

1. Observing the observer
2. Multiple description
3. Fluid patterning
4. Paradox, inconsistency and time
5. Holism and Reductionism
6. Cultural responsibility
7. Aesthetic, mood, rhythm.

Tier Three Transformation Indicators' focus on both the *what* and the *how* blends contexts by definition, and therefore steps firmly into the realm of Warm Data. Stated differently, transformation is an inherently context-specific process, so indicators describing transformation will require a transcontextual orientation that blends quantitative and qualitative elements, in order to capture the benefits of reductionistism *and* holism.

Ending on a reminder of Steve Waddell's confirmation that transformation indicators are largely non-existent, this historical moment represents a significant opportunity to develop transformation indicators while deploying necessary transformations, advancing an "action research" approach.

Conclusion

> [I]t is tempting, given all the caveats and challenges … in every report on sustainable development indicators, to be daunted, to postpone the task, to wait for more thinking, more modeling, more agreement – to wait for perfection. While we are waiting for perfection, fisheries are collapsing, greenhouse gases are accumulating, species are disappearing, soils are eroding, forests are overcut, people are suffering. So, it is important to get some preliminary indicators out there and into use, the best we can do at the moment. That way, as long as we are willing to evaluate and make corrections, we can start to learn, which is the only way we can ever achieve sustainable development.
>
> – Donella Meadows, *Indicators and Information Systems for Sustainable Development* (1998, p. 78)

> Sustainability requires contextualization within thresholds. That's what sustainability is all about. Yet to this day, contextualization rarely appears in sustainability reports. I think the time for procrastination has passed; the time for aggressive movement is upon us.
>
> – Allen White, Co-Founder, Global Reporting Initiative; Vice President and Senior Fellow, Tellus Institute (Baue and White 2014)

The job of sustainable development performance indicators is, as the term suggests, to *indicate* performance on sustainable development – with the end goal of actually *achieving* sustainable development. However, as this report demonstrates, current indicators almost universally lack the ability to indicate the achievement of sustainable development, as they fail to reference thresholds that delineate between sustainability and unsustainability. In this report's terms, there is an abundance of **Tier One** (*Incrementalist Numeration*) indicators, and a dearth of **Tier Two** (*Contextualized Denomination*) indicators. And when it comes to the kinds of transformations necessary to achieve sustainable development, there is almost complete absence of **Tier Three** (*Activating Transformation*) indicators.

So, a set of Recommendations concludes this report, to lay out pathways and strategies for advancing the state of indicators for achieving sustainable development. In that regard, this report follows in the footsteps of the 2015 UNEP *Raising the Bar* report, which set forth a series of Recommendations advocating for broad implementation of Sustainability Context and the attendant thresholds, allocations, and carrying capacities of the capitals. Specifically, the *Raising the Bar* report recommended that:

- All companies should apply a context-based approach to sustainability reporting, allocating their fair share impacts on common capital resources within the thresholds of their carrying capacities.
- Multilateral organizations should collaborate to create a global governance body of scientists, academics, business practitioners, NGOs and other stakeholders to provide guidance on methodologies for determining ecological (and social) thresholds, as well as guidance on approaches to allocations, all of which are broadly applicable to the business level.
- Reporting standards / guidance bodies such as GRI, IIRC, SASB, CDP, etc. should integrate Sustainability Context more explicitly into their frameworks, for

example by applying the concept of carrying capacities to multiple capitals-based frameworks (United Nations Environment Programme 2015).

On the middle Recommendation, r3.0 is incubating a Global Thresholds & Allocations Council (GTAC) as an authoritative advisory governance body to vet and validate threshold determinations, allocation approaches, and off-the-shelf methodologies for entities (such as business enterprises, investment organizations, and geopolitical governing bodies) to apply with confidence (Reporting 3.0 N.d.).

This report lays out the following recommendations:

- All entities that have impacts on vital capital resources that stakeholders rely on for their wellbeing have duties and obligations to measure, manage, and report on these impacts using **Tier Two** (*Contextualized Denomination*) indicators that allocate their fair-share impacts on these common capital resources within the thresholds of their carrying capacities.
- Multilateral organizations (such as UN bodies) should collaborate to create a global governance body of scientists, academics, business practitioners, NGOs and other stakeholders to provide guidance on methodologies for determining ecological and social thresholds, as well as guidance on approaches to allocations, all of which are readily and broadly applicable in practice by business, investment, and governing organizations, among others.
- Organizations with purview over reporting and accounting should embrace Context-Based mindsets by integrating **Tier Two** (*Contextualized Denomination*) indicators more explicitly into their frameworks, for example by applying the concept of carrying capacities to multiple capitals-based frameworks.
- All relevant organizations and bodies should promote research and development as well as broad incubation and implementation of **Tier Three** (*Activating Transformation*) indicators.

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