

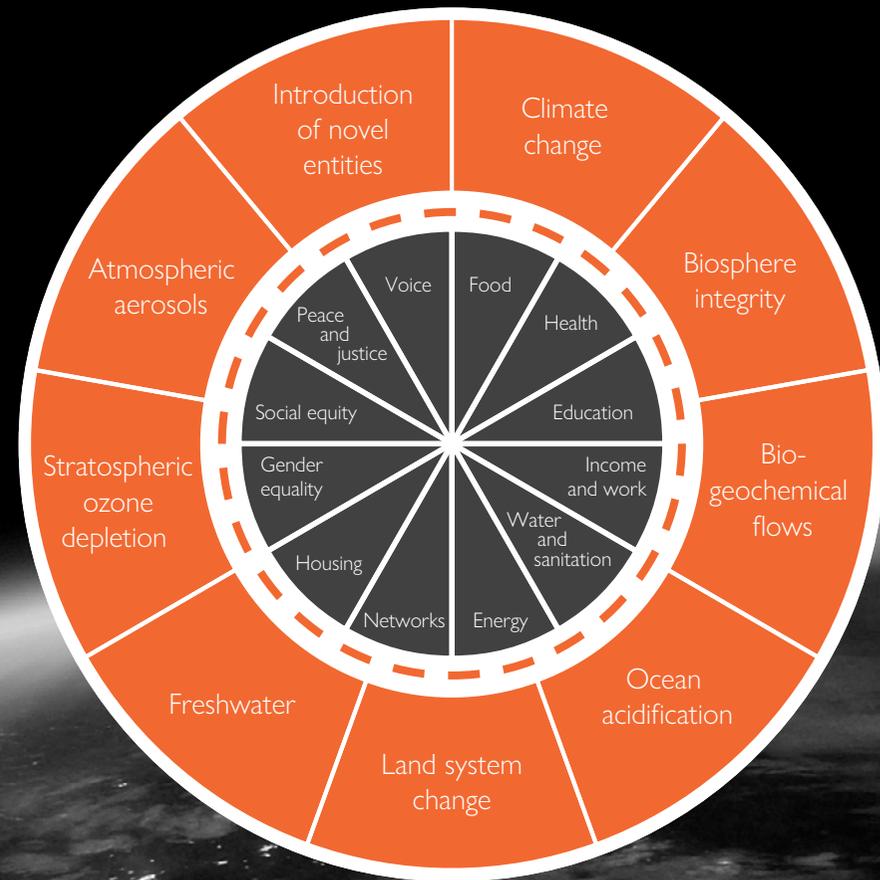
Planetary Boundaries  
and Social Thresholds: Are we  
measuring the right thing?

*A practitioner's perspective*

Business Briefing – August 2017

# What are our Planetary Boundaries and Social Thresholds?

In 2009, Rockström et al<sup>1</sup> identified nine 'planetary life support systems'<sup>2</sup> essential for human survival, which if crossed could result in severe, abrupt and possibly irreversible environmental change to our planet<sup>3</sup>. Raworth (2012 and 2016) has combined the nine planetary boundaries with eleven social thresholds<sup>4</sup>. Together this model sets out the environmental boundaries which we must not cross and the basic social thresholds which we must strive to ensure every person reaches. **These boundaries and thresholds informed the United Nation's Sustainability Development Goals.**



<sup>1</sup>Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin III, F.S., Lambin, E., Lenton, T., Scheffer, M., Folke, C., Schellnhuber, H.J. and Nykvist, B., 2009. Planetary boundaries: exploring the safe operating space for humanity. *Ecology and society*, 14(2).

<sup>2</sup>Planetary Boundaries Introduction of novel entities (chemical pollution); climate change; biosphere integrity; bio-geochemical flows; Ocean acidification; Land system change; Freshwater; Stratospheric ozone depletion; Aerosol loading

<sup>3</sup>In 2015, Steffen et al. validated the original set of boundaries and provided an updated analysis and quantification for several of them

<sup>4</sup>Raworth, K., 2012. A safe and just space for humanity: can we live within the doughnut. *Oxfam Policy and Practice: Climate Change and Resilience*, 8(1), pp.1-26. Social Thresholds (Raworth 2016): Food; Health; Education; Income and work; Water and sanitation; Energy; Networks; Housing; Gender equality; Social equity; Peace and justice; Voice

## Why do they matter?

Planetary boundaries represent tipping points – once the global concentration of greenhouse gases passes a certain point, sea level rise and ocean acidification become irreversible. *“Once you go beyond a certain threshold, you can't go back.”* Social Thresholds represent basic human rights, every person to have the right to resources such as food, water, housing, health care, and energy. Critically, boundaries and thresholds are interdependent. Activities designed to ensure we stay within our planetary boundaries can push people further below the social thresholds. Whilst certain actions to eradicate poverty can exacerbate environmental destruction. Four critical questions arise for global sustainability challenges.

- How we need to share the pie (e.g. so everyone has a share of available water)?
- Where do we need to increase the pie (e.g. so everyone has access to energy)?
- Where do we need to close the gap (e.g. in addressing inequality and inequities)?
- Can we close the gap without crossing one or more planetary boundaries?

## Case in point:

### **We are crossing our Planetary Boundary for Availability of Freshwater:**

The regional boundary set for water withdrawn from individual river basins is 25% of the flow during low-flow months; 30% during immediate- and 55% during high-flow months. This is regularly breached around the world. Over the past seven years withdrawals from the Colorado River Basin have exceeded the average annual supply (17.8bn M<sup>3</sup>) creating severe water scarcities for 35m people in California<sup>5</sup>.

**We are failing to meet the Social Thresholds for Food** - no individual should be malnourished. Yet, in 2016, 11% of the global population are hungry and starving, whilst every 10 seconds, a child dies from hunger-related diseases every year<sup>6</sup>.

### **The interlinkage between aerosol loading (air pollution) and global health:**

Globally, 2.7 billion people have no access to clean cooking facilities and rely on traditional biomass and coal for cooking. Inhaling fumes from smoky fires leads to an estimated 1.5 million premature deaths each year due to lung disease<sup>7</sup>. Burning biomass also produces black soot aerosols and CO<sub>2</sub> emissions, and the use of wood as a fuel can lead to local deforestation and biodiversity loss thus deepening poverty.

<sup>5</sup> <http://pacinst.org/issues/sustainable-water-management-local-to-global/colorado-river/>

<sup>6</sup> The hunger project - <http://www.thp.org/knowledge-center/know-your-world-facts-about-hunger-poverty/>

<sup>7</sup> Raworth, K., 2012. A safe and just space for humanity: can we live within the doughnut. *Oxfam Policy and Practice: Climate Change and Resilience*, 8(1), pp.1-26.

# Are we measuring the right things?

The world is awash with data, each year more companies measure and report on their sustainability performance, however, we are rapidly approaching, and indeed breaching, our planetary boundaries, whilst basic social thresholds are still not being met. **This raises the question... are we wasting time and resources measuring the wrong thing? And if so, how can we make measures more meaningful?**

## Our approach

We have been examining the role of businesses in addressing Global limits since 2013. This year we approached our research differently by focusing on some of the familiar challenges we have heard directly from practitioners.

- **“Our business does not see the boundaries / thresholds as a risk”** We examined what companies did consider as risks, by reviewing the risk disclosures made by 53 of the world's largest companies.
- **“We can't measure our impact at that scale”** We reviewed what 209 of the world's largest companies already measure (and set targets for) against the planetary boundaries and social thresholds.
- **“What works in practice?”** We spoke with 45 sustainability experts, to understand how other sectors, industries and countries are considering planetary boundaries and social thresholds.
- **“We don't need another methodology / framework”.** We reviewed existing tools, frameworks and regulatory requirements to understand where planetary boundaries and social thresholds fit.
- **“How can we do it?”** We launched our Project #D pilot, engaging two companies to co-develop a pragmatic approach to embed 'planetary boundaries and social thresholds' into their materiality, measurement, targets and reporting.

## Business responsibility:

Addressing planetary boundaries and social thresholds, as with the UN SDGs, requires international and national government coordination and policy action – but these will not be achieved without meaningful action by business.

- Business has a critical impact on many of the boundaries (e.g. GHG emissions; ozone depleting substances) and thresholds (e.g. youth employments; gender equality; living wages).
- Business has a key role to play as an engine of economic growth and employment and a source of finance, technology and innovation.

## Why planetary boundaries and social thresholds matter to business:

They provide the foundations upon which businesses exist, whereby natural capital (e.g. water; biodiversity; land) and social capital (e.g. employees) are transformed into financial capital (e.g. wealth).

They represent **Critical risks to business**. The economic costs of indoor and outdoor pollution costs the world more than \$5tn annually in lost work days and welfare costs<sup>8</sup>.

They represent **New opportunities for business**. Addressing social thresholds related to food could be worth over US\$2.3 trillion annually for the private sector by 2030<sup>9</sup>.

This briefing brings together research conducted by Article 13 to understand how companies measure their performance, in the context of planetary boundaries and social thresholds, specifically:

- 1 Are businesses measuring all the risks they are facing?
- 2 Are businesses measuring their performance in context?
- 3 Are businesses measuring the consequences of their activities?
- 4 Are businesses measuring if we are going in the right direction?
- 5 Are businesses measuring how long it will take to address the PBs and STs?

<sup>8</sup>World Bank Group (2016) The Cost of Air Pollution  
<sup>9</sup>Business and Sustainable Development Commission (2017) – Better Business, Better World – [report.businesscommission.org/report](http://report.businesscommission.org/report)

# 1. Are businesses measuring all the risks they face?

**Why it matters?** Breaching any of our Planetary Boundaries and/or Social Thresholds, represents a critical risk for business with direct financial, regulatory and reputational implications. For instance... ?

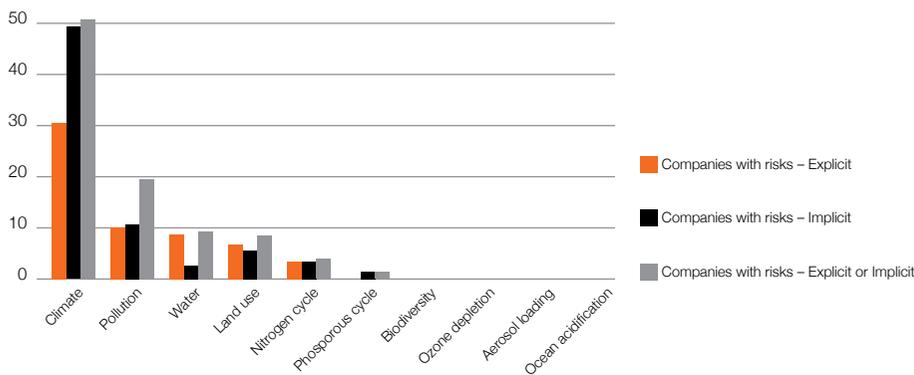
*“In 2016, 607 companies lost \$14 billion due to water scarcity, drought, flood and other water risks.”<sup>10</sup>*

**What we found?** Based on a review of the risks disclosed by 53 of the world's largest companies<sup>11</sup>, we found that the majority are not disclosing risk related to planetary boundaries and social thresholds (see graph). Further, planetary boundaries and social thresholds are not equally weighted or understood in terms of the risks they represent. Whilst risks associated with boundaries such as climate change, pollution, access to education (in relation to future employees) are beginning to be articulated, many others are omitted even when they could represent a material risk.

*“There is a mismatch between what companies see as their material issues vs. what the material issues are for the world.”*

[Multi-stakeholder Business group]

**Planetary Boundary Risk Count**



## Case in point:

### How companies measure the risk of Planetary Boundaries and Social Thresholds

**96% of the companies reviewed cite climate change as a risk to their business – for example**

*“Natural disasters, [...] whether as a result of climate change or [...] severe changes in climate [...] could adversely affect our operations and financial performance. Such events could result in physical damage to [...] one or more of our properties, the closure of one or more stores, clubs and distribution facilities, [...] [and] the inability of customers [...] to reach ... our stores, [...] changes in the purchasing patterns of consumers and in consumers' disposable income, [...] [and] the disruption in the supply of products from local and overseas suppliers.”*

[Global Retailer – within SEC disclosure]

**NONE of the companies cite ocean acidification as a risk to their business**

The oceans currently absorb approximately half of CO<sub>2</sub> produced by burning fossil fuels. However, when CO<sub>2</sub> dissolves in seawater it forms carbonic acid, causing the pH of the ocean to decrease, creating a more acidic ocean. The ocean pH has already decreased by about 30% and if we continue emitting CO<sub>2</sub> at the same rate by 2100 ocean acidity will increase by about 150%. Reducing the pH of the oceans impacts the ocean food chains<sup>12</sup>, with potentially wide ranging impacts on fisheries. A 2016 study found that the US shellfish business – worth \$1bn per year – is facing “high economic risk” in 15 out of 23 coastal states. Ocean acidification represents a critical risk for over one billion of the poorest people, for whom fish and seafood are the primary source of protein<sup>13</sup>.

### Why this matters for business?

Potential risks associated with Planetary Boundaries and Social Thresholds are not being systematically identified – this leaves companies vulnerable to resource scarcity (e.g. fish and ocean acidification), reputational issues (e.g. gender equality) and regulatory requirements (e.g. pollution).

<sup>10</sup>CDP, 2016. Thirsty business: Why water is vital to climate action. [www.cdp.net/en/water](http://www.cdp.net/en/water)

<sup>11</sup>Based on risks cited within Corporate Submissions to the U.S Securities and Exchange Commission (SEC) in 2016

<sup>12</sup>Raven, J. A. et al. (2005). Ocean acidification due to increasing atmospheric carbon dioxide. Royal Society, London, UK.

<sup>13</sup>[http://www.oceanacidification.org.uk/pdf/Ocean-Based\\_Food\\_Security\\_Threatened\\_in\\_a\\_High\\_CO2.pdf](http://www.oceanacidification.org.uk/pdf/Ocean-Based_Food_Security_Threatened_in_a_High_CO2.pdf)

## 2. Are businesses measuring their performance in context?

**Why it matters?** Each year, more companies measure and report their sustainability performance and set new targets. However, the majority of these targets are based on comparing year-on-year environmental and social performance for their own company. The danger is this fails to measure performance in the context of real world boundaries and thresholds. For instance, an organisation may reduce its water consumption by 10% each year, but will this be sufficient to avoid local water scarcities?

**What we found?** Through global ambitions such as the UN Sustainable Development Goals (SDGs), a significant number of companies consider their overall sustainability strategy and performance in the context of global challenges. From our review of the most recent Sustainability Reports published by 209 of the world's largest companies we found:

**58%** cite the SDGs      **11%** cite the GRI's Sustainability Context Principle <sup>14</sup>

*“The SDGs provide a global coherent narrative, helps us make sense of our sustainability efforts [...] however where we are struggling is to find the metrics to show our impact against the goals.”*

[Global Agricultural company]

However, evidence of companies measuring their performance against specific planetary boundaries and social thresholds at either global or more local scale remains limited (see case in point).

*“We have chosen to use different approach, we are looking at the locations where these things and our impact happens, that way we see our business in context. Our thinking is not bounded by the edge of our business.”*

[Service and Construction company]

## Case in point:

### Reporting performance in the context of Planetary Boundaries & Social Thresholds

- **37 of the 209 companies** cite having set, or being in the process of setting a science-based target for their **GHG (carbon) emissions**. *A carbon emissions target is defined as science-based if it is in line with the scale of reductions required to keep global temperature increase below 2°C compared to pre-industrial temperatures, as defined by our planetary boundary for climate change.*
- **72 out of 209 companies** have set targets relating to **water use** – but only **13** make explicit reference to “water scarce, at-risk or stressed sites” or setting ‘context-based targets’. *Context-based targets for water recognize the particular context for each individual water basin, this includes the water basin’s thresholds and availability and critically recognises the individual and collective needs, and voice, of all stakeholders including communities, nature and other organisations<sup>15</sup>.*
- **17 out of 209 companies** have set targets relating to **access to health** e.g. donation of 1m tablets / treatments. However only 5 provide wider context to their target e.g. total number of people worldwide suffering from the illness.

<sup>14</sup>This is based upon explicit reference to the Sustainability Context Principle  
<sup>15</sup>Adapted from <http://pacinst.org/publication/exploring-case-corporate-context-based-water-targets/>

#### Why this matters for business?

Without measuring their performance within context, companies are unable to identify if their actions are sufficient to address the scale of the problem. Without this information, organisations are unable to understand if their resources are being optimised, or how much more investment is required to achieve their goal. Similarly, without this information, stakeholders are unable to appraise the company's performance. **Without context – measurement and reporting is meaningless.**

*“Imagine different organisations climbing a mountain on a cloudy day. Some are further ahead, some are further behind, but most are making progress [...] Once the cloud clears, however, the organisations realise how high the mountain really is, how steep the climb ahead, and how far the summit.”*

[Article 13 quote from Forbes 2016]

### 3. Are businesses measuring the consequences of their activities?

**Why it matters?** Increasing expectations from stakeholders combined with new levels of transparency have placed greater demands on businesses to address impacts of their activities beyond their direct control, moving from their operations to their wider value chain. This has been particularly relevant around responsible sourcing in sectors such as textiles and agriculture. The question is do organisations consider their value chain in relation to impact on all of the planetary boundaries?

**What we found?** The majority of targets set by companies focus on their direct operational performance. However, for certain boundaries and thresholds, there is evidence of companies setting targets and measuring impact for their wider value chain:

- **14 out of 209 companies** have set a target for supply chain around carbon / GHG emissions.
- **5 out of 209 companies** have set a target for supply chain on gender equality.

*“For me the Planetary Boundaries and Social Thresholds are another way of showing companies what their impact is – as they may not necessarily see that they have an impact on, but they do have an impact [when you consider] sourcing and end-of-life. They have an impact somewhere.”*

[Fashion brand]

### Case in point:

Do companies consider the consequences of air pollution and impact on health?

Every year air pollution accounts for over 4 million deaths around the world, and ranks 5th worldwide among all risks factors for total deaths. Over 90% of the world's population lived in areas with unhealthy air in 2015<sup>16</sup>.

From our review of **209 companies, only 13** have set targets to address air pollution. This illustrates the gap in understanding between corporate impact and consequences of impact. e.g.

- **Air pollution arising from international supply chains** - As a result of rapid industrialisation, primarily through coal-powered energy, only 84 of 338 regions in China met national standard for air quality. Air pollution has caused 1 million deaths in China and led to local government ordering factories to close in 2015 and overall costs 10% of GDP for China<sup>17</sup>.

#### Why this matters for business?

Social thresholds and planetary boundaries are complex and interdependent. The risk for businesses is that whilst certain impacts relating to Planetary Boundaries and Social Thresholds can occur within their supply chains – they remain the result of the organisations operation and impact the business either directly or indirectly. There is a need for companies to assess their impact, and the consequences of their impacts, across their full supply chain.

<sup>16</sup>STATE OF GLOBAL AIR/2017 - [https://www.stateofglobalair.org/sites/default/files/SOGA2017\\_report.pdf](https://www.stateofglobalair.org/sites/default/files/SOGA2017_report.pdf)  
<http://www.healthdata.org/data-visualization/gbd-compare>

<sup>17</sup><https://www.theguardian.com/global-development/2016/sep/08/air-pollution-costs-trillions-holds-back-poor-countries-world-bank>

## 4. Are businesses measuring if we are going in the right direction?

**Why it matters?** In addition to measuring performance in context of global or local situation, there is also a need for companies to measure if, as a result of their activities, they are addressing the challenge. If what we measure affects what we do; flawed measures can lead to distorted decisions. An absolute metric might not normalise for other factors meaning that an absolute positive movement in a metric might actually be – in context – a negative outcome. For instance,

“*In sub-Saharan Africa, despite significant investment, as a result of rapid population growth the number of people without access to sanitation has increased since 1990, from 15% to 17% of the population.*”<sup>18</sup>

**What we found?** There is a wide array of metrics companies can use:

- **Absolute metrics:** Refer to the total quantity of a resource used or created e.g. total water used, total kW created from renewable energy.
- **Intensity metrics:** Refer to the total quantity of a resource in relation to a unit of output e.g. water used per employee, emissions per car.
- **Capital metrics:** Refer to the total available resource e.g. the amount of water in a lake, the number of trees in a forest.
- **Flow metrics:** Refer to the change in the total available resource e.g. the amount of water withdrawn from the lake, or the number of trees planted.

<sup>18</sup>[http://www.who.int/water\\_sanitation\\_health/monitoring/jmp-2015-key-facts/en/](http://www.who.int/water_sanitation_health/monitoring/jmp-2015-key-facts/en/)

## Case in point:

Are we measuring if we are going in the right direction?

### Energy use

- **28 of the 209** companies reviewed - have set **absolute reduction** targets for their energy usage. For instance to reduce the total energy used by operations globally by 10%.
- **37 of the 209** companies reviewed - have set **intensity targets** for their energy usage. For instance to reduce the energy used per M<sup>2</sup> of office space by 20% by 2020.

### Access to food

- **6 of the 209** companies reviewed have set targets relating to access to food. **All** of these targets relate to absolute metrics, such as the provision of 1 million meals, but **zero** include metrics of how many people are going hungry.

### Why this matters for business?

The relationship between these types of metrics is critical. On one hand, if an organization only measures its absolute performance, this does not capture the causality of an increase or decrease. For instance if a company sold a part of the business absolute impacts may well decrease. However if a company only measures its intensity performance, this does not capture the total impact. For instance a company may reduce its emissions per item, but sell more items and thus its absolute impact increases. There is a need for companies to measure and report their performance in relation to:

- a) Their absolute impact on the availability of capitals.
- b) Their relative impact and progress in addressing impact on capital availability.

## 5. Are businesses measuring how long it will take to address Planetary Boundaries and Social Thresholds?

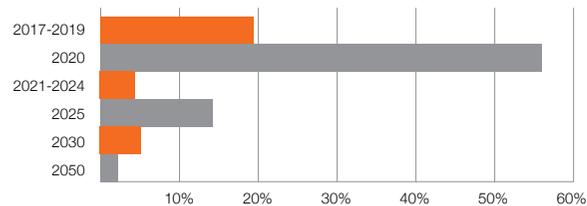
**Why it matters?** In short, we are currently going too slowly. Based on a simple calculation of current rates at which we are addressing social challenges, we can estimate<sup>19</sup>...

- **Food:** Everyone will get enough to eat in **June 2054**.
- **Water:** Everyone will have a safe source of drinking water in **February 2033**.
- **Education:** Every child will be going to primary school in **February 2042**.
- **Energy:** The whole world will have access to electricity **April 2047**.

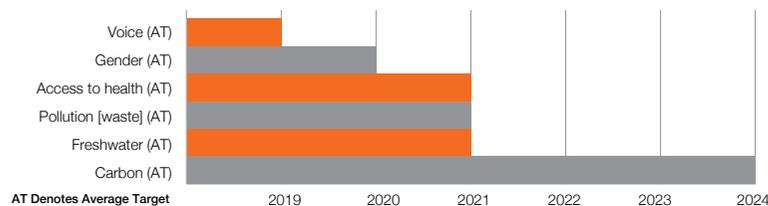
**Earth Overshoot Day:** according to environmental groups WWF and the Global Footprint Network the world used its available environmental resources by 2 August this year.

**What we found?** The majority of targets are set on a 5 year basis

**When targets are set for**



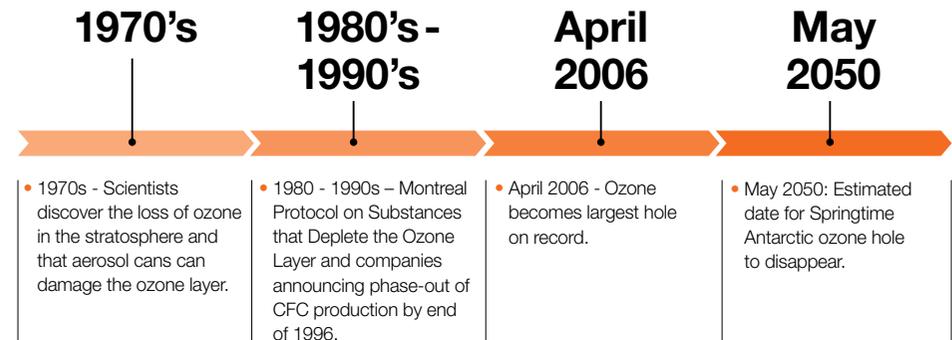
**Target deadlines by boundary –** to show how different Planetary Boundaries and Social Thresholds have different time lines [average = mean]



## Case in point:

How long it takes to address a planetary boundary once crossed?

From first being identified, it is estimated that the ozone hole, caused by crossing the planetary boundary, will take **80 years** to return to a safe level



### Why this matters for business?

The science for planetary boundaries and social thresholds is beginning to be internationally agreed through the Sustainable Development Goals. The global community is expecting action. The time for business is now.

<sup>19</sup>Note this is based on relative rate of increase as per UN Statistics - it does not consider population increases or other connected social or environmental factors

## Article 13 perspective

- Potential risks associated with Planetary Boundaries and Social Thresholds are not being systematically identified – this leaves companies vulnerable to resource scarcity (e.g. fish and ocean acidification), reputational issues (e.g. gender equality) and regulatory requirements (e.g. pollution).
- Without measuring performance within context, companies are unable to identify if their targets are sufficient to address the scale of the problem. This creates the risk that stakeholders could view targets as insufficient or meaningless.
- Social thresholds and planetary boundaries are complex and interdependent. The risk for businesses is that whilst certain impacts relating to the limits can occur within supply chains – they remain the result of the organisation's operation and impact the business either directly or indirectly.
- Companies need to measure their full impact, both absolute impact on the availability of capitals plus relative impact and progress in addressing impact on capital availability. Otherwise the risk is that despite 'positive stories', companies are unable to demonstrate to their stakeholders that they are actually on a path to a more sustainable business.
- Addressing planetary boundaries and social thresholds is complex and will require changes to business models and multi-stakeholder solutions.

### Given the critical challenges we face there are five important questions every business should consider:

1. Have you assessed the potential risks associated with all our planet's boundaries and social thresholds?
2. Are you measuring and reporting your performance in the context of global and local challenges and situations?
3. Are you measuring all the consequences of your business – across your value chain – and how they impact multiple planetary boundaries and social thresholds?
4. Are you measuring relative and absolute impact (both in terms of your performance and also your impact on available capitals)?
5. Have you set short and long-term targets to ensure we stay within the safe zone of planetary boundaries and social thresholds?

## Contact us

**Founded in 1998** our name comes from the 1992 Rio Earth Summit and reflects our vision to help people understand and change their behaviour to enable a more sustainable world.

**As business sustainability consultants** we believe in the transformative potential of integrating social thresholds and planetary boundaries into our business strategy.

**We help** business with a different and more-meaningful way of thinking about sustainability.

**Jane Fiona Cumming**

**Phone:** +44 (0)208 840 4450

**Email:** [janefionac@article13.com](mailto:janefionac@article13.com)