

Principles of Sustainable Finance

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About Me



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Assistant Professor in Finance UNSW Business School (Sydney, Australia)

- 7 years in Paris, dual major in Finance and Psychology
- 5 years in HKU, PhD in Finance
- 3 years as assistant professor in Peiking University
- Speaks 4 languages fluently
- Research interest: Quantitative financial history, corporate finance, ESG biodiversity
- Publised papers on top journals, granded with several rewards, recognized as High-Caliber Talent by the Shenzhen government

About This Course - Sustainable Finance

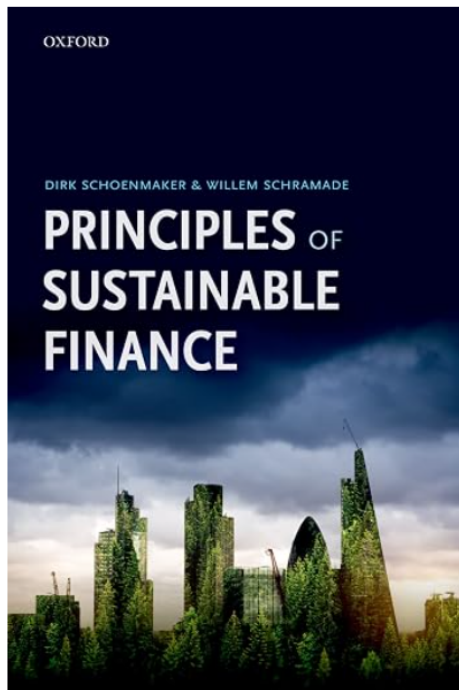
Duration: 1h30 min lecture +10 min break + 20 min Q&A

Main questions to be answered:

- **What is sustainable finance?**
- **What are the roots of the problem?**
- **Can we (and how) use finance to actually help the world to become more sustainable?**



Main textbook



Principles of Sustainable Finance

by [Dirk Schoenmaker](#) (Author), [Willem Schramade](#) (Author) | Format: Kindle Edition

4.6 ★★★★★ (60)

[See all formats and editions](#)



Finance is widely seen as an obstacle to a better world. *Principles of Sustainable Finance* explains how the financial sector can be mobilized to counter this. Using finance as a means to achieve social goals, we can divert the planet and its economy from its current path to a world that is sustainable for all. Written for undergraduate, graduate, and executive students of finance, economics, business, and sustainability, this textbook combines theory, empirical data, and policy to explain the sustainability challenges for corporate investment. It shows how finance can steer funding to certain companies and projects without sacrificing return and thus speed up the transition to a sustainable economy. It analyses the Sustainable Development Goals as a strategy for a better world and provides evidence that environmental, social, and governance factors matter, explaining in detail how to incorporate these factors in the corporate and financial sectors. Tailored for students, *Principles of Sustainable Finance* starts each chapter with an overview and learning objectives to support study. It includes suggestions for further reading, lists and definitions of key concepts, and extensive uses of figures, boxes, and tables to enhance educational goals and clarify concepts. *Principles of Sustainable Finance* is also supported by an online resource that includes teaching materials and cases.

Course Agenda

- **Part 1 — What is sustainability & why does it matter ?** (30 min)
- **Part 2 — Sustainability's challenges (5 tensions)** (50 min + 10 min break)
 - Internalizing externalities
 - Additionality
 - Prisoner's dilemma
 - How to measure?
 - Who pays for it?
- **Part 3 — Financing sustainability** (10 min)
- **Q&A** (20 min)

Part 1

What is sustainability & why does it matter?

From Pre to Post Industrial Revolution

Until 200 years ago, resources seemed endless: clean air, vast forests, plentiful water.

The Industrial Revolution (19th century) boosted productivity:

- Steam engines, mass production → enormous economic growth and rising living standards
- But also: coal burning, deforestation, pollution, and exploitative labour

The classic production models:

- Labour (L) and capital (K) were the only things that mattered
- Assumption: **nature's resources were UNLIMITED**



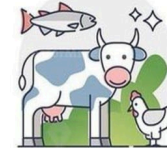
WATER
RESOURCES



WIND POWER
AND SOLAR ENERGY



CRUDE
OIL



ANIMAL
RESOURCES

**NATURAL
RESOURCES**



LAND
RESOURCES



NATURAL
GAS



PRECIOUS METALS,
MINERALS AND ROCKS



FOREST
RESOURCES

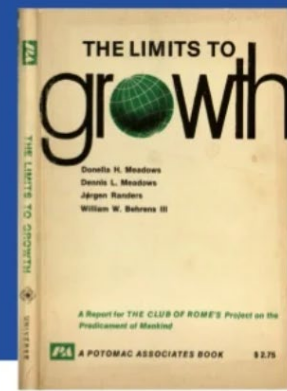
The Club of Rome

Club of Rome

- a nonprofit, informal organization of intellectuals and business leaders
- goal: critical discussions of pressing global issues
- In 1972, they published "**Limits to Growth**"



Understanding "The Limits to Growth": A clear warning and a message of hope



"The Limits to growth" – a book published in 1972 as the product of a study on the future of our planet commissioned by the Club of Rome, has been described by some as ["likely to be one of the most important documents of our age"](#). While millions of copies have been sold in 30 languages over the past 50 years, the book's results have often been misunderstood or misinterpreted. One imprecise summary that is often offered by the publication's critics, is that the book was a "prediction" of collapse and a doomsday scenario. This was most certainly not the authors' message. Below is a short summary of the main conclusions and messages of "The Limits to Growth".

- At the time of publication, "The Limits to Growth" was the first study that looked at the interconnected challenges of the world using one of the first computer models to analyse 12 possible future scenarios of key interactions between global variables for population, technological development, industrial output, food, non-renewable resources, and pollution, spanning the period 1972 to 2100.
- In other words, using today's language, the authors explored the possible impacts of the growing ecological footprint of population growth, human activities and its physical impacts on our finite planet from a systems perspective, as none of these issues can be addressed in isolation.
- It is important to note that not all scenarios presented in "The Limits to Growth" displayed collapse and decline. The authors in fact identified a set of assumptions that produced a "stabilised world" scenario – called the "sustainability scenario" in which collapse was avoided and standards of living remained high. The authors, however, did not forecast which scenario was the most likely or make any predictions in this regard.
- **"The Limits to Growth" contains six main messages:**
 - Firstly, that the environmental impact of human society had become heavier between 1900 and 1972 due to both an increase in the number of humans and the amount of resources consumed and pollution generated per person per year.
 - That our planet is physically limited, and that humanity cannot continue to use more physical resources and generate more emissions than nature is capable of supplying in a sustainable manner. In addition, it will not be possible to rely on technology alone to solve the problem as this would only delay reaching the carrying capacity of the planet by a few years.
 - Third, the authors cautioned that it is possible, and even likely, that the human ecological footprint will overshoot the carrying capacity of the planet, further explaining that this would likely occur due to significant delays in global decision making while growth continued, bringing the human footprint into unsustainable territory.

The Club of Rome Warning (1972)

They modelled 5 interconnected factors:

- **Population, Food production, Natural resources, Industrial output, Pollution**

They concluded:

- **If we keep growing at this rate, Earth's systems will collapse well before 2100**

Two possible futures in their "world model":

- Best case: Population slowly adapts to a stable equilibrium
- Worst case: Overshoot, we consume too much, then crash violently

Current evidence strongly suggests the overshoot path...

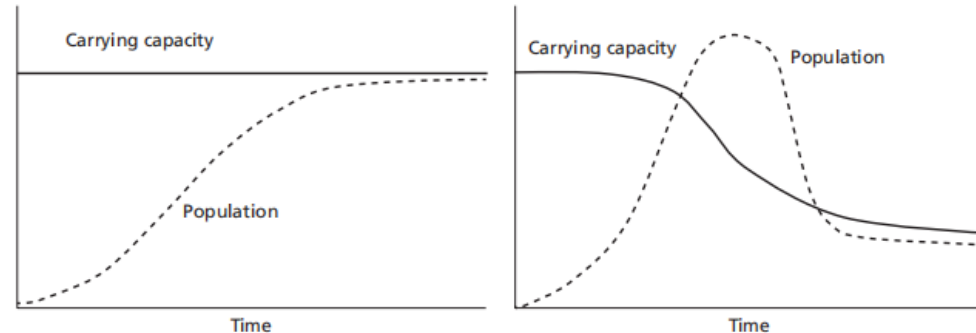


Figure 1.1 The world model

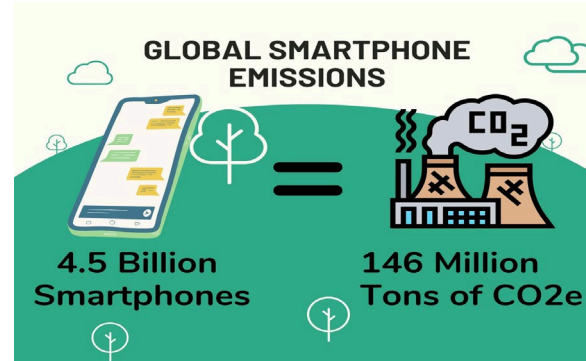
Source: Meadows et al. (1972).

Linear Economy

Our current economy is "linear":

TAKE raw materials → **MAKE** products → **USE** them briefly → **WASTE** (throw away)

- E.g. smartphone: contains rare metals mined under environmentally destructive conditions; Designed to become obsolete in 2-3 years
- Billions end up in landfill, leaking toxic chemicals into soil and water



Alternative=**Circular Economy**: Products to be repaired, reused, remanufactured, and fully recycled => Green tech => Firms' actions needed => But how to force/encourage firms to invest?

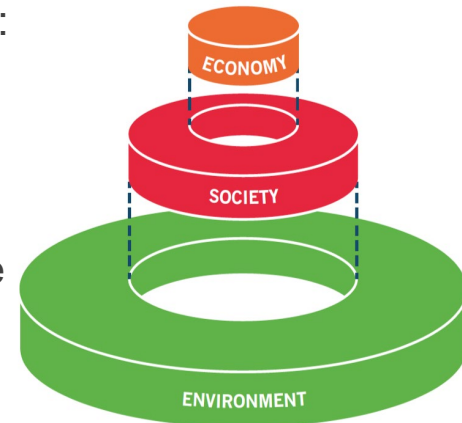
Define Sustainability

Classic definition by The Brundtland Commission (UN, 1987) :

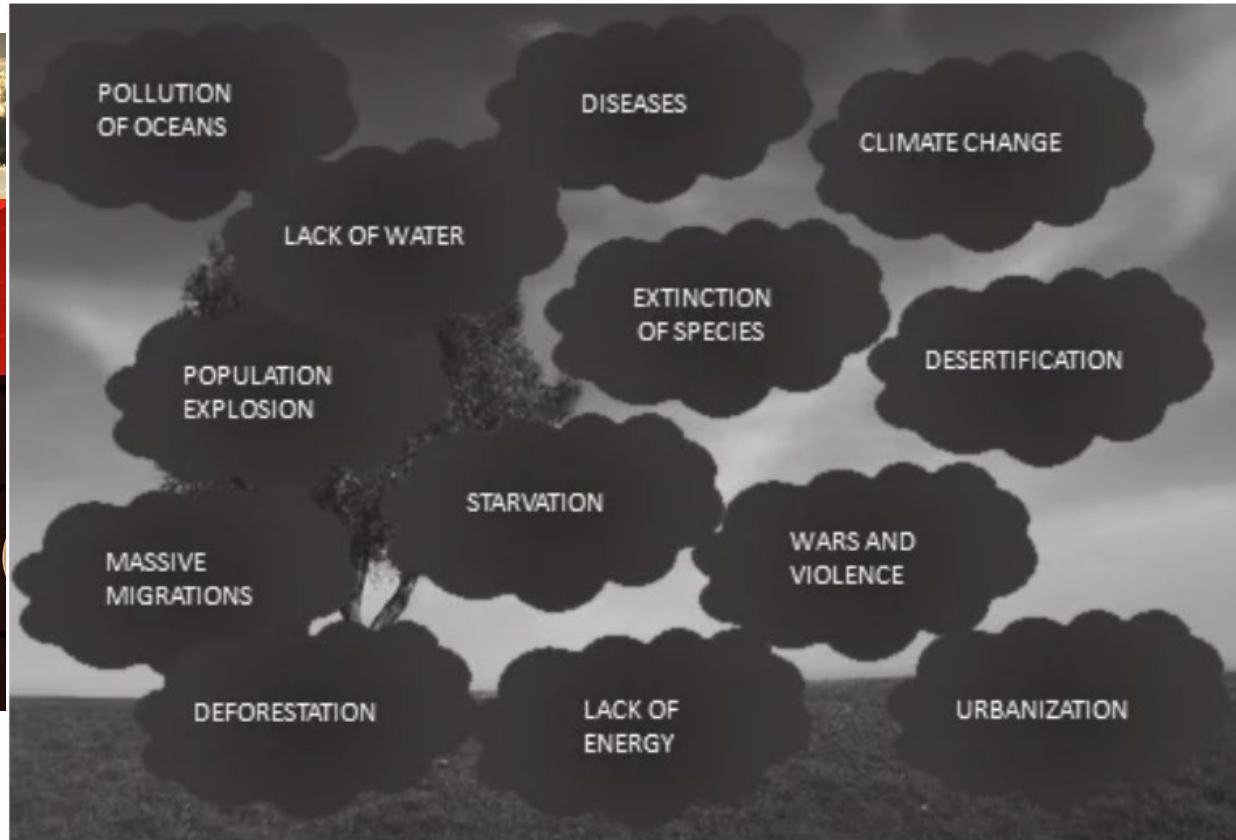
- ***Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.***
 - Like a bank account: You can spend money, but not so much that there's nothing left to generate interest for your children
 - But which needs? How to measure ? Whose future generations?...

Consensus: Sustainable development has 3 dimensions of challenges:

- **Economic** — creating prosperity that actually lasts
- **Social** — ensuring everyone has food, health, education, dignity
- **Environmental** — keeping the planet's systems stable and liveable



Examples on Environmental and Social Issues



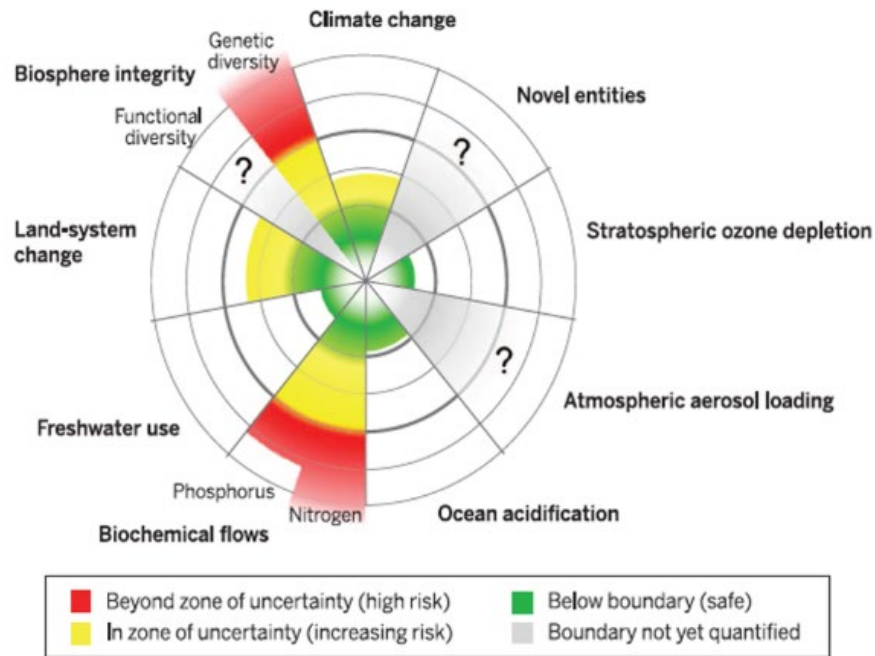


Refine definition: The Planetary Boundaries

Table 1.1: The ecological ceiling and its indicators of overshoot

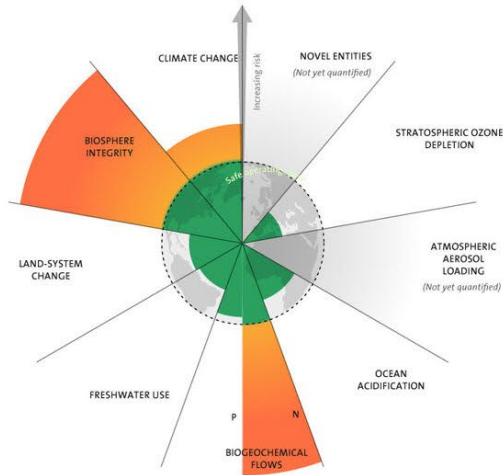
Earth system pressure	Control variable	Planetary boundary	Current value and trend
Climate change	Atmospheric carbon dioxide concentration; parts per million (ppm)	At most 350 ppm	399 ppm and rising (worsening)
Biosphere loss	Genetic diversity: rate of species extinction per million species per year	At most 10	Around 100-1,000 and rising (worsening)
	Functional diversity: biodiversity intactness index (BII)	Maintain BII at 90%	84% applied to southern Africa only
Land-system change	Area of forested land as a proportion of forest-covered land prior to human alteration	At least 75%	62% and falling (worsening)
Freshwater use	Blue water consumption; cubic kilometres per year	At most 4,000 km ³	Around 2,600 km ³ and rising (intensifying)
Biochemical flows	Phosphorus applied to land as fertiliser; millions of tons per year	At most 6.2 million tons	Around 14 million tons and rising (worsening)
	Reactive nitrogen applied to land as fertiliser; millions of tons per year	At most 62 million tons	Around 150 million tons and rising (worsening)
Ocean acidification	Average saturation of aragonite (calcium carbonate) at the ocean surface, as a percentage of pre-industrial levels	At least 80%	Around 84% and falling (intensifying)
Air pollution	Aerosol optical depth (AOD); much regional variation, no global level yet defined	–	–
Ozon layer depletion	Concentration of ozone in the stratosphere; in Dobson Units (DU)	At least 275 DU	283 DU and rising (improving)
Novel entities (e.g. chemical pollution)	No global control variable yet defined	–	–

Source: Steffen *et al.* (2015).



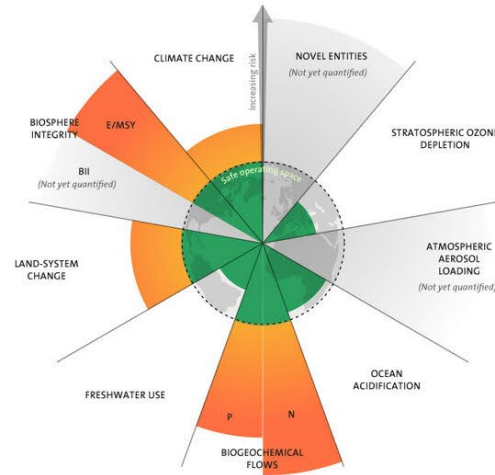
URGENT! ACTION NEEDED!

2009



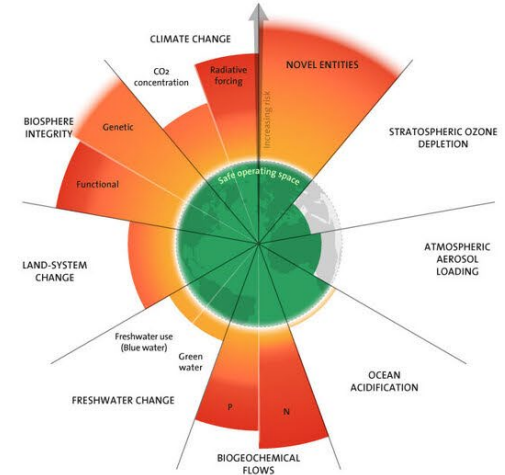
7 boundaries assessed,
3 crossed

2015



7 boundaries assessed,
4 crossed

2025



9 boundaries assessed,
7 crossed

<https://www.stockholmresilience.org/research/planetary-boundaries.html>

Novel entities: Plastics, Pesticides, Antibiotics, Nanomaterials, Genetically Modified Organisms (GMO)...



Tipping Points and Feedback Loops

Tipping point: a threshold beyond which the system changes irreversibly

Example: The Greenland Ice Sheet

- Research found **it could begin irreversible total melting at just +0.9° C more warming**
- Melting ice reflects less sunlight → more warming → faster melting (a feedback loop)
- If the entire sheet melts: sea levels rise by 7 metres, affecting billions

Other critical tipping points:

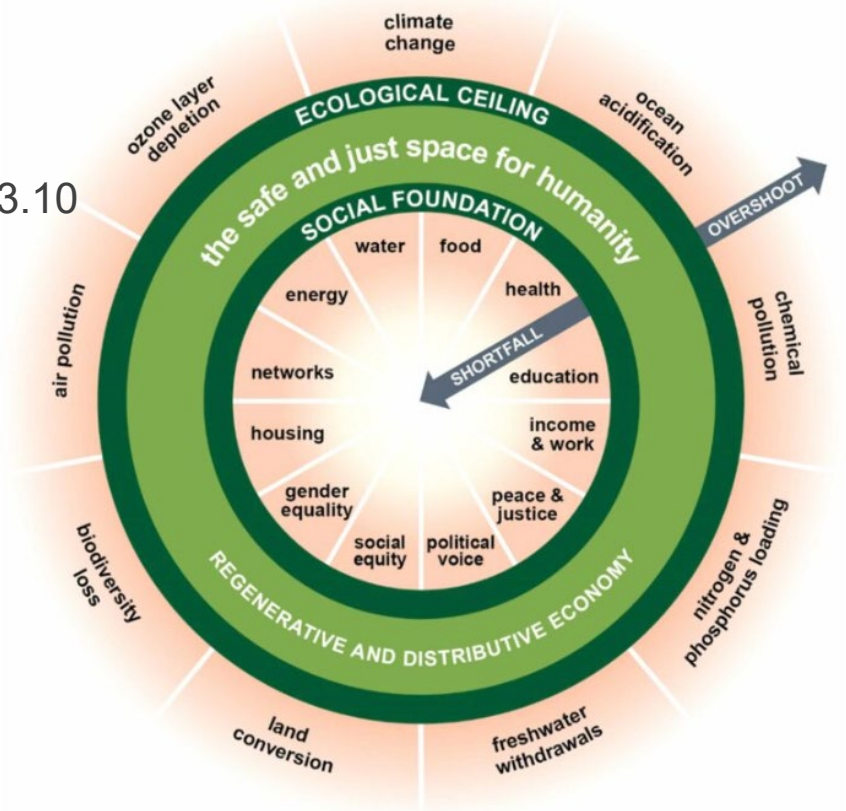
- Amazon rainforest: too much deforestation → forest turns to dry savanna permanently
- West Antarctic ice sheet collapse; Atlantic Ocean circulation breakdown

Key lesson: gradual-seeming changes can trigger sudden, catastrophic shifts

Social boundaries or foundation

The Doughnut (Raworth, 2017)

- Ø Food security (no hunger)
- Ø Adequate income (no poverty with income < \$3.10 a day)
- Ø Access to health care
- Ø Access to water and clean cooking facilities
- Ø Education
- Ø Decent work
- Ø Modern energy services
- Ø Gender equality and social equity
- Ø Political voice

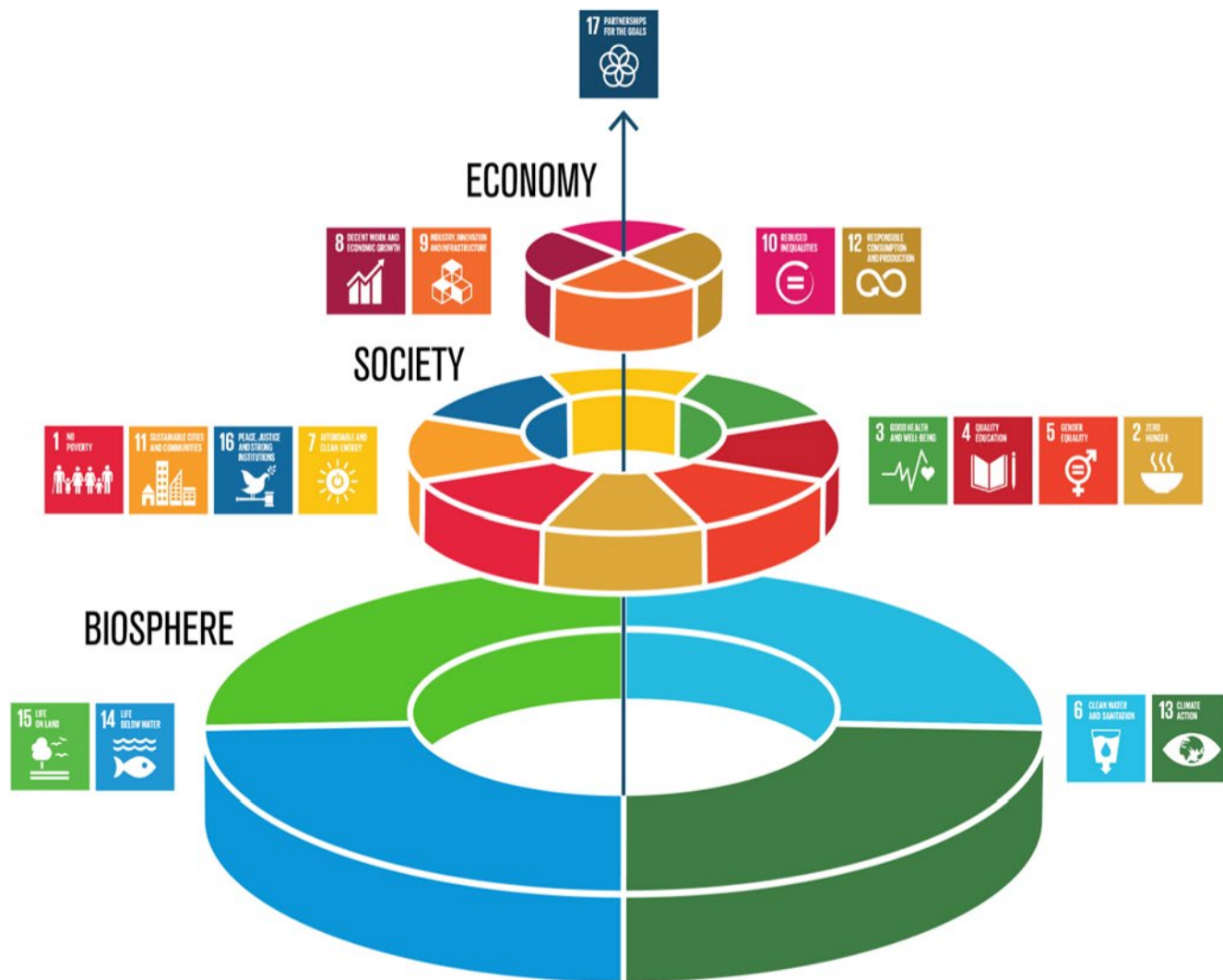


UN: 17 Sustainable Development Goals (SDG)



**SUSTAINABLE
DEVELOPMENT** GOALS

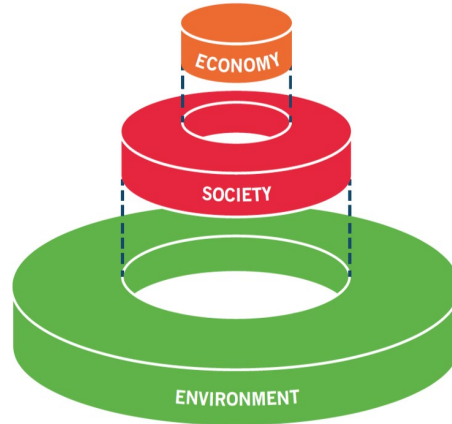




Recall: Define Sustainability

Classic definition by The Brundtland Commission (UN, 1987) :

- ***Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.***



Can you answer now:

What is sustainability & why does it matter (in particular in recent years) ?

Part 2

Sustainability's challenges (5 tensions)

➤ **Internalizing externalities**

- Additionality
- Prisoner's dilemma
- How to measure?
- Who pays for it?

Externalities



Externality

[,ek-,stər-'nɑ-lə-tē]

A cost or benefit caused by an economic actor that is not suffered or enjoyed by that same actor.

 Investopedia

The illustration shows a factory with three smokestacks emitting thick black smoke. A large, dark, irregular shape representing a spill or pollution is in the foreground, with a small fish swimming nearby. The background is a solid light blue.

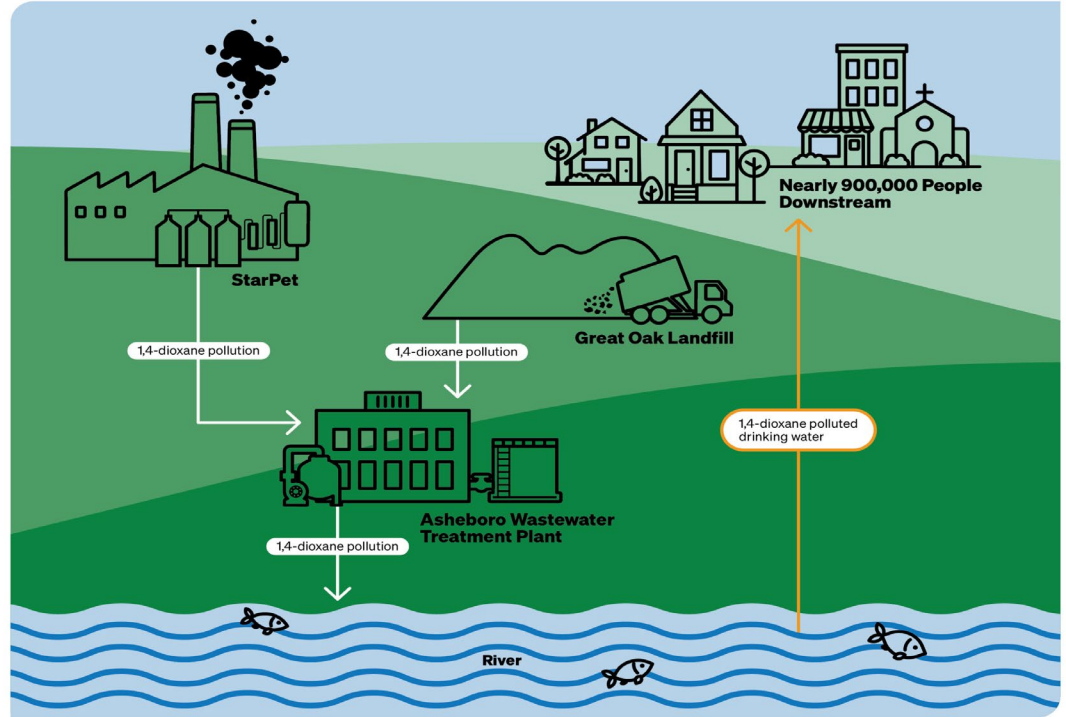
Any examples?

What is 1,4-dioxane pollution?

Written by [Samantha Baars](#)

And how do we make polluters pay instead of people?

Asheboro's Failure to Control 1,4-Dioxane Pollution



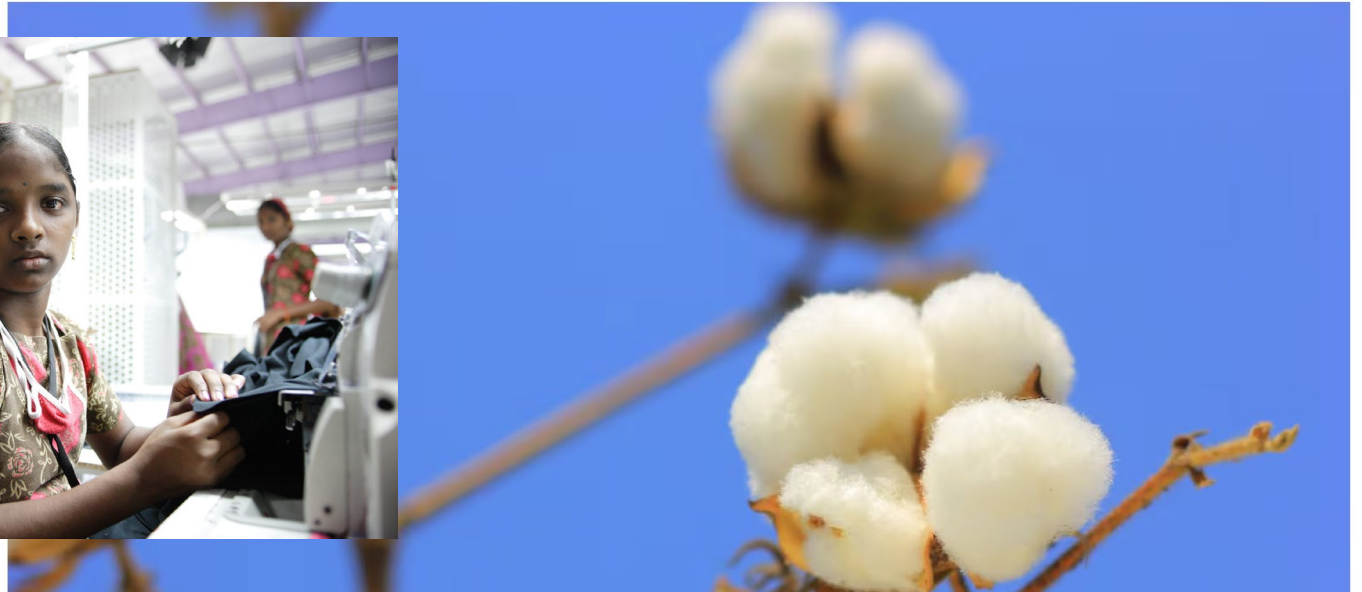
‘Ethical’ Cotton Is Being Picked by Child Labourers in India, Watchdog Finds

A new report has linked businesses supplying companies including Zara-owner Inditex, H&M Group, Gap Inc. and Amazon to incidents of forced labour and debt bondage on Indian cotton farms.

BOF PROFESSIONAL

SUSTAINABILITY

Share

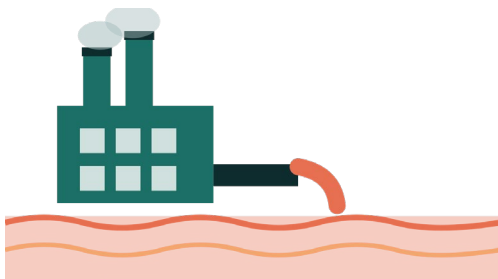


Why are these happening?

What is the objective of a corporate ?

Maximize Shareholder Value

Shareholder value = Profits = Revenue - **Cost**



Treat the wastewater: Costs money per tonne.

Discharge it into the river: Costs nothing.
The cost is paid by the town downstream.

Externalities from a financial prespective

PRIVATE COST

What the firm pays

Wages · energy · materials · interest · tax
Measured, audited, and reported every quarter.

E.g. social and environmental cost

- Carbon emissions from burning coal → climate damage not paid by the coal company
- Worker injury in a factory → cost falls on the worker, not on the product price
- Pesticide runoff into rivers → farmers downstream lose crops, but chemicals firm profits

SOCIAL COST

What the world pays

Private cost, plus a few other things.
Measured by nobody, and reported nowhere.

Externalities

- is the gap between private cost and social cost
- generally not priced by the market





***How to make corporates
internalize (pay for the costs of)
externalities?***

Simple Solution: Update the Value Function?

The shareholder view

Friedman (1970)

The firm's job is to **maximize shareholder value**, i.e. make money for its owners.

The stakeholder view

Freeman (1984)

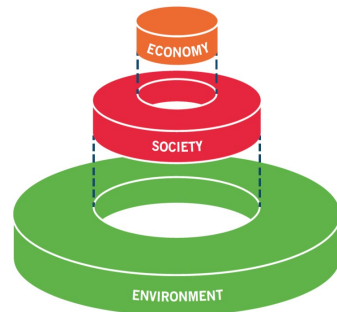
Consider employees, customers, suppliers and communities.

A recent proposal

Hart & Zingales (2017)

Maximize shareholder WELFARE (Economy/Socia/Environment), not market value.

Any problems still there?



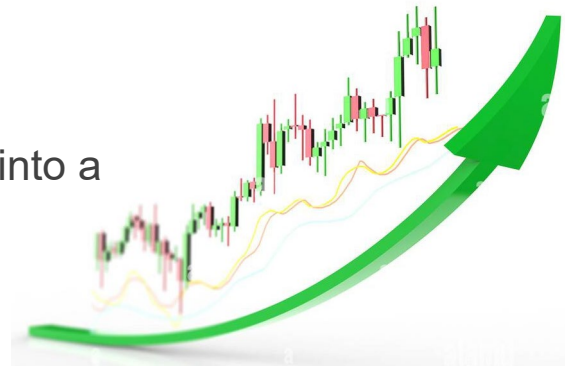
Part 2

Sustainability's challenges (5 tensions)

- Internalizing externalities
- **Additionality**
- Prisoner's dilemma
- How to measure?
- Who pays for it?

Suppose you own shares in a company A

- It has been an excellent investment. The share price has risen every year you have held it, and you are pleased with yourself.
- One day you find that the company discharges untreated waste into a river.



Will you sell the stock?

- Sell v.s. Do not sell
- What will happen to the river?
 - *If you sell, you no longer profit from it. Someone else does. Does the water change?*
- What else can you do?

Now suppose fifty factories sit on that river.

- All of them discharge. Nobody can tell you what share of the damage belongs to the one you own.
 - ❑ Do you still sell the stock ?
- Your company is the cleanest of the fifty.
 - ❑ Do you still sell the stock ?
- In all cases, you sold your shares
 - ❑ What will happen to the river?



Additionality

Additionality asks: what would have happened anyway, without you? The difference is your actual contribution.

To make a difference, one of the following must hold:

Price and cost of capital

Enough investors move that clean firms can raise money more cheaply and dirty ones cannot.

Ownership and votes

You keep the shares and use them: vote, file resolutions, replace directors.

New money

You buy at issuance, lend directly, or fund green projects.

Key word: investors *move together*, but...

Part 2

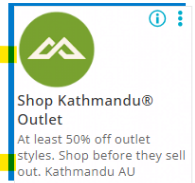
Sustainability's challenges (5 tensions)

- Internalizing externalities
- Additionality
- **Prisoner's dilemma**
- How to measure?
- Who pays for it?



The Collapse of the Grand Banks Cod Fishery

The Grand Banks of Newfoundland are a series of underwater plateaus found off the northeast coast of Canada. For centuries the Grand Banks produced a seemingly endless supply of cod and other commercially valuable fish. However, overfishing and mismanagement of stocks in the second half of the twentieth century saw the number of cod dwindle and then ultimately collapse, causing economic turmoil and significant social issues for the people of Newfoundland who had come to rely on cod fishing as a major part of their economy. As Charles Clover writes in *The End of the Line*:



1992

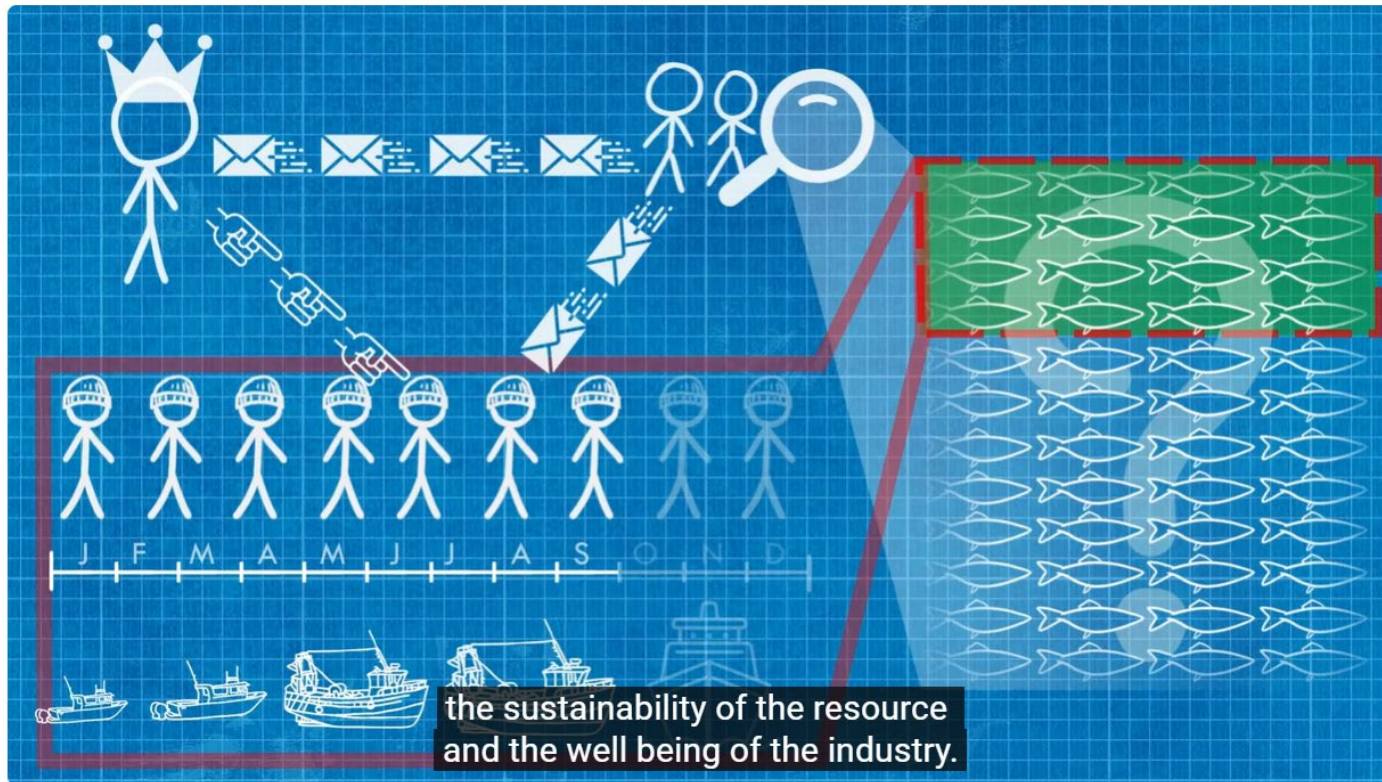


“The Grand Banks is the textbook case of failure in fisheries science. An army of scientists in one of the world’s richest and most advanced nations managed to destroy one of the richest fisheries in the world while convincing themselves for a decade that they were doing no such thing. The Newfoundland cod collapse was the nightmare that shook the world out of its complacent assumption that the sea’s resources were renewable and being managed in an enlightened manner” (1).

Nobody was trying to destroy the fishery. But individual externalities created disaster at aggregate.

Youtube video: If you time travelled, could you save the Grand Banks Cod?

<https://www.youtube.com/watch?v=Rwxkqno1PTc>



If you time travelled, could you save the Grand Banks Cod?



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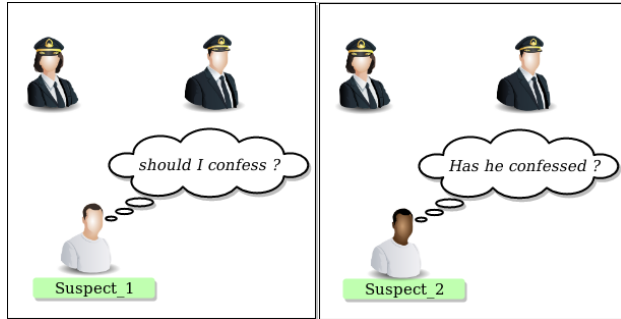


1.7K



UNSW
SYDNEY

Prisoner's dilemma



Two suspects are interrogated *independently*

'The Prisoner's Dilemma'

	B stays silent (Cooperates)	B Betrays A (Defects)
A stays silent (Cooperates)	Both serve 1 year	A serves 3 years, B goes free
A Betrays B (Defects)	A goes free, B serves 3 years	Both serves 2 years

PsycholoGenie.com

game can be used as a model
for many real world situations.

Prisoner's dilemma: The Grand Banks Case

	Boat B restrain	Boat B overfish
Boat A restrain	?	?
Boat A overfish	?	?

Prisoner's dilemma: The Grand Banks Case



Other names of the problem

Tragedy of the commons

The Grand Banks Cod tragedy

A resource everyone can use and nobody owns gets used up. Each extra net brings the whole catch to you; the cost of the thinning stock is shared by every boat.

First-mover disadvantage

Why voluntary industry action tends to stall.

Whoever installs the treatment plant first raises their costs first, and loses the contract first. Being early is punished, so everyone waits.

Free riding

The benefit is shared; the cost is not.

Think of a group assignment where one member does nothing and receives the same mark. If one firm cuts emissions, the whole industry enjoys the better reputation and the lighter regulation.



How to break the trap?

Moving together and making it credible.

1 Regulation

A **government** sanctions polluting behavior.
Need strong incentive to implement and to enforce.

2 Prices

A **tax** or a **permit** system, so that “being green” becomes the cheaper option.

3 Industry agreements

Firms bind themselves collectively, e.g. self restrain the quota, sharing green tech, etc.
Fragile without enforcement.

4 Market sanctions

When negative ESG scandal, firms face immediate **reputational damage and stock price collapse**, making defection costly even without government regulation.

Any problems still there?

Part 2

Sustainability's challenges (5 tensions)

- Internalizing externalities
- Additionality
- Prisoner's dilemma
- **How to measure?**
- Who pays for it?

Suppose now you are an impactful investor, and you want to do the right thing.

A company tells you it is going to reduce its emissions. It would like your money.

Do you believe it? And how would you check?

It is harder than it sounds

CLASSIC FIRM PERFORMANCE (PROFITS)

ENVIRONMENTAL PERFORMANCE

Rules for measuring it

Detailed accounting standards,
developed over a century

Standards are new, incomplete, and
still competing

Independent verification

Audited every year, by law

Mostly voluntary, and often not
audited at all

Legal consequence for lying

Serious, personal, and enforced

Weak in most jurisdictions

How often you find out

Every quarter

Once a year at best, often long after
the fact

Units

One (money). Everything adds up.

Tonnes, cubic metres, ratios,
scores... They do not add up.

Measuring and Pricing Externalities

Conceptually:

Step 1: Identify which externalities are material for a company or project

Step 2: Monetise them => attach a financial value to social/environmental impact

- True Price methodology: calculate the "true cost" of a product including all externalities
- Integrated Profit & Loss (IP&L): extend the income statement to include social (S) and environmental (E) impacts
- Example: a chocolate bar might cost €2 in the market but €4 in "true price"
 - The difference = unpaid externalities (child labour, deforestation, CO₂)

Step 3: Incorporate into Integrated Value ($IV = FV + SV + EV$)

Measuring and Pricing Externalities

Example:

- **Carbon tax:** firms pay per tonne of CO₂ emitted → incentive to reduce emissions
- Cap-and-trade (ETS): government caps total emissions; firms buy/sell permits



Early adopters: Scandinavian countries with \$50–\$130/t CO₂ since the 1990s, but most of the world still has **NO effective carbon price**

Political obstacles to carbon taxes:

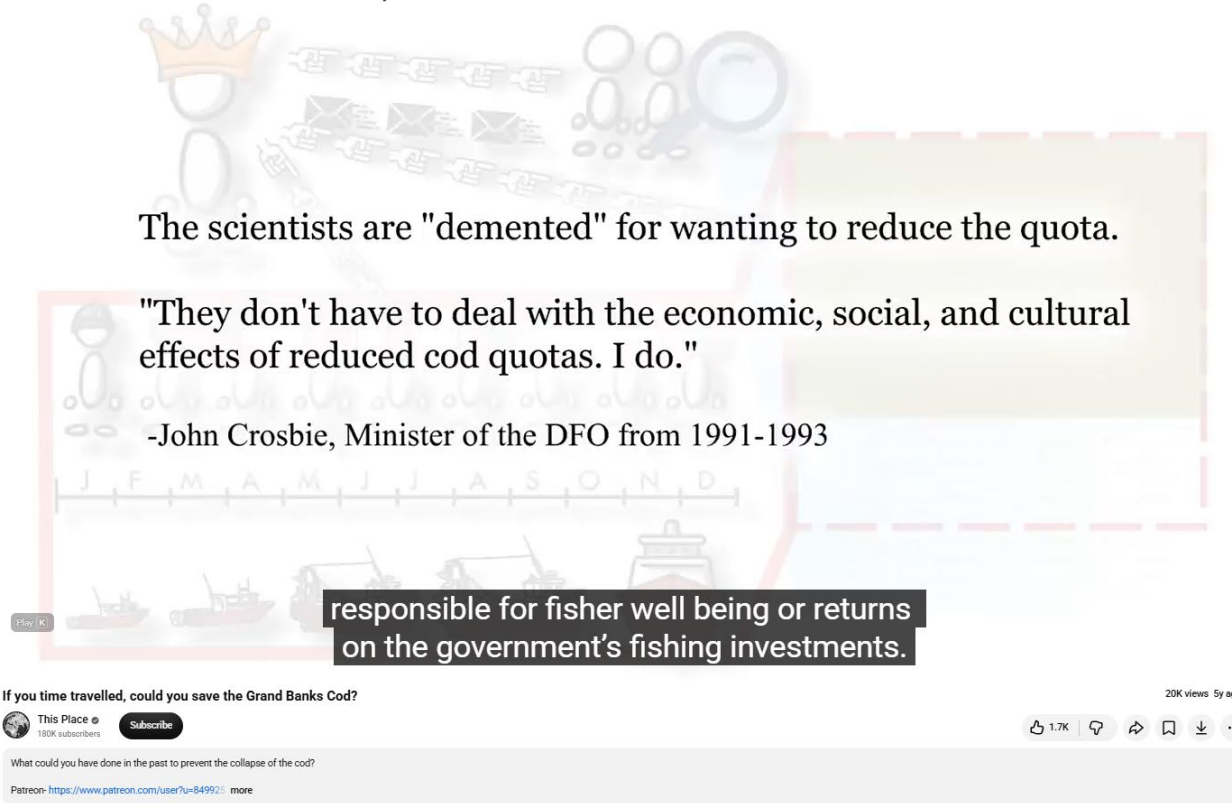
- Short political cycles — taxes hurt today, benefits arrive in 30+ years
- International coordination failure — one country acts, others free-ride
- Climate scepticism undermines the political will to act



File photo of a 2012 protest in Sydney against the proposed carbon tax, which th...

If you time travelled, could you save the **Grand Banks Cod**?

<https://www.youtube.com/watch?v=Rwxkqno1PTc>



Yet we've made huge progress (ESG)

Firms' Environmental KPIs:

- Carbon emissions (Scope 1, 2, 3), water use, waste, land use, biodiversity impact

Firms' Social KPIs:

- Employee turnover, gender pay gap, supply chain audits, living wage compliance, injury rates

Firms' Governance KPIs:

- Board independence, CEO-worker pay ratio, audit quality, anti-corruption policies

ESG scores and market recognition:

- Companies that outperform on material ESG factors outperform financially (Khan, Serafeim & Yoon, 2016); Negative ESG scandal impose large reputational and financial costs on firms (Derrien et al., 2025) => Does it sounds a bit sceptical?

Part 2

Sustainability's challenges (5 tensions)

- Internalizing externalities
- Additionality
- Prisoner's dilemma
- How to measure?
- **Who pays for it?**

“Doing well by doing good”

The ideal world (and some scholars actually found that): companies with better environmental and social records are also more profitable (higher stock market value).

How come ? Who are paying the costs?

1

Firm pays for itself

Less waste, lower energy bills, fewer accidents, better staff, a stronger brand. The investment returns more than it costs — through efficiency, loyalty, and lower risk.

2

Customers pay

People pay a premium for the cleaner product.

3

Investors accept less

Shareholders knowingly take a lower return so the firm can do something they value.

4

(Or Just signalling effects)

Part 3

Financing Sustainability



What Is Finance?

Finance allocates funds from people who have spare money to people who need money.

- Banks: take deposits from households, lend to businesses and governments
- Stock markets: investors buy shares in companies, providing them capital to grow
- Bond markets: companies and governments borrow money from investors

Finance is the giant steering wheel for the economy

Whoever controls the flow of money has enormous power to shape the future

What Is Sustainable Finance?

"Sustainable finance looks at how finance (investing and lending) interacts with economic, social, and environmental issues."

Finance contributes to sustainability in three ways:

- **1. Capital allocation** — directing money to its most productive use
- **2. Corporate governance** — investors can influence how companies are run
- **3. Risk pricing** — putting a value on uncertain future outcomes

Each of these functions can **drive or block sustainability**

Coalition: No single actor (government, company, or investor) can drive the transition alone.



Financial Tools

- **Equity** — investing with an ownership stake (ESG + impact investing)
- **Bonds** — green bonds, social bonds, sustainability-linked bonds
- **Banking** — sustainable lending, values-based banking
- **Insurance** — managing long-term catastrophe risk

Equity

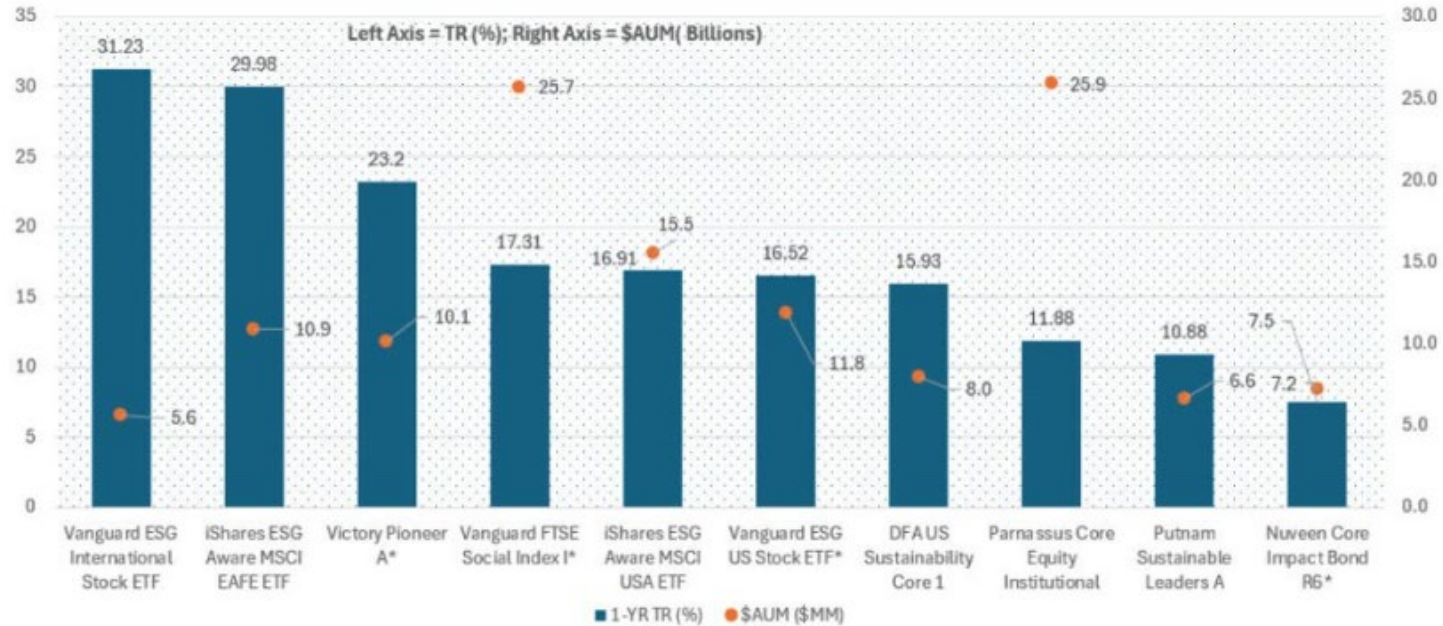
Owning equity shares = owning a piece of the company + voting rights + long-term exposure.

- Choosing companies → e.g. avoid “sin” stocks (tobacco, landmines, etc)
- Voting rights → influence board composition and corporate policy

The growing role of Green Institutional Investors

- Individual investors are small. Institutional investors are enormous.
- Pension funds, insurance companies, sovereign wealth funds collectively manage \$100+ trillion
- They not only invest, but also monitor and vote

10 largest focused sustainable L-T funds and 1-YR performance results-2025



Notes of Explanation: L-T=long-term funds (excluding money market funds); *=fund rated A (refer to notes); in the case of mutual funds, fund performance results apply to the largest share class. Sources: Morningstar, Sustainable Research and Analysis LLC.

Bonds

Bonds = lend money, get interest. No voting rights, but huge influence through capital allocation.

Green bonds: proceeds ring-fenced for eligible green projects

- Renewable energy, green buildings, clean transport, sustainable water management
- Green bond market: \$600+ billion issued in 2025 — one of the fastest growing markets globally

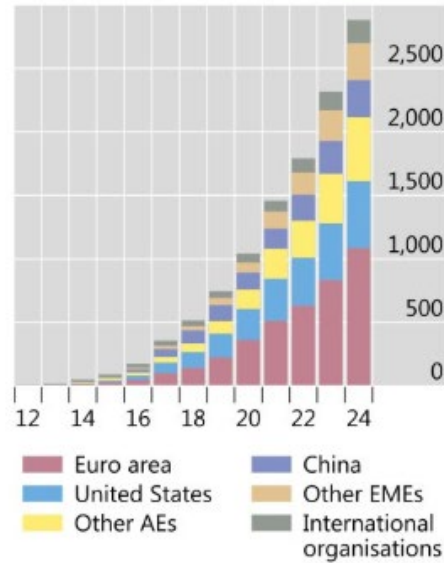


Green bond volumes have increased exponentially¹

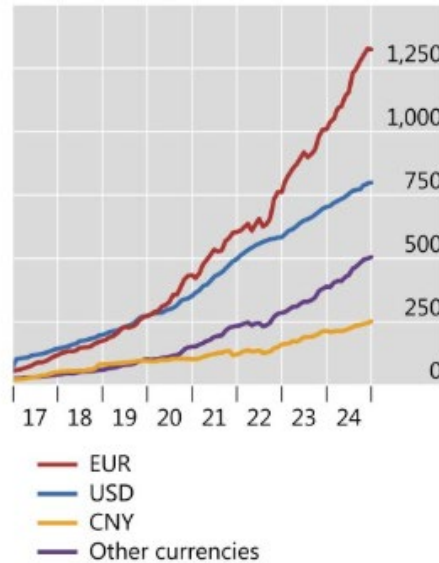
In billions of US dollars

Graph 1

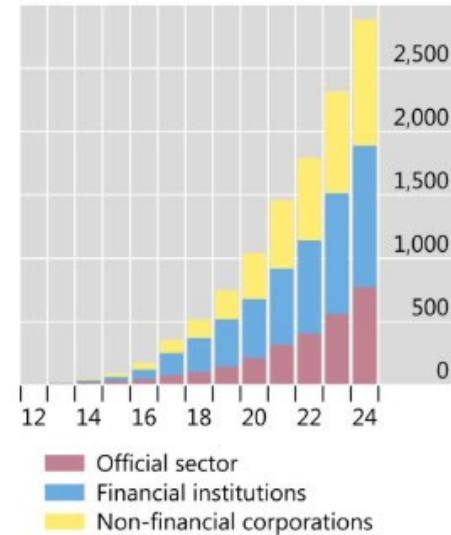
A. By country



B. By currency



C. By issuer sector



¹ Amount outstanding is calculated using total cumulative issuance minus cumulative amount matured as of a given year.

Sources: Climate Bonds Initiative; Dealogic; Environmental Finance Bond Database; S&P Trucost; authors' calculations.

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Challenge: greenwashing

Banking and Insurance

Banking — sustainable lending

- Risk-based approach: assess climate and social risks in every lending decision
- Equator Principles: 100+ banks commit to social/environmental standards in project finance
- Values-based banking : Triodos, GLS Bank, GABV members — mission-driven lenders
- Impact lending: direct loans to affordable housing, microfinance, clean energy projects

Insurance — managing long-term catastrophe risk

- Climate change is making extreme weather events more frequent and more severe
- Re-insurers (Munich Re, Swiss Re) are the world's most sophisticated climate risk analysts
- Microinsurance: extending coverage to smallholder farmers and low-income communities
- Insurance companies are largest bank/equity/bond institutional investors.

The Three Stages Framework

Stage 1 — SF 1.0: "Do No Harm" (Avoid the Worst)

- Exclude sin companies with very negative social or environmental impact
- Examples: tobacco, landmines, companies using child labour

Stage 2 — SF 2.0: "Do Less Harm" (Balance All Three Dimensions)

- Integrate ESG factors into every investment and lending decision
- Combine financial, social, and environmental value into one "integrated value"

Stage 3 — SF 3.0: "Do Good" (Drive Positive Impact)

- Start with sustainability goals; financial return is a constraint, not the objective
- Examples: green bonds, impact investing, microfinance

Extention: The Role of Technology

We are probably expericing a Technological Revolution

Clean energy technology costs have reduced:

- Solar power cost fell by more than 90% between 2010 and 2023
- Wind energy is now cheaper than new coal power in most of the world
- Electric vehicles approaching price parity with petrol cars in many markets

Data and AI are transforming sustainability measurement:

- Satellite imagery can track deforestation and carbon stocks in real time
- AI tools analyse millions of supply chain data points for labour rights violations
- Better data reduces greenwashing and makes sustainable investment more accurate

Challenge: AI => Data center => Huge debates on electricy/water consumption and pollution

Summary: What We Covered Today

- **Part 1 — What is sustainability & why does it matter ?**
- **Part 2 — Sustainability's challenges (5 tensions)?**
 - Internalising externalities
 - Additionality
 - Prisoner's dilemma
 - How to measure?
 - Who pays for it?
- **Part 3 — Financing sustainability**

What Can You Do?

Individual Choices

- Investment decision
- Career choices

Questions & Discussion