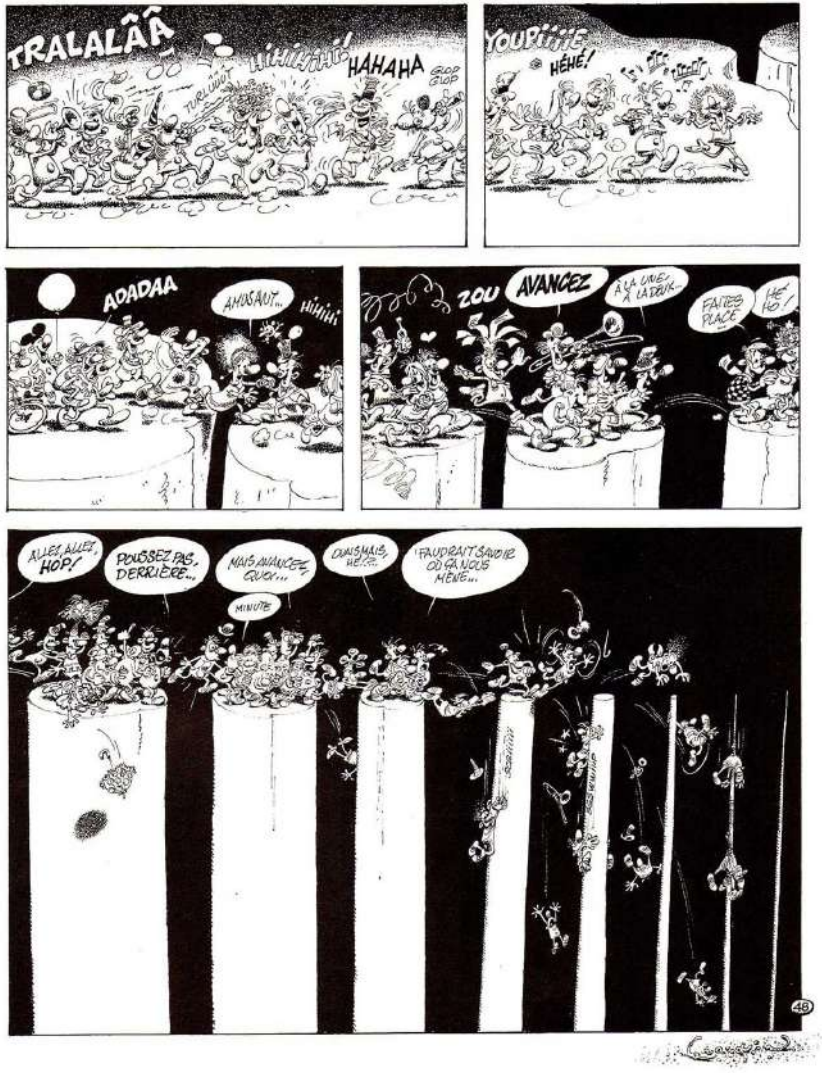

What if we thought about sustainable scientific research ?

Laurent JEANNEAU
CNRS researcher
Organic geochemist

Project manager for socio-environmental transition for research activities at Université de Rennes

laurent.jeanneau@univ-rennes.fr

Part 1. Why can scientific research be considered unsustainable in social and environmental terms ?

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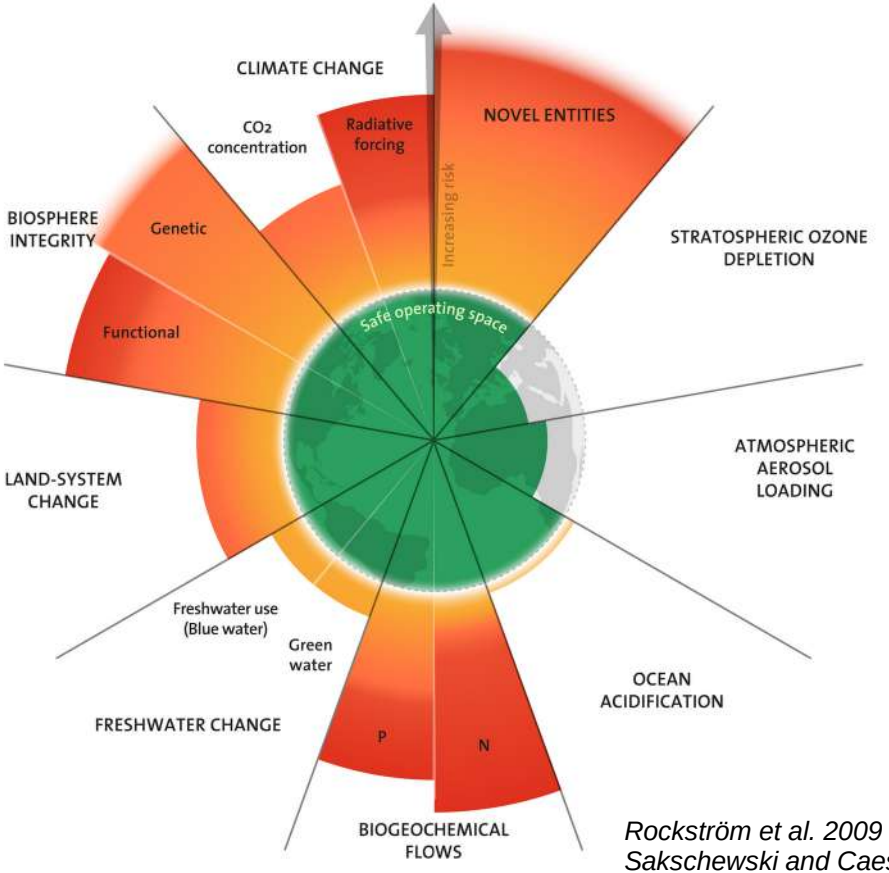
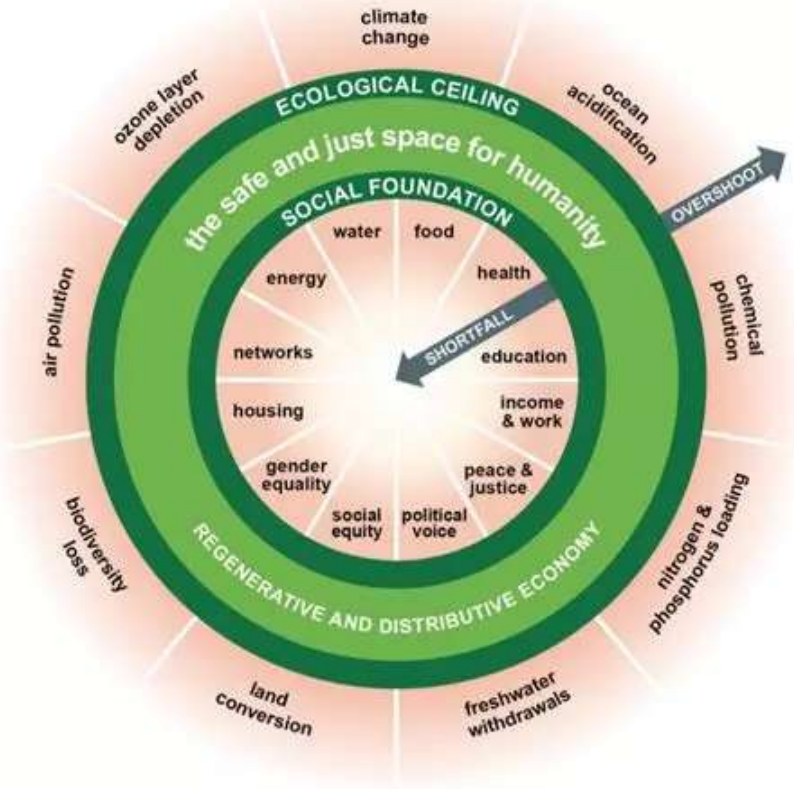


Rockström et al. 2009
Sakschewski and Caesar et al. 2025



Raworth 2017

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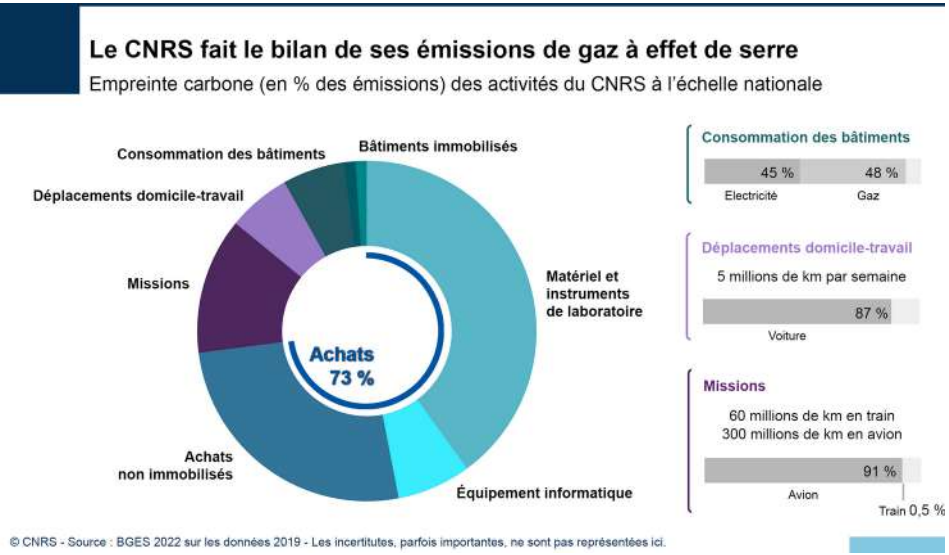

2022 : 14,7 T eCO2 / agent

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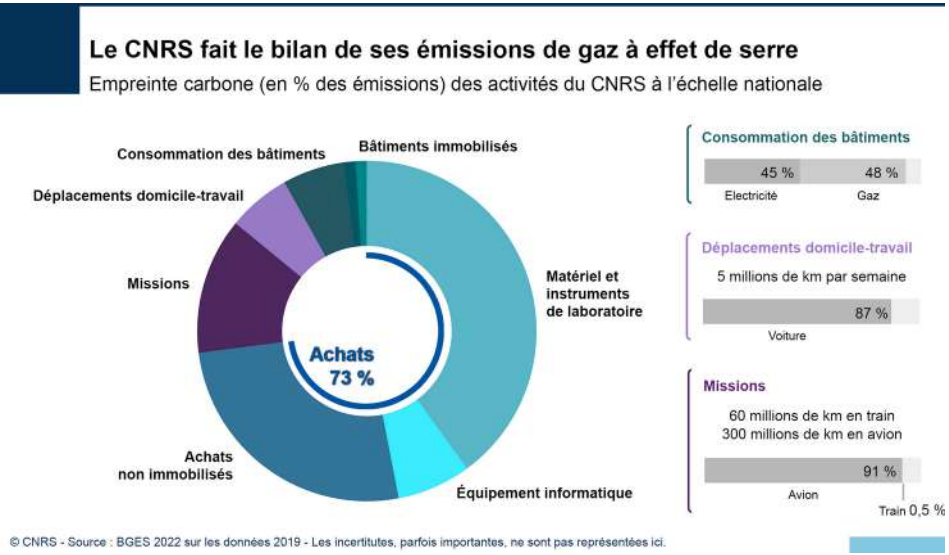

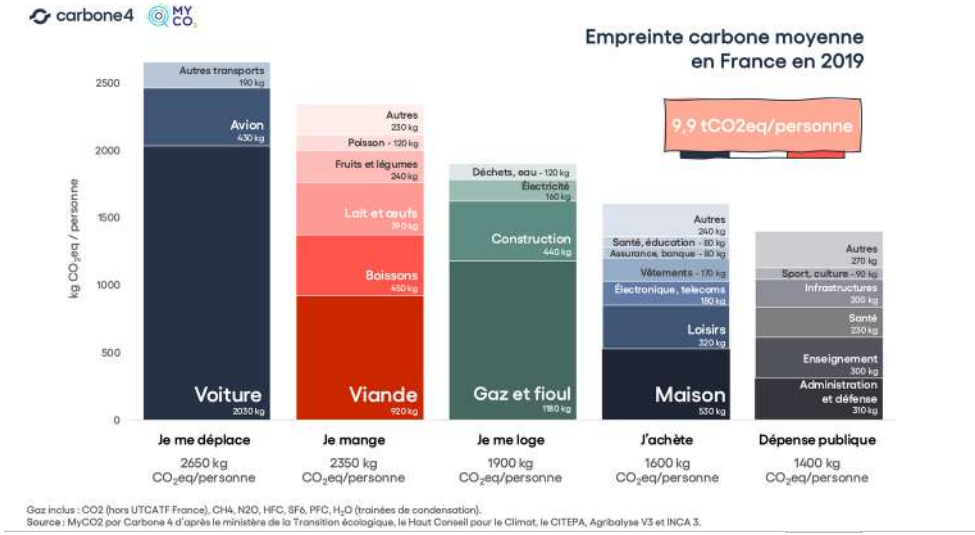

2022 : 14,7 T eCO2 / agent

Target to limit climate change : 2 T eCO2 / person in 2050

To achieve that, public services are asked to divide their emissions by 6

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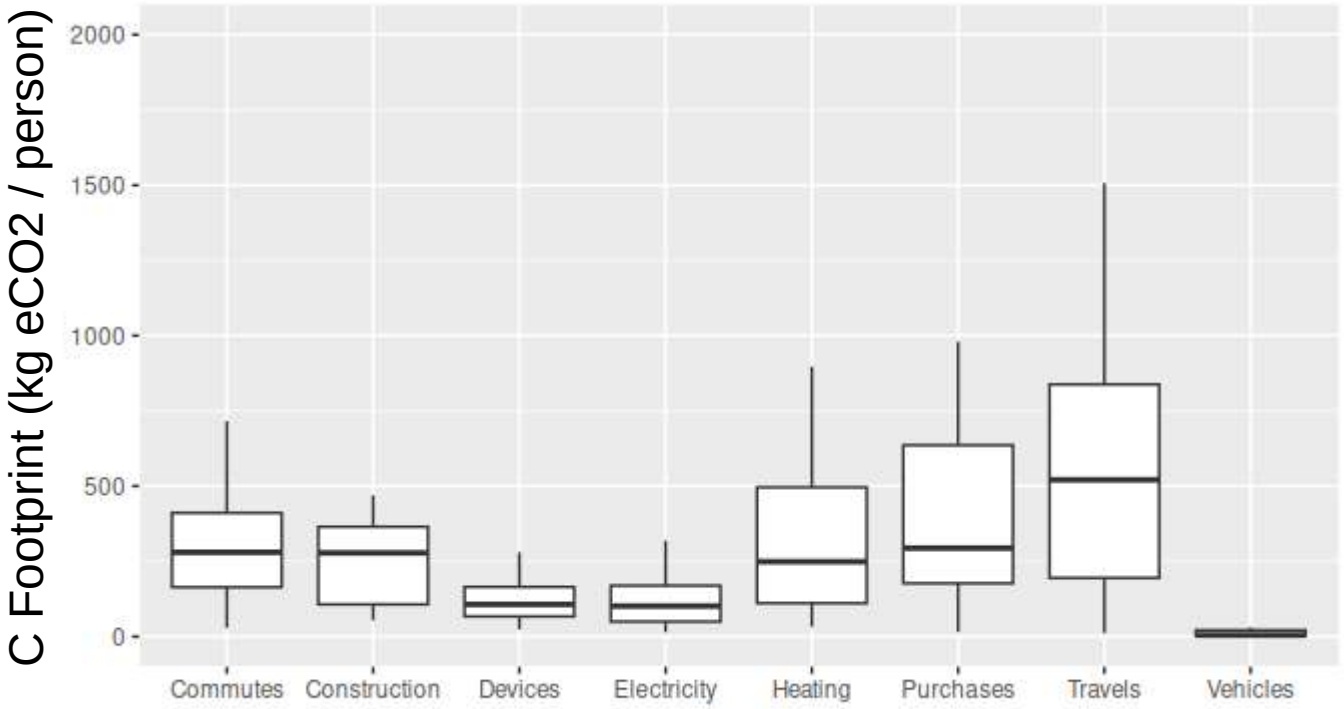

37 GHG inventories from 22 laboratories from 2019 to 2024

For the 13 GHG inventory including Construction and Purchases

Mean = 2.1 T eCO2
SD = 0.6 T eCO2

Data from GES1point5

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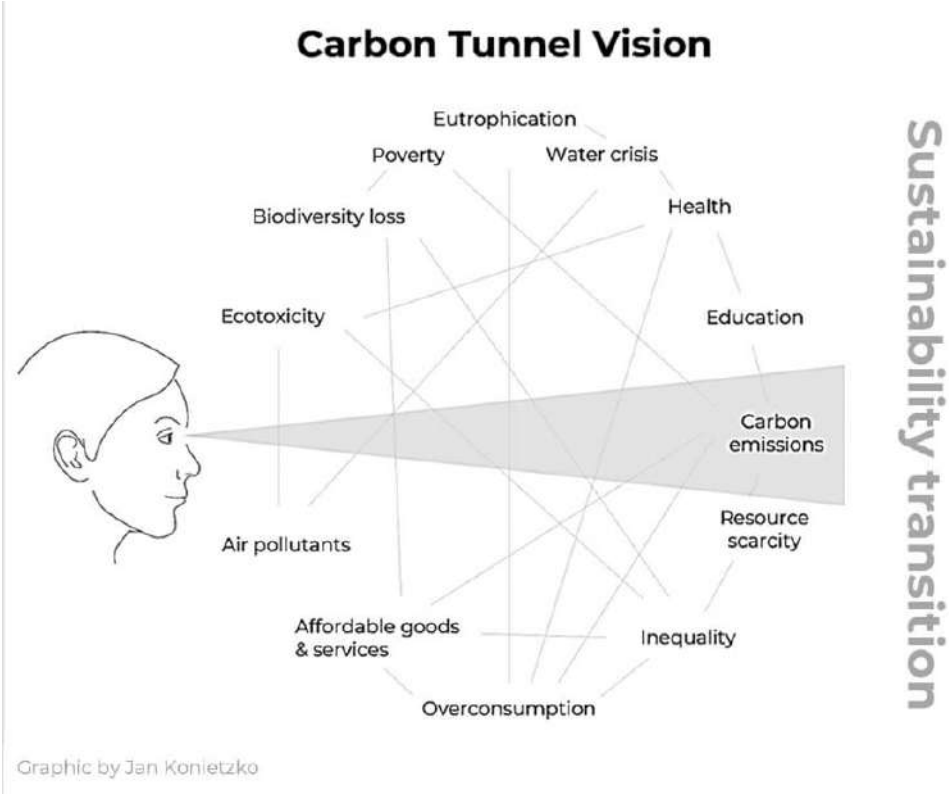
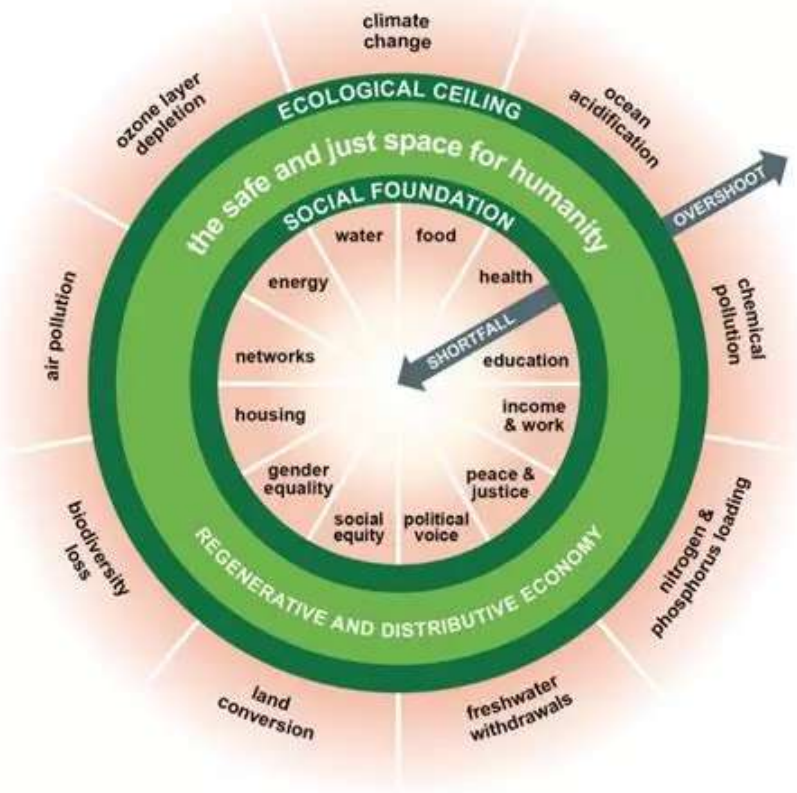
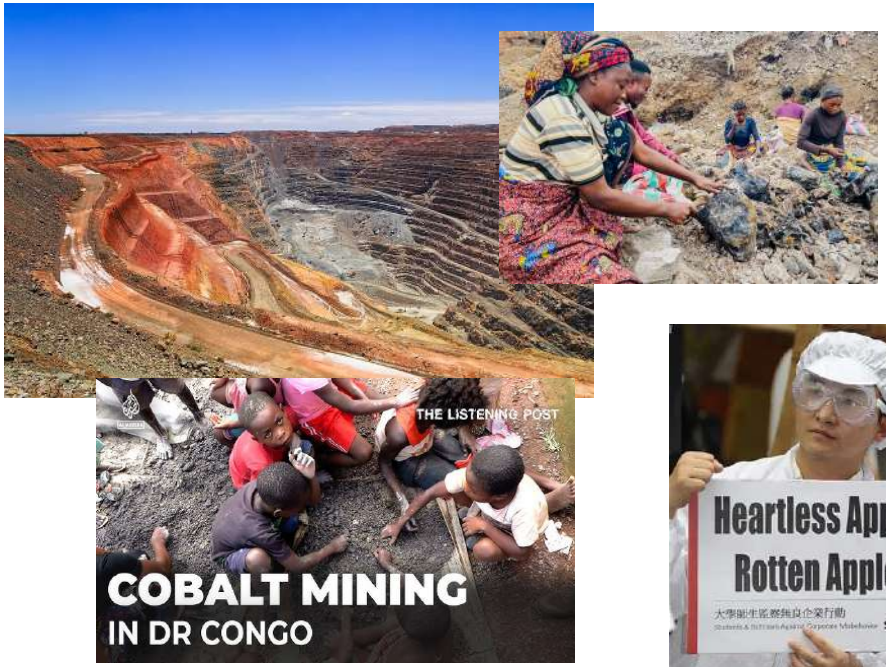


Sustainability transition



Part 1. Why can scientific research be considered unsustainable in social and environmental terms ?

Because all the products we are using, from equipment to consumables have large environmental and social impacts due to every step of their life cycle from mining to waste industries.



Part 1. Why can scientific research be considered unsustainable in social and environmental terms ?

Because our modern societies **are extractive, colonialist and predatory** towards humans and nature,

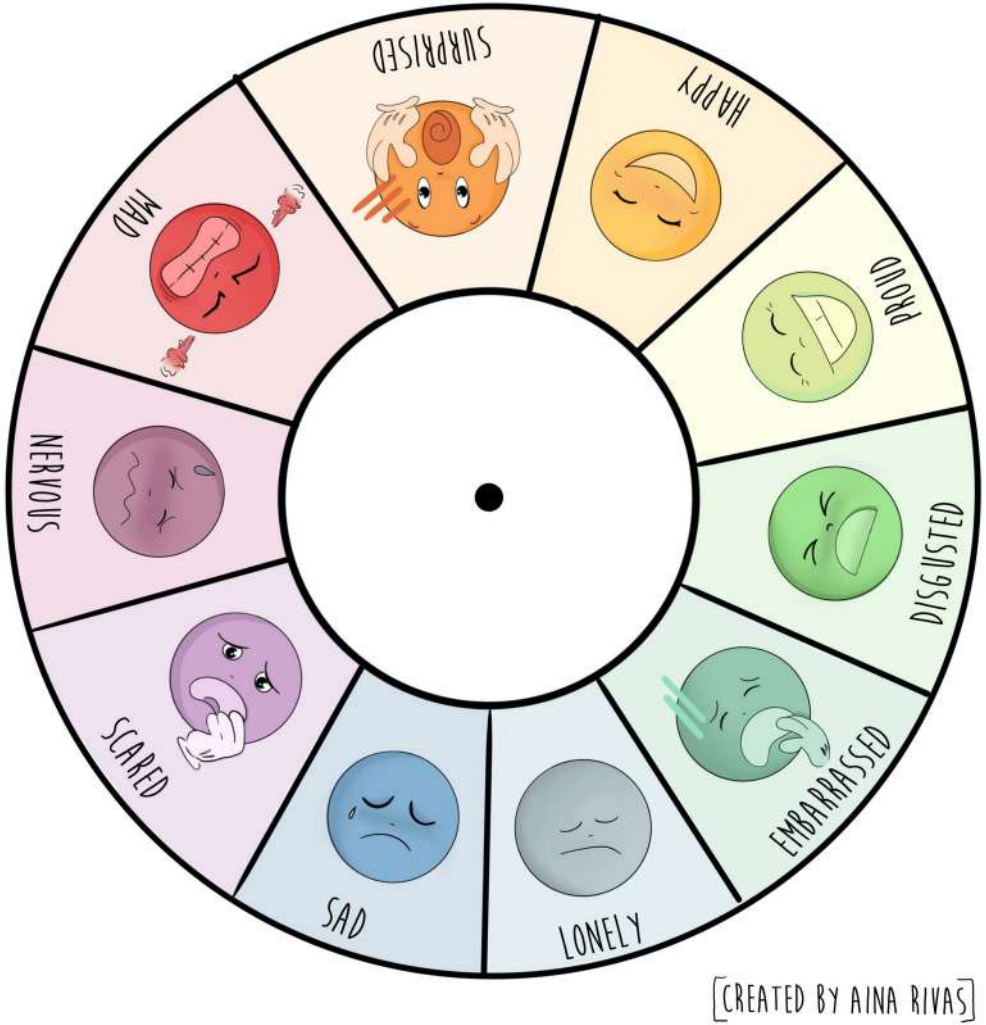
Because the scientific research has made the **development** of these societies **possible,**

Because the scientific research we do today is **intertwined with** the functioning of **these societies,**

Today's scientific research is socially and environmentally unsustainable.

As highlighted by the CNRS Ethics committee, reducing our negative social and environmental impacts is a matter of ethics, such as animal testing or genetic engineering.

How do you feel about this issue ?



Now that we've established that, all we have to do is take a step back, isn’t it?

But this is not so easy !

Part 2. What are the individual and systemic obstacles to the development of sustainable scientific research ?

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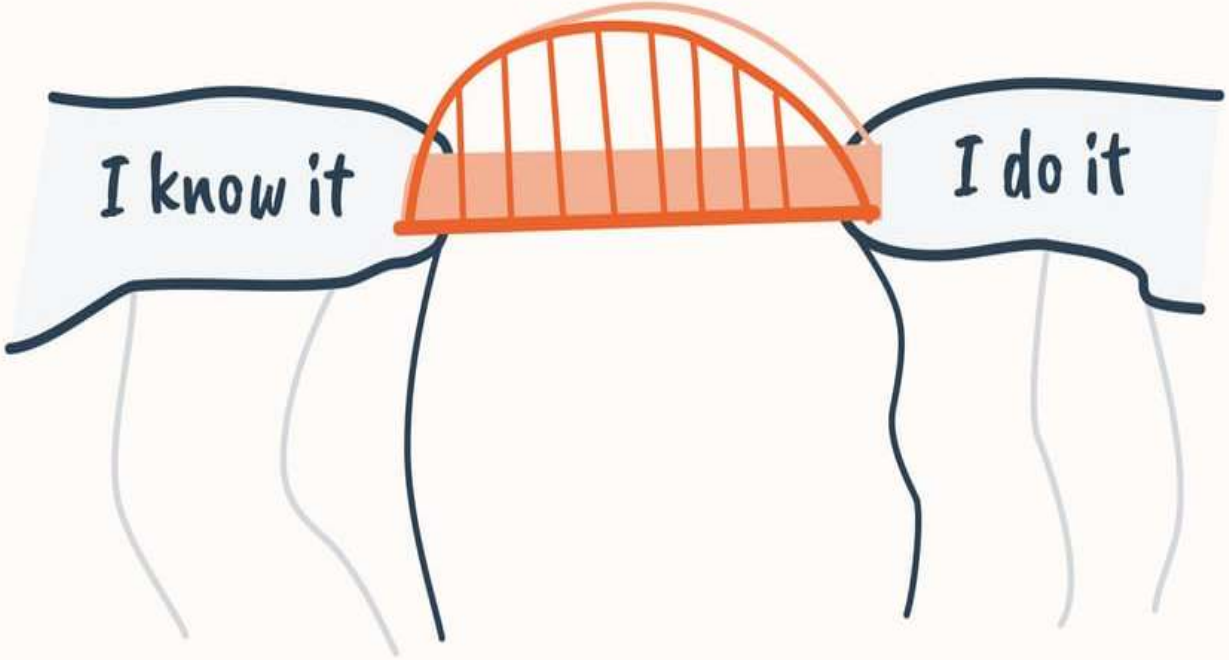
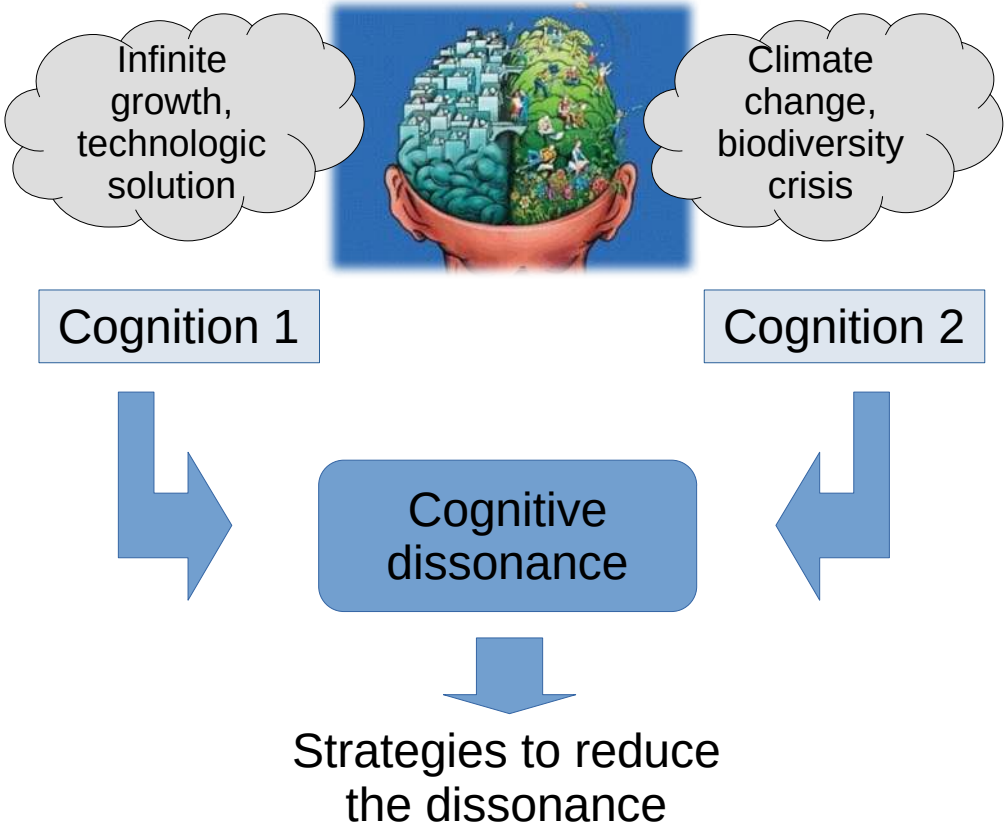


Part 2. What are the individual and systemic obstacles to the development of sustainable scientific research ?

Cognitive biases

Quick and intuitive ways of **making judgements or decisions** that are less laborious than analytical reasoning that takes all relevant information into account.

These biases are conditioned by our **beliefs**, i.e. our **convictions** that we accept as true without formal proof. The more deeply rooted they are, the more they influence biases.



Part 2. What are the individual and systemic obstacles to the development of sustainable scientific research ?

Strategies to reduce the dissonance

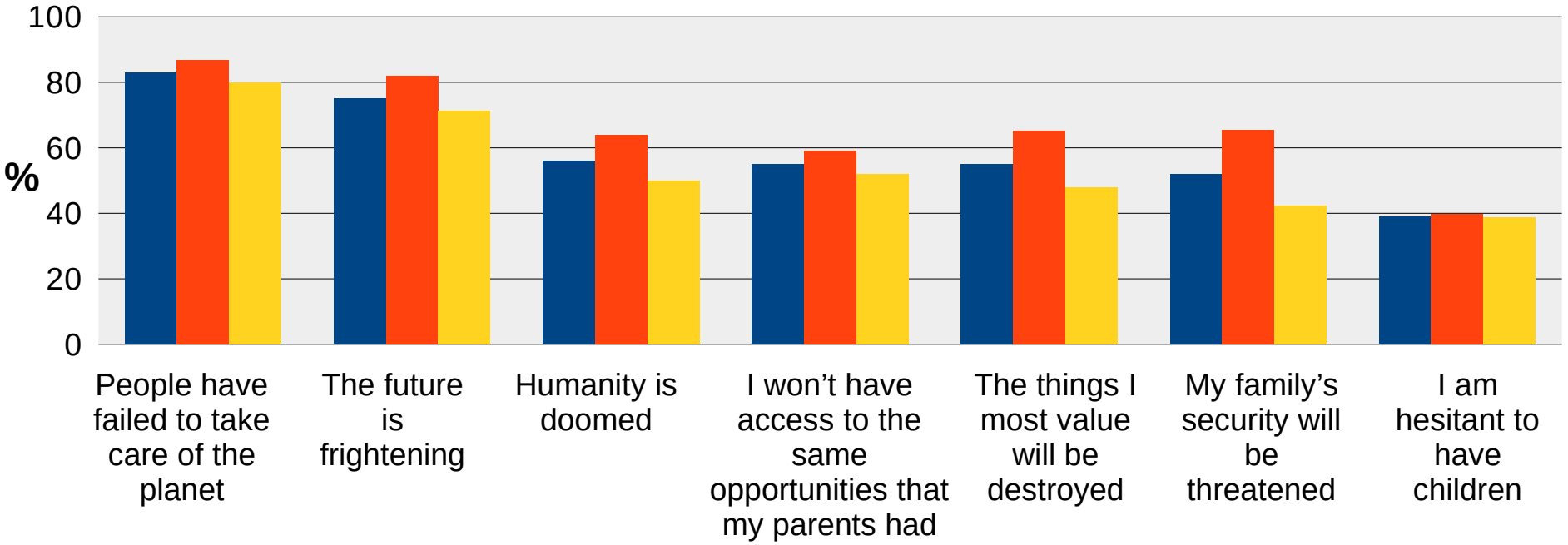
REACTIONS

- Feeling guilty

EMOTIONS

- Anxiety

Part 2. What are the individual and systemic obstacles to the development of sustainable scientific research ?



Blue : mean of 10 countries / Orange : developing countries / Yellow : developed countries

Survey of 10 000 young people from 16 to 25 years old and from 10 countries

Hickman et al., 2021

Part 2. What are the individual and systemic obstacles to the development of sustainable scientific research ?

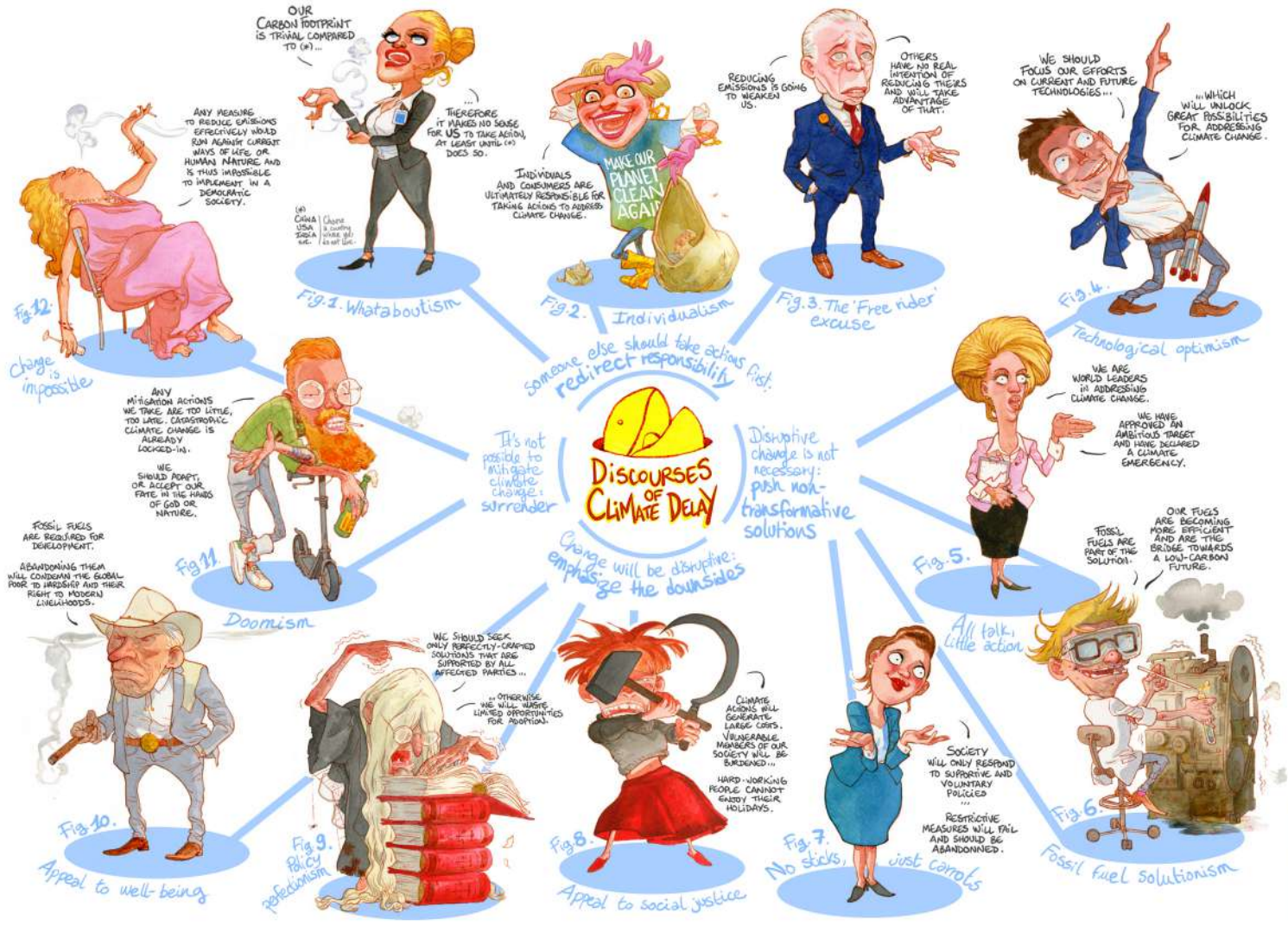
Strategies to reduce the dissonance

REACTIONS

- Feeling guilty
- Engaging in self-deprecation
- Doubting oneself
- Minimising, rationalising, justifying
- Rejecting information or responsibility

EMOTIONS

- Anxiety
- Coping strategy, avoidance
- Loss of confidence in one's abilities
- Emotional distancing
- Denial, rejection



Lamb et al., 2020

Illustrations Léonard Chemineau

Part 2. What are the individual and systemic obstacles to the development of sustainable scientific research ?

In the scientific community, the same discourses are found plus four additionnal ones that are specific

1. Obsession with measurement: prioritising measurement over action

This argument involves putting concrete proposals for action on hold on the grounds that it is first necessary to accurately measure the ecological footprint of institutions .

The insistence on describing, evaluating and measuring seems to be a real « professional bias » on the part of scientists.

2. Researcher freedom

A second argument typically put forward by the scientific community is to defend academic freedom against any restrictions that might be imposed on it for environmental reasons.

Carbou et Sébastien, 2023

Part 2. What are the individual and systemic obstacles to the development of sustainable scientific research ?

In the scientific community, the same discourses are found plus four additionnal ones that are specific

3. The neutrality argument

It consists of asserting that acting explicitly in accordance with ecological goals amounts to breaking out of the stereotypical framework of scientific activity: « Our job is to advance the pursuit of knowledge in a neutral manner, so above all, we must not become activists. »

4. Sacred science

This consists of rejecting any questioning of scientific activities on the grounds of their intrinsic value. This stance often takes the form of a presupposition or obvious fact: any suggestion of ecological measures that would undermine the core business of scientists is immediately considered absurd or unthinkable. This argument thus calls for a form of sanctification of scientific activity.

Carbou et Sébastien, 2023

Part 2. What are the individual and systemic obstacles to the development of sustainable scientific research ?

Strategies to reduce the dissonance

REACTIONS

- Feeling guilty
- Engaging in self-deprecation
- Doubting oneself
- Minimising, rationalising, justifying
- Rejecting information or responsibility
- Changing beliefs

EMOTIONS

- Anxiety
- Coping strategy, avoidance
- Loss of confidence in one's abilities
- Emotional distancing
- Denial, rejection
- Acceptance

Part 2. What are the individual and systemic obstacles to the development of sustainable scientific research ?

What are the beliefs we have to change ?

IN OUR EVERYDAY WORK ?

The newer the **equipment**, the better the quality of the result produced (4/6).
« *equipment race for innovation* »
« *high tech = high concept* ».

The values relating to **competition** focus on <u>excellence</u>
« *Competition is necessary and generates excellence* ».

« Freedom of research, not inhibiting creativity with low-carbon constraints »

IN RELATION TO THE ORGANIZATION OF RESEARCH ?

Assessment focus on <u>indicators</u>
« *Quantitative rather than qualitative assessment* »
and the <u>internationalization</u>
« *Research evaluation: a lot of international collaboration is needed; it's better that way* ».

The **competition** is divided into two topics:
<u>recognition</u>: « *We manage the competition. The important thing is visibility* ».
the <u>ever-increasing</u> « *race for data, race for projects, race for publications* ».

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What are the beliefs we have to change ?

IN OUR EVERYDAY WORK

IN RELATION TO THE ORGANIZATION OF RESEARCH ?

IN A NUTSHELL …

Among the values/beliefs identified by colleagues as **barriers** to reducing the environmental impact of research are **technosolutionism**, the **digitization** of work, the **ever-increasing** data, publication, grants... and **competition** as a driving force behind innovation.

The values relating to **competition** focus on excellence
« Competition is necessary to guarantee the quality of the result produced (4/6).
« equipment race for innovation »
« high tech = high concept ».

« Freedom of research, not inhibiting creativity with low-carbon constraints »

Assessment focus on indicators
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Part 3. How we can overcome them to unleash our capacity to invent the kinds of research that could fit a just, safe and desirable world for humanity ?

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Respect

Kindness

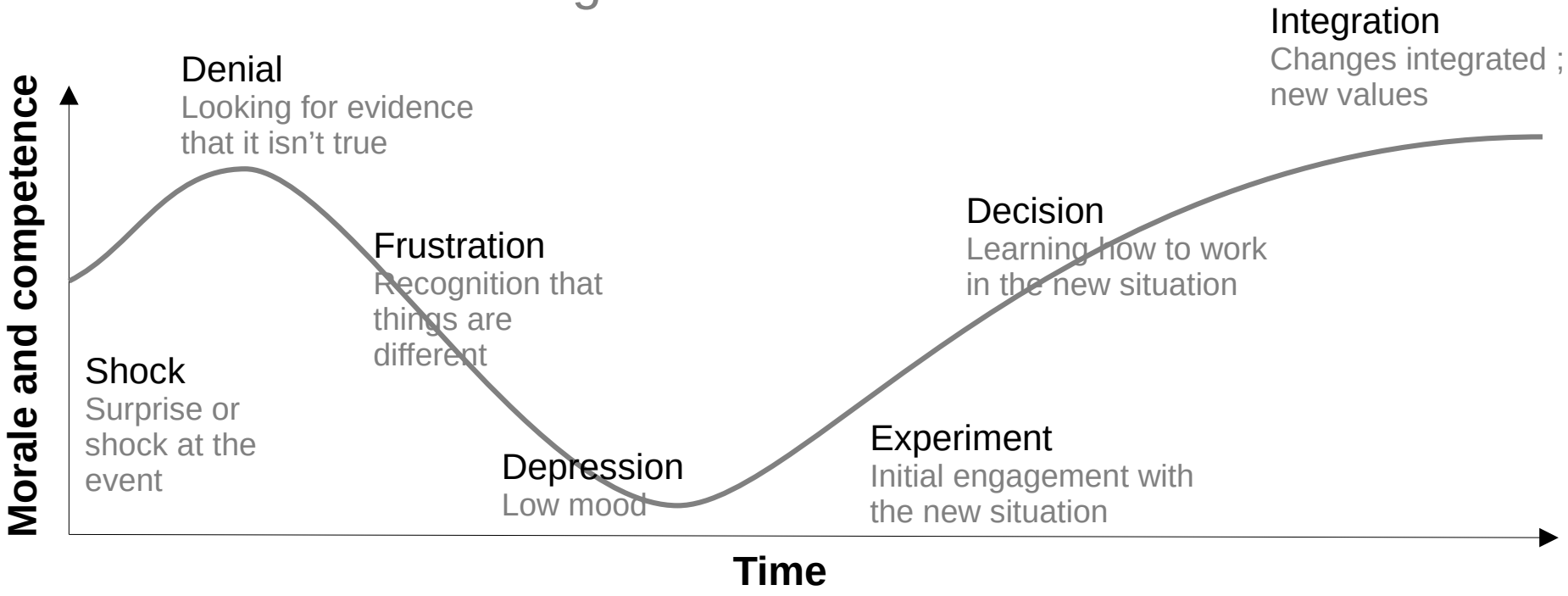
Mutualization

Organizational freedom

Slow science

Part 3. How we can overcome them to unleash our capacity to invent the kinds of research that could fit a just, safe and desirable world for humanity ?

The Kübler-Ross Change Curve



Part 3. How we can overcome them to unleash our capacity to invent the kinds of research that could fit a just, safe and desirable world for humanity ?

We have now to experiment… good news : this is our job !

Respect

Kindness

Mutualization

Organizational freedom

Slow science

A research that is conceived with society and not for society

A research that seeks to understand and not to control, whether humans or non-humans

A research that shows humility in the face of its subject and does not allow itself to be intoxicated by the power it derives from believing it can dominate it

… and new attributes, if you want to contribute

Take home message

This transition to sustainable research is perceived as a constraint by the majority of the scientific community. However, it can also be seen as a tremendous opportunity to mobilise our knowledge and innovation skills to create sustainable scientific research.

Thank you