

What is a Green lab and what for?

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Master Qbio-8th February 2022



- The results of the survey / comparison with other surveys
- A few facts
- What is the problem?
- What can be done ?
- Who can do it ?
- How can this be done ?

Survey results

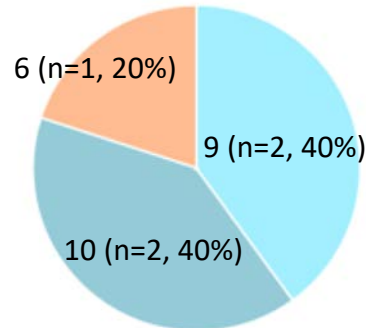


Mini survey Q bio students Green science

This survey is anonymous and just dedicated to anticipate the thursday course about green science

Can you describe in a few sentences your vision of the environmental crisis (such as the global warming for example)?

Do you feel concerned by this situation?



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" The environmental crisis is the result of the human activity on earth that is too present and intense, impacting on the other forms of life on earth "

" It is a fact and partially unchangeable "

" global warming is important and real, it can endanger the life and the environment of a lot of inhabitants of the earth "

" pollution, the destruction of ecosystems that disable the ability of nature to self regenerate or to endangered species to survive in this short time "

" It's difficult to reverse an environmental change "

" People are not aware enough about the environment crisis and the action are minor comparing to the problem "

" we need to change our perception on how we impact the environment "

" primary focus on accountability of the main contributors to the environment crisis, and particular consideration for its main stakeholders "

" it is important to control and conserve the degradation of ecosystem, extinction of species "

" requires global cooperation, requiring transdisciplinary approaches in seeking critical and systemic solutions "



Survey results

Is the environmental crisis the result of human activity ? Your opinion ?

“ The environmental crisis is the result of the human activity on earth that is too present and intense, impacting on the other forms of life on earth ”

Survey results

Is the environmental crisis the result of human activity ?

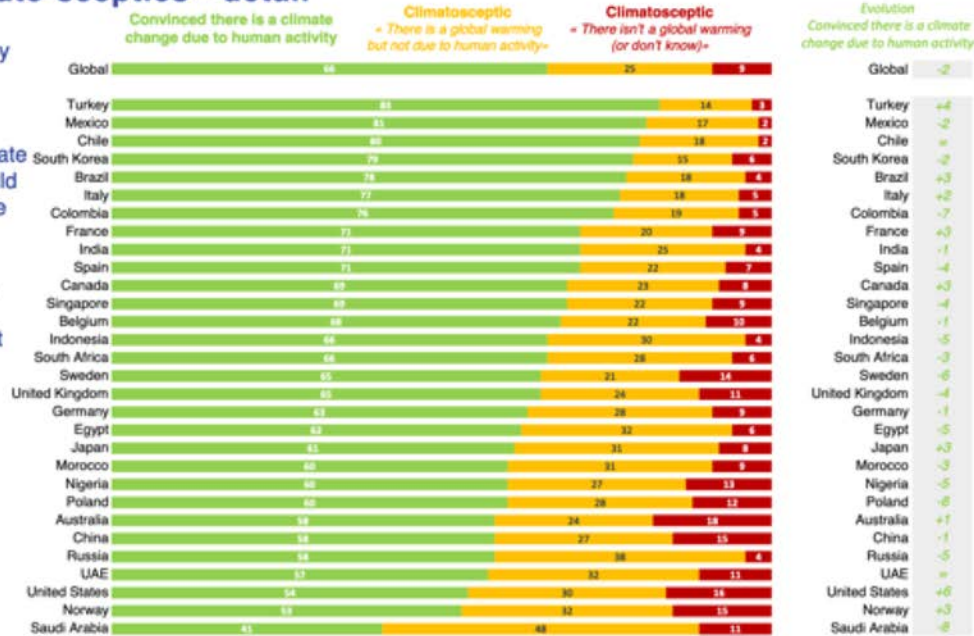
" The environmental crisis is the result of the human activity on earth that is too present and intense, impacting on the other forms of life on earth "

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Summary of climate-sceptics - detail

Q. Would you personally say that we are experiencing climate change?

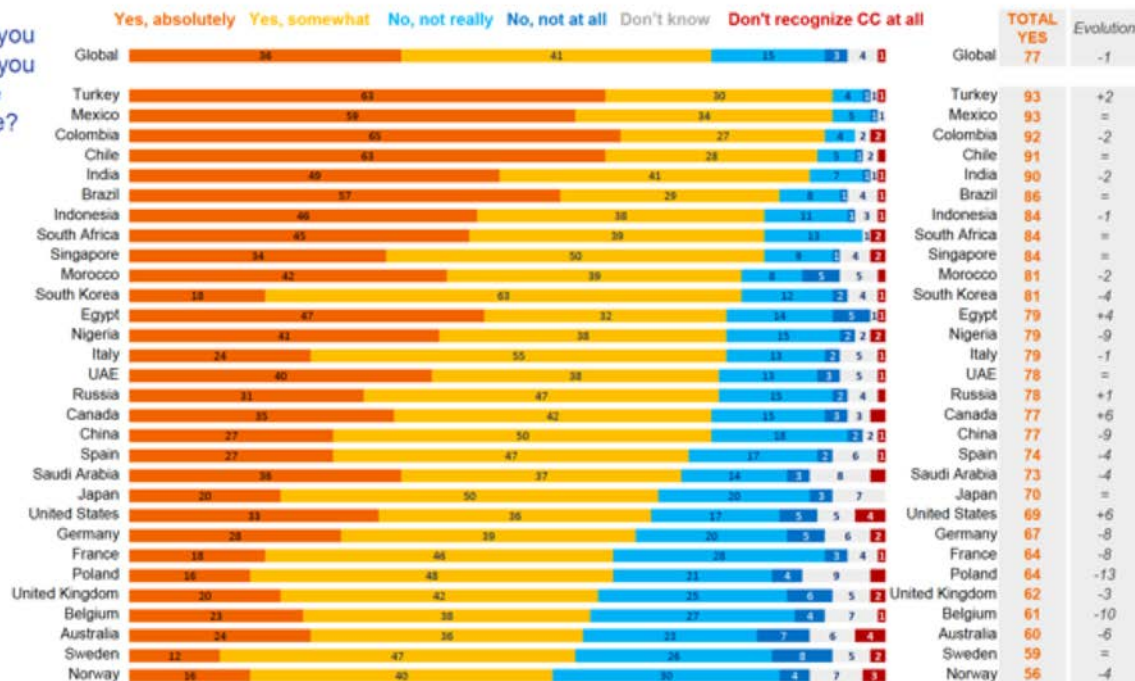
Q. And concerning this climate change we hear about, would you say: that it is mainly due to human activity, that it is mainly due to a natural phenomenon, like the ones the Earth has experienced throughout its history or that there is no way to know?



Survey results

Have noticed the effects of climate change

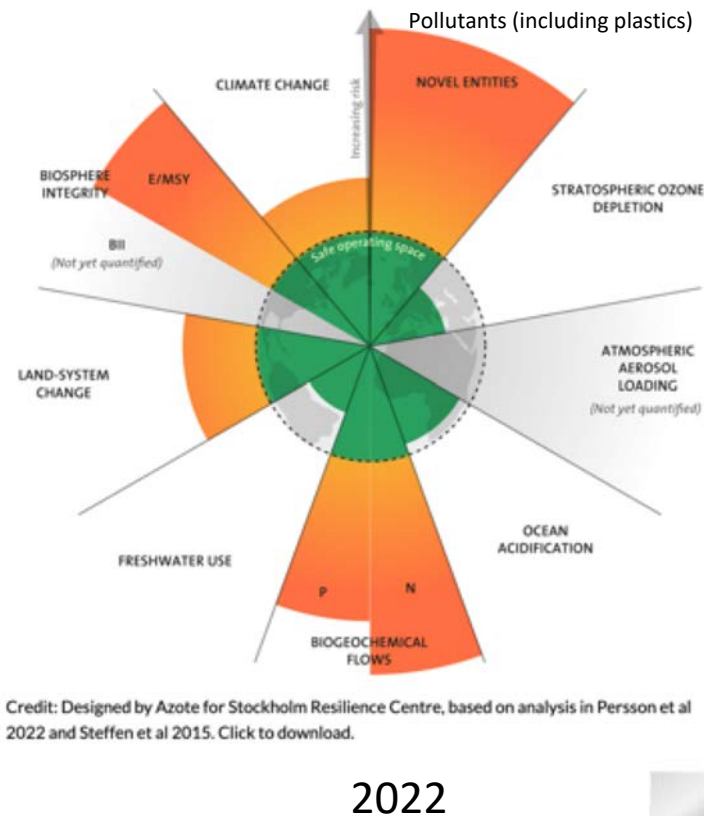
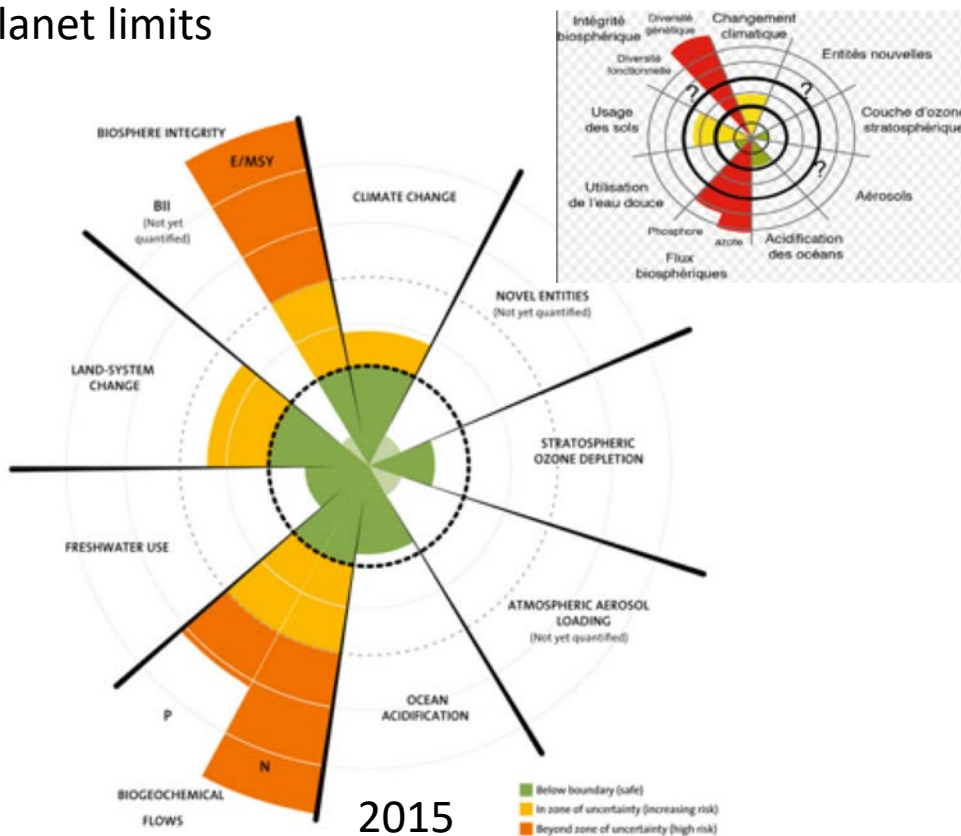
Q. On the whole, would you say that, in your region, you have already noticed the effects of climate change?



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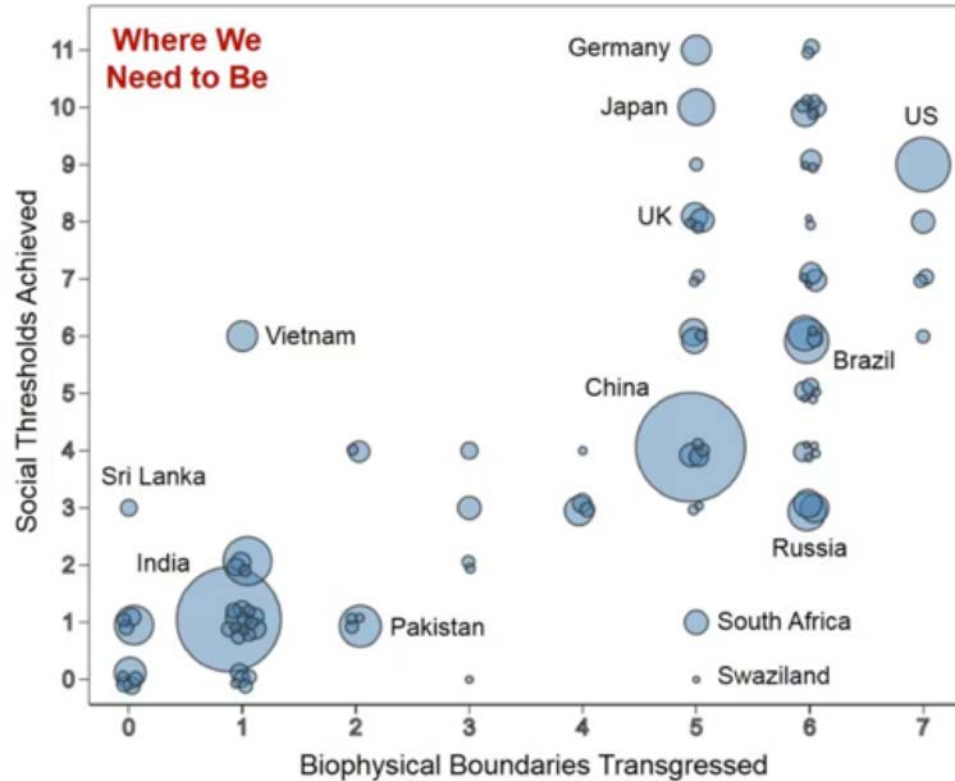
What are the facts?

Planet limits



Credit: Designed by Azote for Stockholm Resilience Centre, based on analysis in Persson et al 2022 and Steffen et al 2015. Click to download.

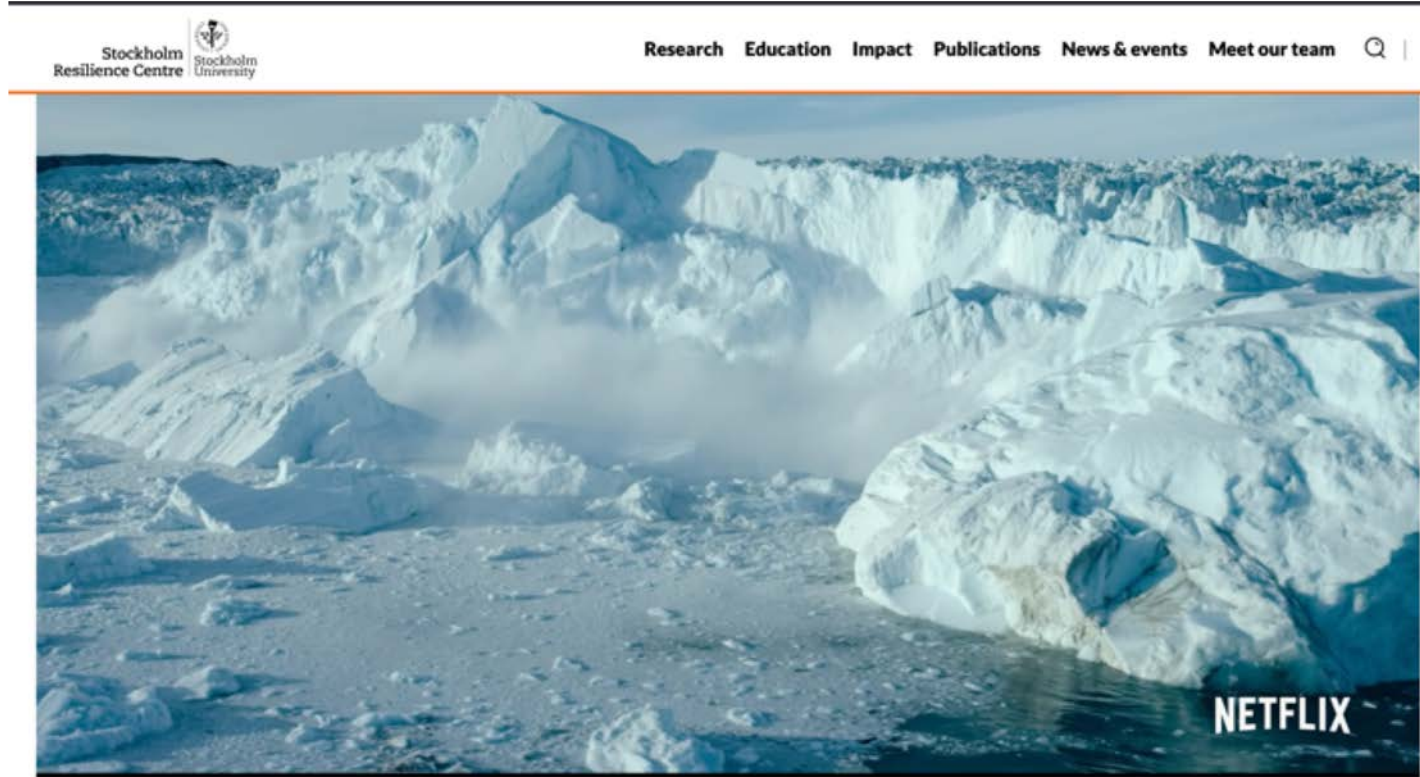
What are the facts?



<https://theconversation.com/is-it-possible-for-everyone-to-live-a-good-life-within-our-planets-limits-91421>

What are the facts?

Climate change



<https://www.stockholmresilience.org/research/research-news/2021-04-30-new-netflix-documentary-brings-the-planetary-boundaries-to-the-world.html>

What are the facts?

Tipping points

RAISING THE ALARM

Evidence that tipping points are under way has mounted in the past decade. Domino effects have also been proposed.



A. Amazon rainforest
Frequent droughts

B. Arctic sea ice
Reduction in area

C. Atlantic circulation
In slowdown since 1950s

D. Boreal forest
Fires and pests changing

F. Coral reefs
Large-scale die-offs

G. Greenland ice sheet
Ice loss accelerating

H. Permafrost
Thawing

I. West Antarctic ice sheet
Ice loss accelerating

J. Wilkes Basin, East Antarctica
Ice loss accelerating

©nature

Lenton et al, 2019, Nature



Characteristics

- Anthropocen : human-made
- all planet (space)
- Inertia (time frame)
- Complexity
- No getting back (tipping points)

<https://www.stockholmresilience.org/research/research-news/2021-04-30-new-netflix-documentary-brings-the-planetary-boundaries-to-the-world.html>

http://klimat.czn.uj.edu.pl/enid/1_Man-made_climate_change_-Inertia_of_climate_1wl.html

<https://www.eea.europa.eu/articles/understanding-and-acting-on-the-complexity>

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Why is this a problem and what is the problem ?



Why is this a problem and what is the problem ?

- Anthropocen : human-made
- Our responsibility towards other live beings (or other countries / human civilizations) or towards next generations
- all planet (space)
- all planet (space) : no technical solution yet, that would allow one country to solve the problem for the other. Need to get all countries acting together
- Inertia (time frame)
- Inertia (time frame) : difficulty to realize how urgent it is to act for many people
- Complexity
- Complexity : no simple solution
- No getting back

Why is this a problem ? What is the problem ?

Problem was not human-made

Problem was not complex



Space-scale was similar (all planet)

Time-scale was similar (problem not visible at the beginning apart from scientists), but shorter

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What can be done?

On a individual basis

"Do all my move in Montpellier by bike. Do car sharing. Try to reduce my consumption of transformed products (food for example)."

"Water economy , try to buys without packaging, try to consume less red meat, use less the car and more either public transport or bike, buy food that was about to be expired and thus trown"

By NGO

" Involvement in local organizations ... which seek to disseminate awareness, and encourage action towards environment conservation and protection."

"I buy my fruits and vegetables at the local grocery, which does not require plastic bag like in supermarket. I use my own cup at the coffee machine, and got a reusable bottle to reduce waste."

By politics (local/regional /state level)

By companies (national or international)

At the international level

"minimize water use (dish wash, shower) - recycle as much as possible -"

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Who can do it ?

On a individual basis

By NGO

By politics (local/regional /state level)

By companies (national or international)

At the international level

Notre empreinte carbone est fortement contrainte par l'**environnement social, technique et politique** dans lequel nous vivons.

- 60 %

- Décarbonation de l'industrie
- Décarbonation du système agricole
- Décarbonation du fret
- Décarbonation des services publics
- Décarbonation de l'énergie résiduelle consommée (chaleur, gaz, électricité)

Sur les 80 % de baisse nécessaires, 60 % ne pourront être réalisables que grâce à **une impulsion politique et collective.**

11 t CO₂ éq.

- 20 %

- 60 %

2 t CO₂ éq.

Gestes perso.

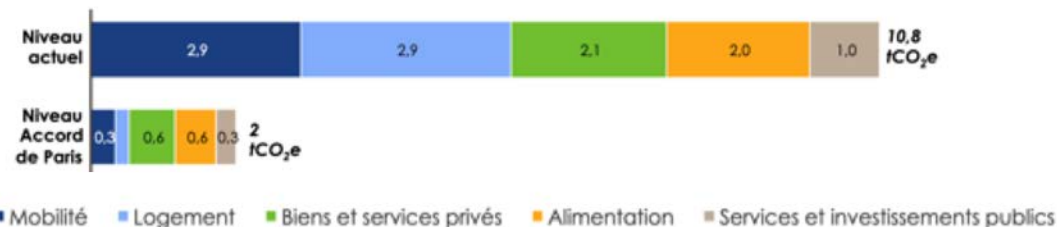
Action collective

1/4

3/4

Pour que l'empreinte carbone des Français diminue, **les entreprises et l'État doivent donc aussi se transformer en profondeur.**

Empreinte carbone moyenne d'un Français
tCO₂e



<https://www.carbone4.com/publication-faire-sa-part>

<https://offset.climateutralnow.org/footprintcalc>

<https://www.goodplanet.org/en/carbon-calculator/individual/>

In French (with tools from Ademe) :

<http://avenirclimatique.org/micmac/index.php>

When acting like a hero

Who can do it ?

On a
individual
basis

By NGO

By politics
(local/regional
/state level)

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1/4

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Pour que l'empreinte carbone des Français
diminue, **les entreprises et l'État doivent
donc aussi se transformer en profondeur.**

Conclusion : having personal pro-
environmental behaviors + acting at the
collective level !

When acting
like a hero

<https://www.carbone4.com/publication-faire-sa-part>

Who can do it ?

On a individual basis

By NGO

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At the
international
level

influence



Scientists (academia)



https://fr.wikipedia.org/wiki/Greta_Thunberg

"I would like to discuss on the position of scientists in the society and about their responsibility towards the climate change situation, to trigger more change and produce innovative solutions."

"How can we be more involved, through the work that we do, towards contributing efforts in countering the environmental crisis? What are the avenues available for us? And how can we do our part?"

Who can do it ?

On a individual basis

By NGO

By politics
(local/regional /state level)

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At the international level

influence



https://fr.wikipedia.org/wiki/Greta_Thunberg



Scientists (academia)

https://www.francetvinfo.fr/monde/environnement/crise-climatique/tribune-crises-environnementales-1-400-scientifiques-appellent-les-candidats-a-la-presidentielle-et-les-medias-a-sortir-des-discours-de-l-inaction_4930099.html#xtor=CS2-765-%5Bautres%5D-



The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body for assessing the science related to climate change.

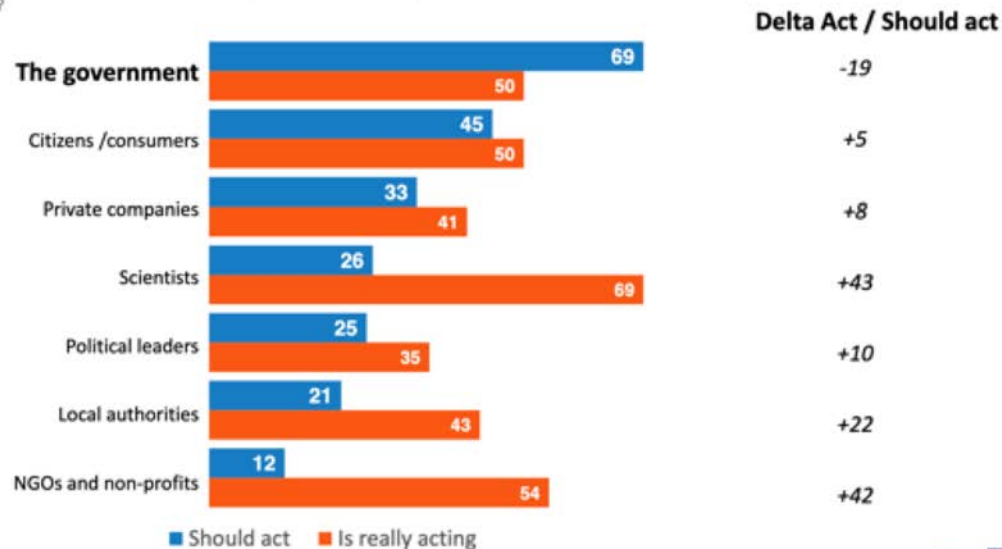
<https://www.ipcc.ch/>
<https://ukcop26.org/>

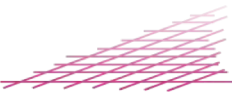
Who can do it ? Scientists ?

One of the factors behind this is that the climate issue is still primarily seen by the public as a matter for governments, thus attributing great weight to regulation.

Citizens feel that they are doing their part and ultimately little is expected of private companies

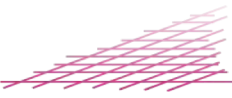
Q. In your opinion, which entities in the following list need to take action first and foremost to fight climate change in your country? / Q. For each of the following players, do you think that they are taking action to fight climate change in your country?





Some scientists' actions at the organisational level in France

- Collective « Labos 1p5 »
 - Think tank <https://labos1point5.org/>
 - Implementation of method to calculate lab carbon footprint
 - Since 2021 : an official research group (CNRS, INRAE) to experiment actions in lab to reduce lab carbon footprint
- Serious game : MaTerre 180 min <https://materre.osug.fr/-C-est-quoi->
- Atecopol (political ecology) : Toulouse, Montpellier, Paris...
<https://atecopol.hypotheses.org/contacts>
- GDS (group of services) Ecoinfo (CNRS) <https://ecoinfo.cnrs.fr/le-gds-ecoinfo/>
- Within labs : « green committee », network of lab green committees from Montpellier (in construction..)



Some scientists action at the organisational level elsewhere

- University College of London <https://www.ucl.ac.uk/sustainable/staff/labs/resources-and-materials>
- My green lab <https://www.mygreenlab.org/>

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Practical tips to be done in the labs

“ Place of environmental issues in the lab, action to make the lab more green.”

“ Options to consume less plastic during experiments”

- ✓ Plastics : not much recycling actually possible
- ✓ Carbon footprint when coming to the lab (cycling ...)
- ✓ Carbon footprint in the lab (heating, isolation of buildings, ordering green goods)
- ✓ Conferences : reduce air plane ! + see how to calculate carbon footprint of your event
 - ✓ <https://evenementresponsable.ademe.fr/> (French)
 - ✓ <https://sustainability.biologists.com/blog/which-areas-contribute-the-most-to-an-events-footprint/>

Use of plastics (from UCL)

10 ways to reduce plastics in laboratories

Can your packaging be sent back?

Several suppliers offer this so it can be reused. Engage your suppliers on what options they can offer.



Glass vs. Plastics: Could you switch from plastic to reusable glass?

The energy used for washing is far less than that to remake and transport plastic.



Can you recycle your packaging?

Most packaging doesn't require incineration. Consider if there are ways to avoid excess clinical waste, e.g. targeting a few items which aren't contaminated to no longer go through clinical waste.



Create reagents/kits in-house:

Many common reagents and materials may be produced on site e.g. pour your own gels for DNA electrophoresis



Could you buy bulk?

Combine and share with other labs. Only do so when certain to utilise all contents.



Do you require gloves?

Much research was successfully done without gloves in the past. Choose the appropriate gloves for your task – a thinner version may be just as safe.



- Can you reuse gloves between experiments?
- Thicker gloves are easier to reuse but have more plastic. Consider the balance between thickness and reuse that is best for your work.

Could your leftover plastic containers be used for something else in the lab?



Purchase 'flexible' kits:

Many labs use kits for standard processes – purchase kits which allow you to buy the contents separately – avoiding waste bottles/reagents.



Can you downsize your plastics?

Sometimes there are alternatives which perform the same task with less plastic. E.g. smaller tube sizes.



Tip boxes: Can you reload tip boxes?

Non-contaminated tip boxes can be recycled or some suppliers offer take-back schemes.

