

Chapter 9

Lifestyle

There can be only one permanent revolution – a moral one; the regeneration of the inner man. How is this revolution to take place? Nobody knows how it will take place in humanity, but every man feels it clearly in himself. And yet in our world everybody thinks of changing humanity, and nobody thinks of changing himself.

Leo Tolstoy

Never before have we had such an awareness of what we are doing to the planet, and never before have we had the power to do something about that... The future of humanity and indeed, all life on earth, now depends on us.

Sir David Attenborough

The IPCC reports are crystal clear: we need a transition and even a transformation. We need pervasive change of processes and behaviour at all levels: individuals, societies, industries, institutions, and governments. We simply must redefine our lifestyle and our consumption patterns and dare to think outside the box.

9.1 THE REAL DIFFICULTY

There is too much greed and too little compassion in the world. Science does not provide any solution how to decrease human greed and how to increase human compassion. This is the all-encompassing climate change challenge.

It is not global warming that makes the threat. It is the gasoline, the oil, the coal, the natural gas, the methane. This is caused by humans.

The threat is not the global warming. The real threat is caused by our own choices of burning fossil fuels.

In the radio news on 6 January, 2015 it was reported that the oil price had dropped below US\$50 per barrel. A striking comment was that ‘the consumption of oil is increasing but not sufficiently fast, since there is a surplus production’. This is our economic imperative: grow or die. When the oil price had dropped there was hardly any discussion of the consequences for the climate. Most of us are aware of climate change, but this does not change our lifestyles or the political agenda, even if the whole earth is threatened. What is wrong with us?

As discussed in Chapter 8, the economic model built on consumption and growth is not designed to cope with the climate challenge. At the same time, we demand that politicians and decisions makers around the world should take a responsibility for systems issues that they cannot influence.

Climate change is becoming an existential threat and we should get prepared for it, not only in our private lives. Education of young people and academic curricula are hardly ever designed to prepare young people for the upcoming challenges but are designed along specialist silos. Civil engineers, urban planners, city managers, or architects are seldom trained to deal with climate change. Electrical engineers, together with other specialists, should be prepared for the necessary electrification of the society. Environmental engineers must discover all possible interactions that determine the fate of our nature. And so on.

Collectively, we have most of the technology to reduce greenhouse gases, but we have never really shown the will. Our value system, our lifestyle, mobility, what we eat, our clothes, our economic models – *everything must work together* to deal with the climate crisis. To seriously deal with climate change will probably require a completely new attitude to life. Many people have climate anxiety today – probably because we are not prepared to sacrifice anything? Maybe somebody else can start?

*Everything must
work together
to deal with the
climate crisis.*

The dominating groups choosing the train and eating less meat are found among young people, women, and people living in large cities. Climate change is causing an increasing worry, and more and more people make active choices to live a little smarter with respect to the climate.

9.2 RELATION BETWEEN WEALTH AND EMISSIONS

In section 8.1 we described some consequences of the huge economic inequalities in the world. The Oxfam Inequality report³²² presents not only the absurd inequalities in the world, but also clarifies with painful clarity how inequality kills. Gender and racial inequalities are increasing and widening economic inequalities are tearing the world apart. This is true not only between individuals but also between nations. The development is logical: structural policy choices are made for the richest and most powerful people.

The pandemic was a harsh reminder about the bizarre inequalities. With deprived access to vaccines, hospital care, public health, and food, millions of poor people died unnecessarily. At the same time, the richest people got even richer. Some Oxfam comments:

- The top 1% have achieved almost 20 times more wealth than the bottom 50% of the global population, since 1995.

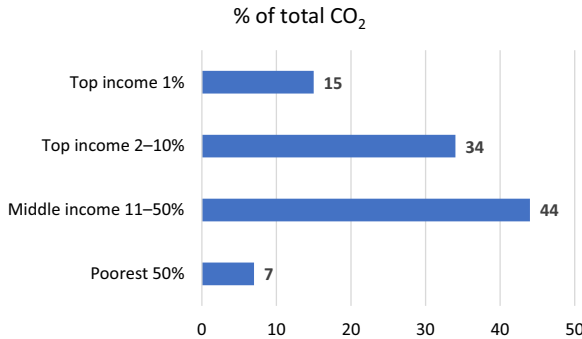


Figure 9.1 Contributions to global emissions from different income groups.

- 250 men have more wealth than all 1 billion women and girls in Africa, Latin America, and the Caribbean, combined.

The rich part of the global population is increasingly killing the planet. [Figure 9.1](#) illustrates how the wealthiest people in the world are the primary contributors to global warming. The richest 1% emit 70 tons of CO₂ per capita and year, while the poorest 50% emit 1 ton. In 2019, CO₂ emissions per capita in the world was 4.93 tons per capita.

The top 1% wealthy people emit more than twice as much compared to almost 4 billion people at the bottom of the wealth pyramid. The high-income half of the global population produces 93% of all emissions, but it is usually the poorest part of the population that pays the cost for the consequences. The obvious outcome is, that unless the wealthiest 10% do not change their (our!) lifestyle the world will miss the 1.5 or 2°C goals, whatever the remaining 90% will do. Oxfam predicts that the contributions to the global emissions from the richest people will increase further during this decade.³²³ The global crisis is caused by the richest people and only they can do anything about it, as discussed in section 8.1. The carbon footprint of the billionaires' houses, vehicles, aircrafts, and yachts are mindboggling, in excess of thousands of tons per year. Space tourism is the latest addition of exceptional carbon footprint from a few people. Their pollution to the atmosphere has no fee. The purpose is not to further explore space around us or to build on the technology for the good of humanity. It is luxury consumption and an exclusive adventure for a few. Our problem is that so many people admire the richest people.

The high-income half of the global population produces 93% of all emissions

Greta Thunberg, our Swedish climate activist has expressed it brilliantly at the Pre-COP26 Youth Summit: *'The climate crisis is of course only a symptom of a much larger crisis. A crisis based on the idea that some people are worth more than others, and therefore have the right to exploit and steal other people's land and resources. It is very naïve to believe that we can solve this crisis without confronting the roots of it'*.

Around half of the 1% richest people in the world come from the USA and China. This illustrates that emission reductions must take place not only domestically in rich nations. These countries also must provide financial support to low- and middle-income countries to handle the climate crisis. As noted in sections 3.6 and 8.1, there is both a legal and moral obligation to make this happen. Unfortunately, the wealthiest people do not seem to voluntarily change their lifestyle. Therefore, governments must take the responsibility to significantly raise taxes on consumption with high carbon footprints, from SUVs to mega yachts, private jets, space tourism, destroying the planet and letting the poorest people pay the price.

9.3 MEASURING NATIONAL EMISSIONS

There are different measures of the emissions from a country. The *national* emissions include greenhouse gases being generated within the national border, the territorial emissions. This is what is usually reported to the UN and other international bodies. From one aspect this is adequate since the nations have the responsibility for these emissions in their climate work, and they have some authority to control these emissions. Furthermore, it is relatively simple to calculate emissions from combustion within the national borders. For example, national emissions in Sweden have decreased from slightly more than 70 Mt in 1990 to 50 Mt in 2020. This is the right direction but does not show the real carbon footprint of Sweden. Also, production-based accounting does not account for carbon leakage – the phenomenon of countries reducing their domestic emissions by shifting carbon-intensive production abroad.³²⁴

Burning wood
is worsening
climate change

Wood burning is seldom reported as part of the national emissions since it is defined as carbon emission neutral, so called biogen CO₂. One CO₂ molecule from wood has the same carbon footprint as one molecule from oil. The misinterpretation is dangerous since the CO₂ is not captured by new trees until decades later. But the climate crisis is

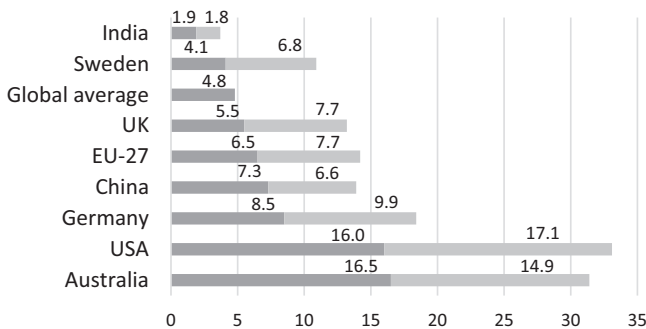


Figure 9.2 Emissions within the national borders of some countries (tons/person/year). Dark grey shows production emissions; light grey shows consumption emissions. *Source:* Our world in data & Global Carbon Project.

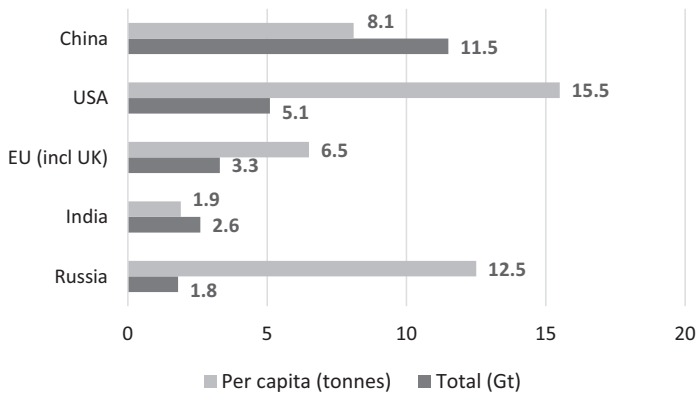


Figure 9.3 The total and per capita emissions by the world's five biggest emitters in 2019. China emits around 30% and the USA 13.5% of the global emissions. *Source:* EC Emissions database for Global Atmospheric Research.

happening now, so this type of biofuel is not a solution. If Sweden had reported biogen CO₂, then there has been no carbon footprint decrease since 1990.

The *consumption* emissions are significant and take imported and exported goods into consideration. Calculating emissions from imported goods are more uncertain. For example, to calculate emissions caused by importing a car, having components from several countries, is quite unreliable. Since there is no official statistics for consumption footprints, the numbers may vary. Still, the consumption footprint is significant. For example, total emissions for Swedish residents' air travel increased 61% between 1990 and 2014 (Figure 9.2).³²⁵ By 2014 the air travel emissions were of similar size to Swedish road traffic. The global average carbon footprint is today around 5 tons of CO₂ per person and year and must decrease to 2.5 tons to meet the 1.5°C goal of the Paris agreement. Figure 9.2 shows that most high-income countries exceed this target by far, while low-income countries are below the targets. Figure 9.3 shows the total and per capita emissions by the world's five biggest emitters in 2019. These numbers ought to be related to the accumulated emissions, shown in Figure 3.1.

Note the difference between national and consumption emissions

9.4 CONSUMPTION PATTERNS

The IPCC says we need to:

- Buy less meat, milk, cheese and butter.
- Eat more locally sourced seasonal food – and throw less of it away.
- Drive electric cars but walk or cycle short distances.
- Take trains and buses instead of planes.
- Use videoconferencing instead of business travel.
- Use a washing line instead of a tumble dryer.

- Insulate homes, and
- Demand low carbon in every consumer product.

We know that this is required. Let us consider a couple of consumption areas with large carbon footprint impact.

9.4.1 Apparel industry

The fashion industry accounts globally for 4–8% of all man-made greenhouse gas emissions. That's roughly the equivalent of the global aviation and shipping industries' emissions combined. The fashion industry has published information on carbon footprint reductions made in retail stores and warehouses. A major part of the apparel industry carbon footprint, however, comes from the supply chains, mostly garment manufacturing in low-income countries. They rely heavily on coal-fired energy and are also great consumers of water for raw material like cotton. Most of the manufacturing is outsourced, implying that the retail stores are only indirectly responsible for the carbon footprint of their products.

Fashion industry emissions are similar to global aviation emissions.

What makes the fashion industry more problematic than most other consumer goods industries is the frenetic pace of change that it encourages. Each passing season (or 'microseason') consumers are pushed to buy the latest fashion items.

The apparel industry has a large water footprint. Fabric dyes pollute water bodies, with devastating effects on aquatic life and drinking water. Trendy styles of tight jeans contain stretchy elastane synthetic material derived from plastic, which reduces recyclability and increases the environmental impact further.

Around 65% of the clothing is made of synthetic polymer polyester fabric.³²⁶ Polyester is easy to clean and durable and is also lightweight and inexpensive. Around 70 million barrels (11 million m³) of oil a year are used to make polyester fibres in our clothes. The carbon footprint from a polyester shirt is about 5.5 kg while a cotton shirt generates 2.1 kg of CO₂.

One of the issues is PFAS (per- and polyfluoroalkyl substances), the collective name for a group of 5000 toxic (but still legal) chemicals used in many consumer products. PFAS is used to provide non-stick, water repellence, and anti-grease not only for outdoor gear but also for cosmetics, food packaging, frying pans, and firefighting foam. PFAS is not degradable in nature and is accumulated in many of the nutrient chains in nature. The industrial use of PFAS has been so high that almost every human on earth has measurable PFAS in the blood.

A good friend, Michael Greenberg, saw the direct connection between scornfulness and cotton: *'Cotton, the gift of God, requires huge amounts of water during its production. This precious fabric is washed and worn out already during the industrial process to provide jeans with fashion holes in the legs. This is nothing else than a mockery toward people that cannot afford whole and pure clothes.'* Lifestyle matters.

On the positive side, a significant effort of innovation is going into crafting lower-impact fabrics. Biocouture, fashion made from more environmentally

sustainable materials, is increasingly becoming prioritized by the industry. A simple way to reduce the footprint is to buy fewer fashion clothes, swap clothes with friends, or use second-hand clothes. According to the World Bank, 40% of clothing purchased in some countries is never used.

9.4.2 Aviation

Most of the excessive carbon footprint from affluent people is related to transportation. As noted in section 6.1 some 2.8% of global CO₂ emissions come from aviation. According to the International Council on Clean Transportation (ICCT) just 3% of the global population take regular flights³²⁷ and only 1% of the global population cause half the emissions from aviation.³²⁸ As noted in Figure 6.9, the aviation industry emits around 1 Gt, where 85% of emissions derive from passenger transport. Fuel efficiency, measured in carbon footprint per passenger km, has improved by around 2% per year for international flights. However, while efficiency improved some 12% between 2013 and 2018, the number of passengers increased, so emissions from aviation rose by 32%. It is projected to double in 20 years. The USA, EU, and China accounted for around 55% of the CO₂ emissions from air traffic in 2019.

1% of the global population cause half the aviation emissions.

Emissions from air travel are significant part of the national emissions in rich countries, even if aviation contributes much less globally. For example, in Sweden international air travel has doubled in 30 years. Today emissions from air travel are as large as emissions from car transportation, and significantly higher than the steel and cement industries that are typically considered climate baddies.

Emissions from various modes of transportation are shown in Figure 6.7, while Figure 9.4 illustrates the carbon footprint per passenger km. Note that at the flight altitude, there is a larger greenhouse gas footprint than at ground.

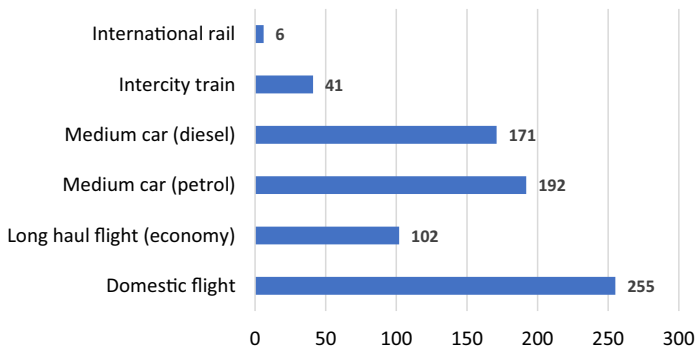


Figure 9.4 Emissions in grams of CO₂ equivalent per passenger km. The car emissions are calculated for single occupancy. The flight emissions depend on the length of the flight and the aircraft cruising altitude and weight. The domestic flights are defined as flights less than 1000 km. A long-haul flight has a lower figure on average per km because of huge emissions given off during take-off and landing.³²⁹

On top of the CO₂ emissions, water in the form of water vapour trails, soot, and nitrous oxides have a capability of trapping additional heat at flight altitude. The non-CO₂ emissions make up around half of the flight emissions. A passenger in premium class emits 2.6–4.3 times more CO₂ per km than a passenger in economy class.

Obviously, to travel alone in a fossil fuel car gives a carbon footprint similar to flying. An electric car getting the power from coal-powered plants will have a footprint of the same order of magnitude as a gasoline or diesel car. There is no surprise that train transportation is more eco-friendly. Often it is the attitude rather than the comfort that determines the mode of transportation. For example, going by train from my Swedish hometown of Göteborg (Gothenburg) to Stockholm (500 km) takes 3 hours by train, from city centre to city centre. Flying takes less than an hour, but usually more than 3 hours from city centre to city centre. The emissions from the flight are at least six times higher. The transportation to and from the airports has to be added.

Flying economy class London–New York roundtrip will generate of the order 1.65–1.8 tons of CO₂, depending on the calculation method used. Considering the global average footprint of 5 tons/person, this flight corresponds to one third of an annual budget.

Since the price for each transportation mode does not reflect the environmental costs, the ticket prices are often skewed. Recently I travelled to Slovenia from Sweden and took the train instead of flying. The train ticket was more expensive, but the travel was memorable. It is an enjoyable and comfortable tour through Sweden, Denmark, Germany, and Austria before entering Slovenia. The scenery was beautiful, I could read, work, relax, and eat. The travel took one day longer, but the time was used efficiently, and the memory is pleasant.

China is rapidly expanding its high-speed rail network – at the same time as building hundreds of new airports. A train trip between Beijing and Shanghai took me 5 hours of comfortable train ride at 300 km/h speed. Travelling between the city centres via the airports would have taken me longer and caused a lot more stress. The differences in carbon footprint are immense.

9.5 ACTIONS

Climate change and all its consequences cannot be solved by behavioural changes, by technical development, or political decisions in isolation. Individuals can influence decision makers and politicians, and political leaders dare to make brave decisions if citizens are prepared for it. All creative behavioural policies face one crucial condition to deliver: public acceptance. This is obvious: behavioural measures will only reach full effectiveness if citizens fully support the policy goals and instruments. If citizens perceive the scheme's impacts as socially unfair, acceptance collapses.

Anyone is looking for decent living standard with a minimum of requirements, such as:

- Shelter (housing, cooling, heating)
- Nutrition (food, food preparation, food conservation)

- Health (water, sanitation, health care)
- Socialization (communication and information, education), and
- Mobility (transport infrastructure).

The different ways to satisfy these needs are massively different in wealthy countries compared to low-income countries. We have given several examples of the huge inequalities in the world. We have to start with ourselves and our individual behaviour: the way we travel, how we consume food, clothes and gadgets, how we recycle, how we heat or cool our homes. Do we buy energy efficient equipment? Do we invest our money in sustainable industries? Any single lifestyle change will not change the world, but we have to start to change ourselves. Surely, the poorest people do not have to make further sacrifices than they already have. However, lifestyle changes are especially important in richer parts of the world where energy intensive lifestyles are the norm (and the reader of this book almost surely belongs to this group).

Technology alone is not enough: net zero emissions in 2050 cannot happen without the consent and active support of people. In part, this involves a mixture of low carbon technologies and people's engagement.

Policy makers and politicians dare to make more brave decisions if the citizens are willing to adapt. There is a true pedagogical task to explain how behavioural changes are essential to meet climate goals, to emphasize their many co-benefits, including improved health and well-being, cleaner air, less traffic congestion, cheaper fuel bills, and even fewer road traffic injuries.

We may repeat some actions that have been suggested to deal with our challenges. On the individual level:

- Make radical demand-side changes to reduce consumption to levels of sufficiency.
- Educate at all levels on the couplings between lifestyle, consumption, and climate.
- Empower young people with competent education and encouragement. Being able to communicate with other specialists is a crucial step to solve complex problems.

On the society and political level:

- Dare to talk about personal and national responsibilities.
- Realize the great environmental debt to low-income countries and act.
- Reconsider academic curricula to address complex problems.
- Professionals caught in silos should look for courses in policy making and policy theory.
- Decision makers ought to attend some courses on systems analysis or 'control for decision makers' showing how systems thinking can be applied.
- Educate on consequences of food habits, fashion trends, and consumption patterns.
- Implement adequate carbon tax on everything.

- Decide about higher taxes on wealth.
- Invest more in more climate friendly transportation. People will only drive less if they have convenient alternatives.
- Make private use of cars in cities where municipal transportation is available, relatively more expensive and less convenient.
- Facilitate the change to public transport or active mobility with additional incentives. For example, companies could give some reward to employees going to work with a minimum carbon footprint.
- Implement mandatory standards for appliances, buildings, or vehicles, and for all private investments to become low carbon over time.
- Prohibit domestic air routes when an alternative train takes less than 3–4 hours. Apply what we learnt during the pandemic, to meet online instead of travelling, whenever it is possible.