ENDING THE DESTRUCTION OF OUR HABITAT

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Many of the biggest cities in the world are getting unbreathable air, due to smog and particulate matter. In many Chinese cities people are using surgical masks to protect themselves from air pollution (Figure 1).

Figure 1: People wearing surgical masks to protect themselves from the bad air quality in Beijing.

Many of the world's rivers that have served as drinking water sources for many thousand years, are now becoming so polluted (Figure 2) that they can no longer be used for drinking water.

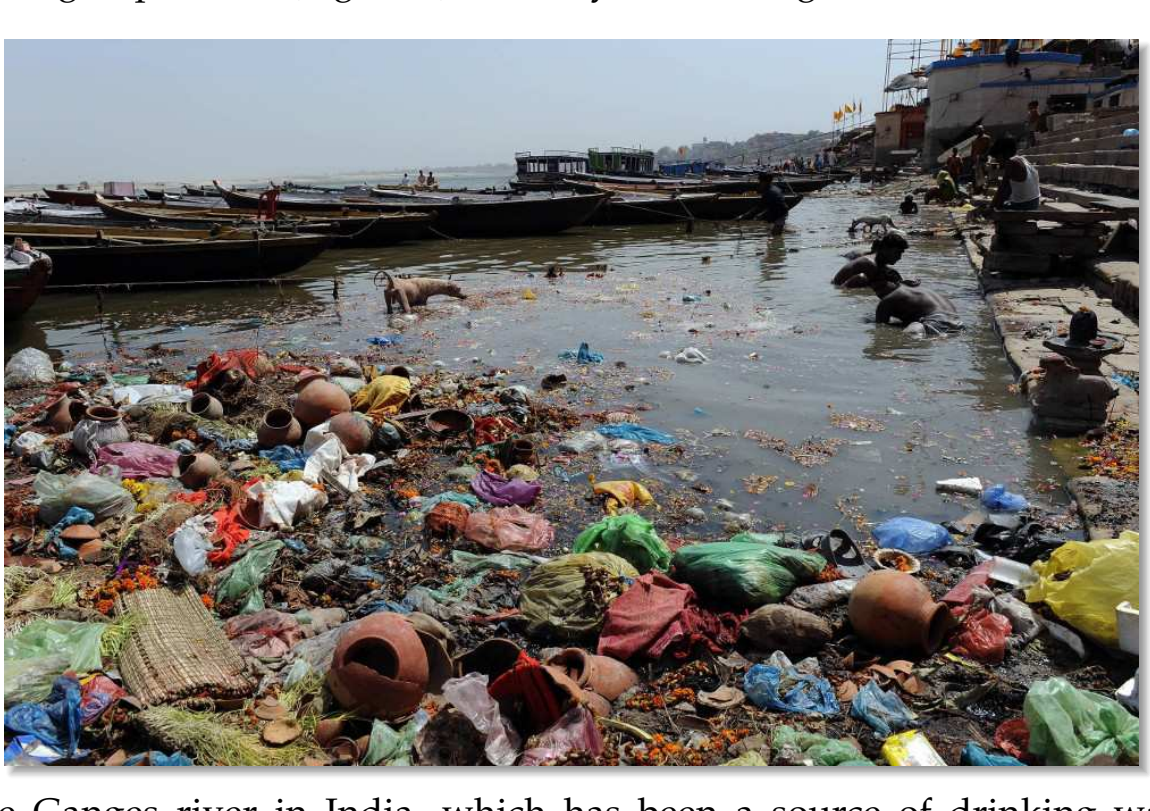

Figure 2: The Ganges river in India, which has been a source of drinking water for many thousand years, is now one of the most polluted rivers in the world.

Everyone should find this unacceptable. To have breathable air, and drinkable water should be our greatest priority.

The decline of surface area per individual

The world population seems to have increased from approximately 2 million people 12 000 years ago to about 6 billion people in year 2000[1]. There are approximately 126 billion acres of surface area on this planet[2], so we had about 5 orders of magnitude more surface area per individual 12 000 years ago than today (Figure 3). Or, if we divided the surface area of this planet equally 12 000 years ago, each individual would have about 63 000 acres of surface area, while if we divided it equally in year 2000, each individual would own only about 20 acres. You might think that 20 acres still is a lot for an individual, but only about 6 of these 20 acres are landmass, and only about 2 of these 20 acres are well suited for agriculture[3]. If the world population continues to grow as expected there will be about 9 billion people in year 2050. Then each person will own only about 14 acres of surface area if we divide it equally, and only 1.4 of these acres are well suited for agriculture.

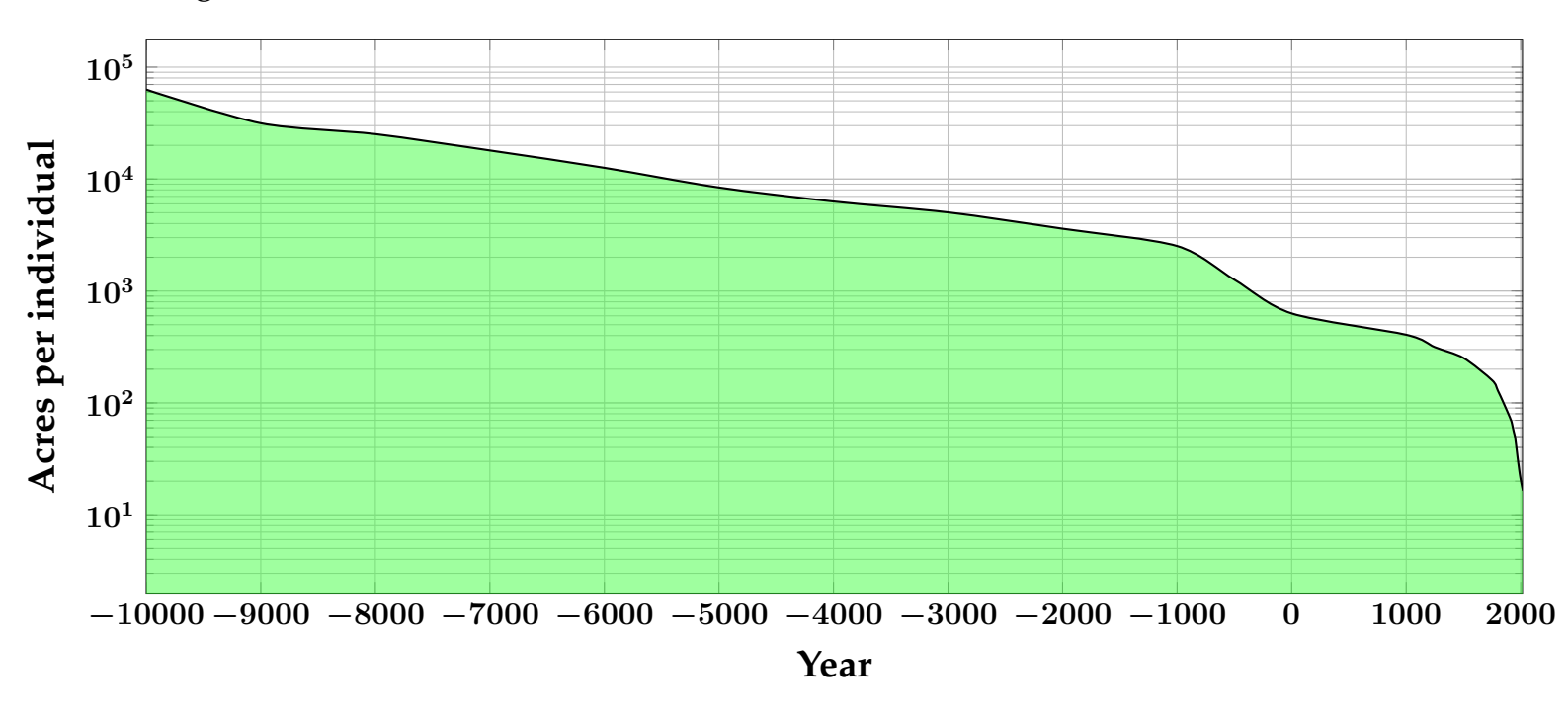

Figure 3: Diagram showing the decline of surface area per individual during the last 12000 years.

In order to create agricultural land we often chop down forests and replace them with monocultures of crops. This leads to a decrease in biological diversity since forests have a much higher biodiversity than monocultures of crops[4]. From 1970 until today, we have destroyed about 20% of the Brazilian rainforest (Figure 4). Tropical rainforests and coral reef's have the highest biodiveristy on Earth, and should therefore be protected at all costs.

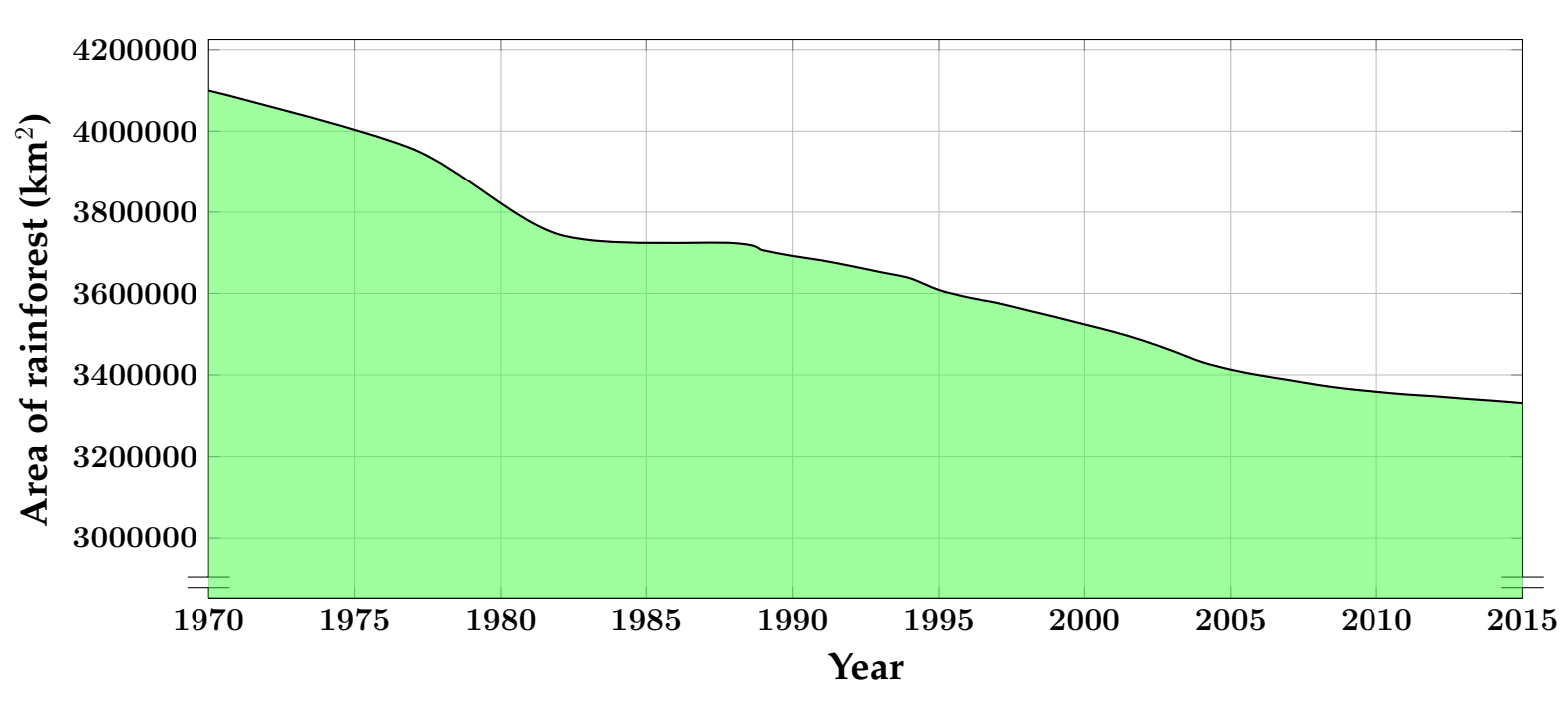

Figure 4: Estimated decline area of the Brazilian rainforest, from 1970 until 2015.

Most of our land use is related to agriculture, but different types of consumables require different amounts of land. It might be a good idea for us to cut down a bit on the consumables that require most land. Or if it is possible, we could try make the consumables use less land, for example by hydroponic farming.

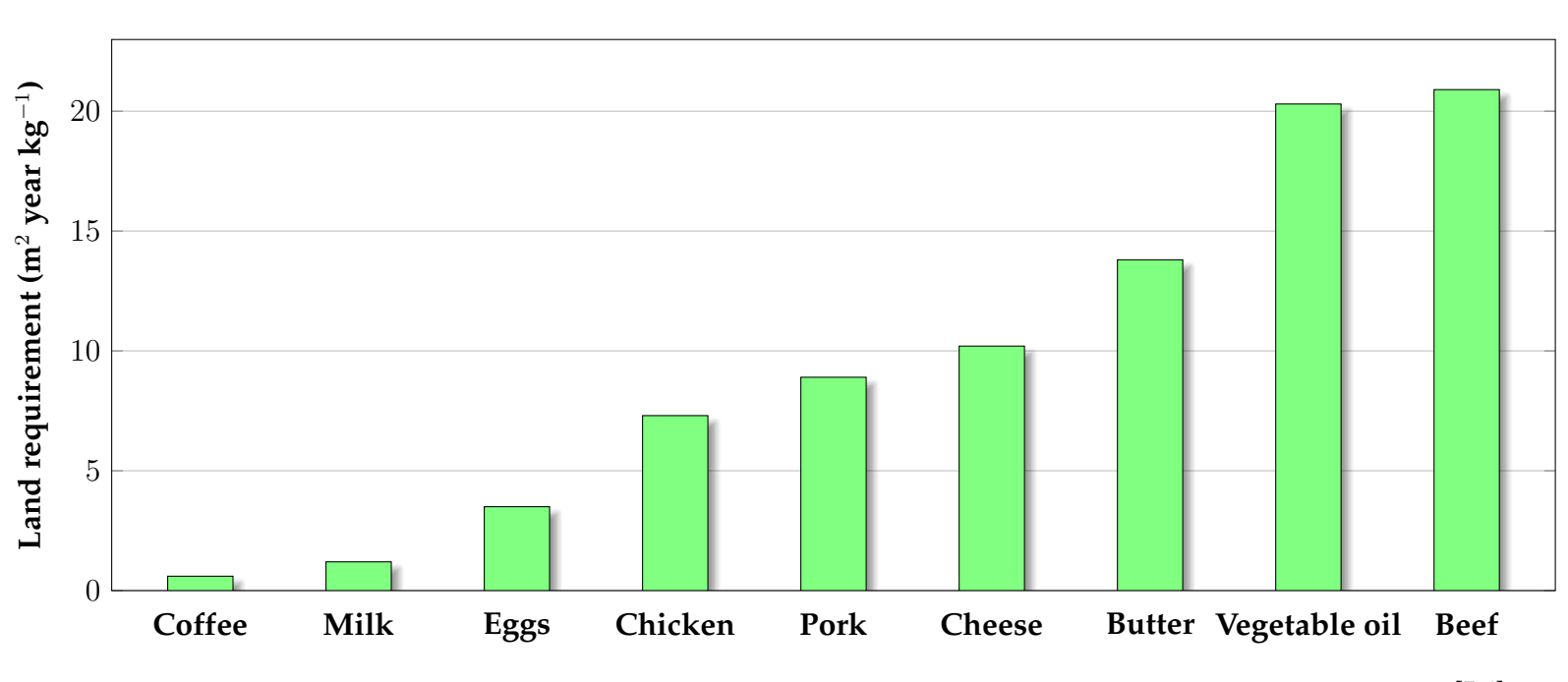

Figure 5: Square meters of land needed to produce 1 kg of different consumables.[5,6]

Roughly 70% of earth's surface area is ocean, but obviously we do not have enough ocean to feed the world population either, as the amount of fish is dropping rapidly due to overfishing[7]. Today, there are no undeveloped fish stocks left, and more than 70% of the global fish stocks are either overexploited or have collapsed (Figure 6).

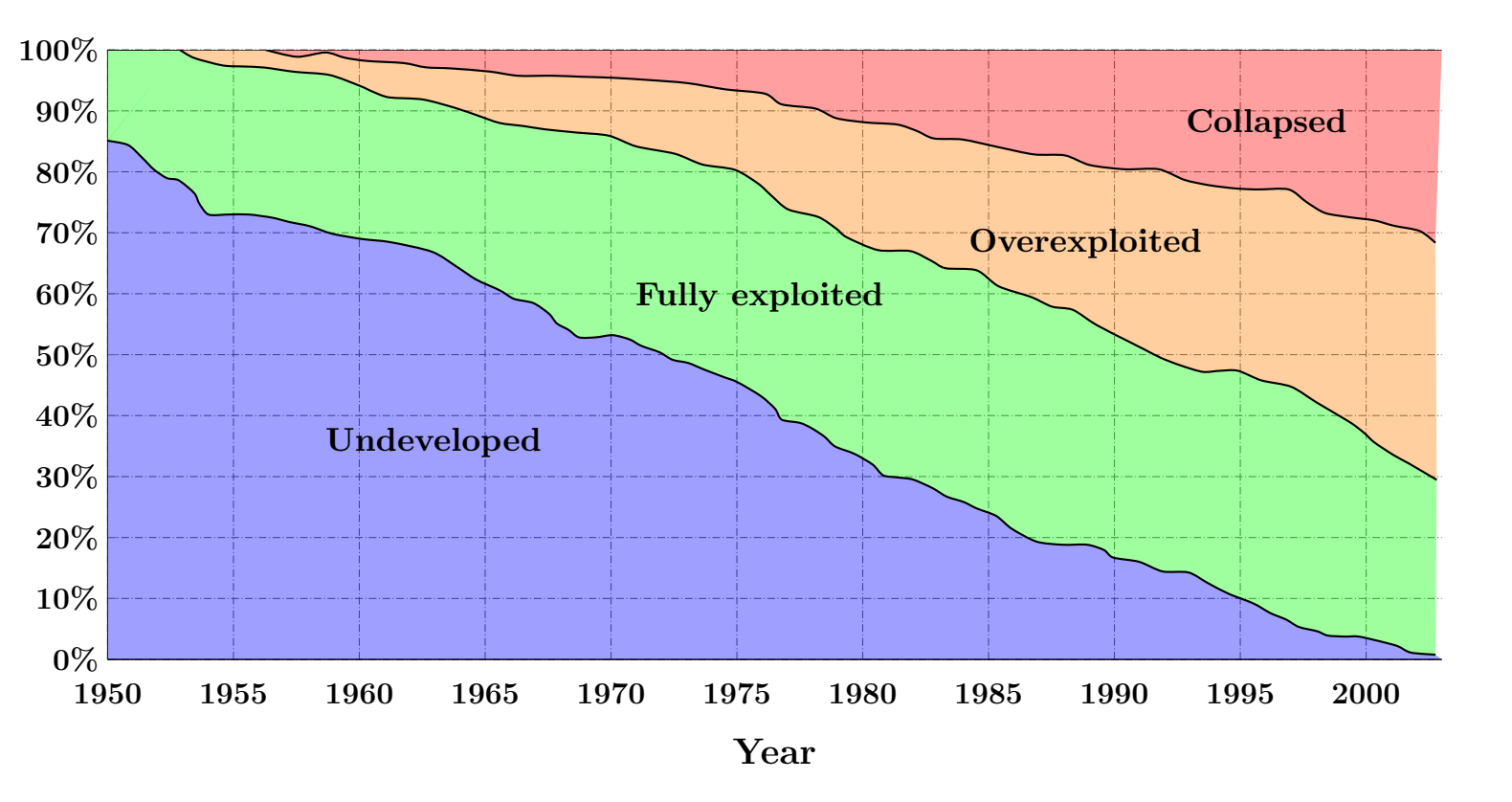

Figure 6: Diagram showing the decline in global fish stocks since 1950 due to overfishing.[8]

Pollution is also affecting global fish stocks. Plastic waste can take many hundreds of years to decompose. Fish tends to mistake plastic microdebris for food, and it is increasingly found in the gastrointestinal tract of fishes and several other animals that obtain their food from the sea[9]. Ingestion of plastic pieces can scratch and annoy the intestines, cause internal bleeding and lead to premature death. Some types of plastic contain diethylhexyl phthalate (DEHP) or bisphenol-A (BPA), which are thought to be endocrine disruptors that interfere with human hormonal function. Other toxic chemicals found in the sea can also adhere to pieces of plastic.

Figure 7: Pieces of plastic found in the gastrointestinal tract of a fish

Plastic microdebris has also been found in agricultural soil[10], and perhaps even more disturbingly in our drinking water[11]. We don't necessarily know the full scope of how this might be affecting our health. In any case, it seems like a good idea to use more biodegradable types of plastic in our consumer goods.

Resources we are in danger of running out of

The world's biocapacity is equal to the amount of renewable resources our planet can generate. According to the global footprint network we are currently consuming about 50 percent more resources than our planet can regenerate[12]. We are only able to do this because of non-renewable resources, such as fossil fuels. Phosphorus is a fertilizer used in agriculture, and the extraction of phosphorus is likely to peak around 2030[13]. In many areas of the world we are also using too much fresh water. Many ground water reservoirs are in the process of being depleted[14] and once these reservoirs are depleted it can take thousands of years to completely replenish them.

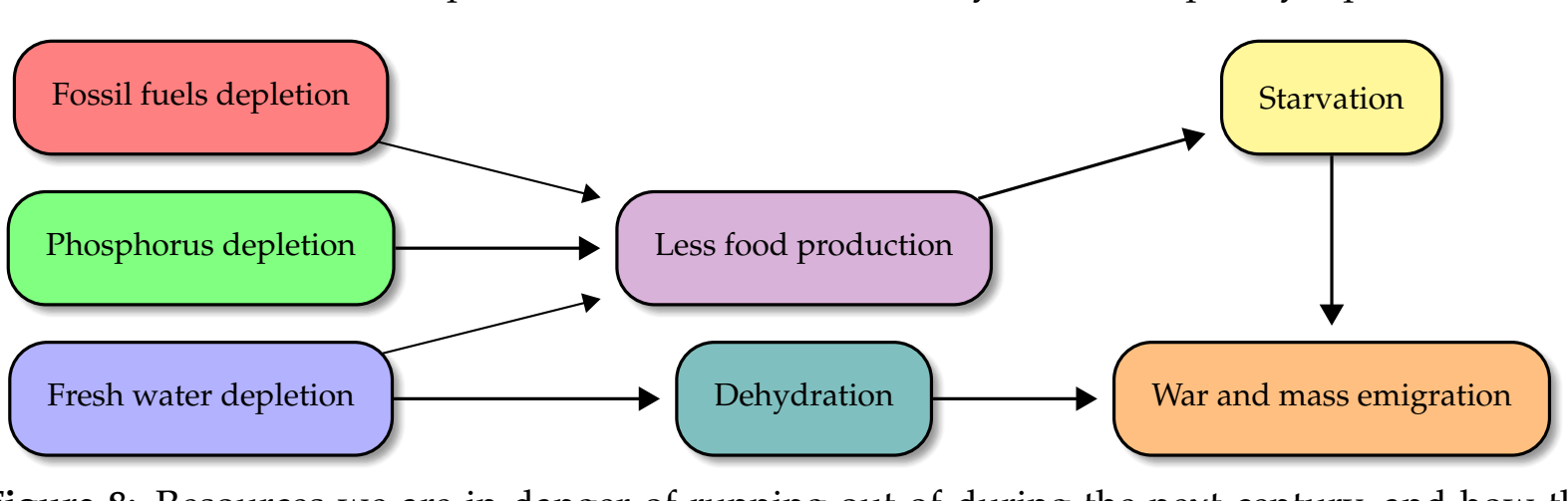

Figure 8: Resources we are in danger of running out of during the next century, and how the depletion of these resources might impact our society.

Billions of people are in danger of dying from hunger when we do not have enough fresh water, fossil fuel and phosphorus to produce food for everyone (Figure 8). The consequences of resource depletion is going to be most severe for people living in overpopulated third world countries. These countries might start to fight against each other for resources, and mass emigrate to other places because of desperation. Complete chaos might then emerge in the third world, and a horrible situation for the people living there. The demand for rare earth elements is also expected to surpass production soon[15]. They are used in lasers, magnets, batteries, computers, cellphones and other cutting edge technologies (Figure 9).

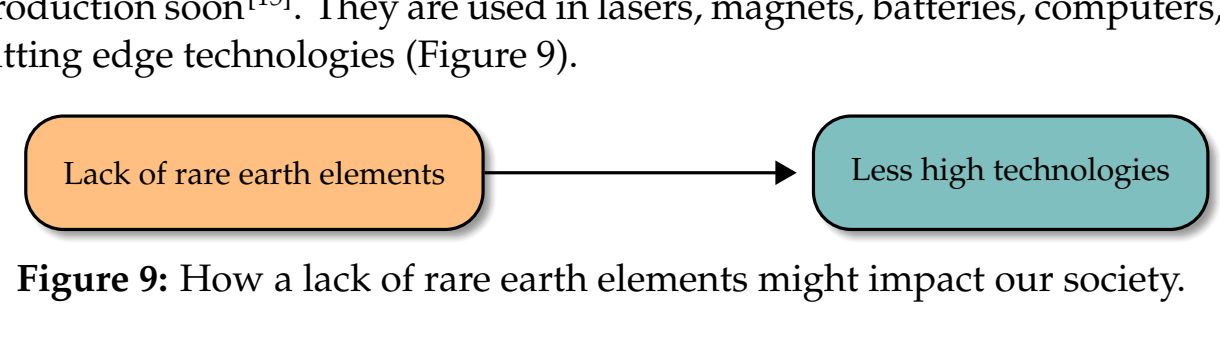

Figure 9: How a lack of rare earth elements might impact our society.

Decreasing our fresh water footprint

More than 70% of our fresh water is used in agriculture, while less than 10% is used in our homes. So even if everybody takes shorter showers, it is not going to have a huge impact on the amount of fresh water we use. Changing the food we are eating might however have a large impact upon our fresh water footprint (Figure 10). Eating less beef and more vegetables, seems like the most efficient way to reduce our fresh water footprint[16].

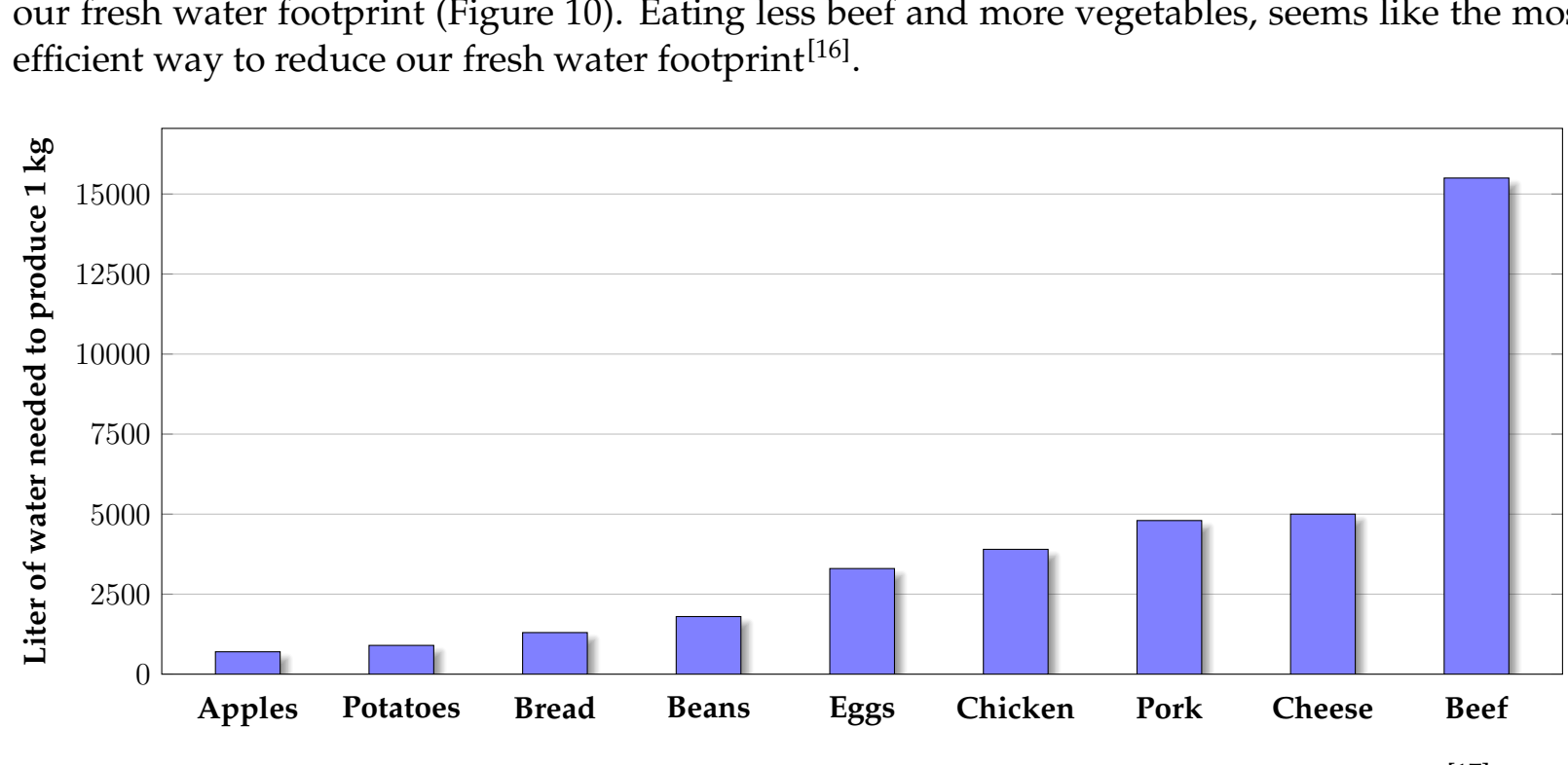

Figure 10: Liters of fresh water needed to produce 1 kg of different consumables.[17]

Decreasing our caloric footprint

Grain production underlies most of our caloric intake, since also livestock is fed by grain. The energy conversion from grain to edible meat is however not particularly efficient, since large amounts of energy is lost to the metabolism of farm animals. Even without an increased birth rate, the world population is expected to increase as the people living today get older. In order to feed this aging world population, it might be advisable for us to eat less meat. In particular, we should perhaps consume less beef, since the production of beef is remarkably inefficient.

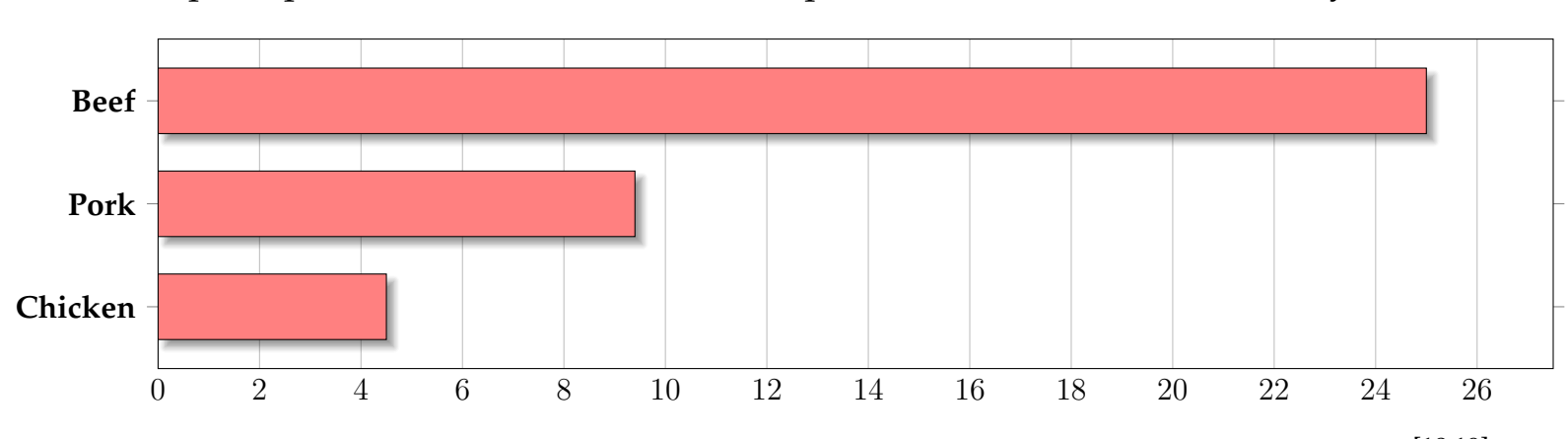

Figure 11: Kilograms of livestock feed needed to produce 1 kg of edible meat.[18,19]

Decreasing our carbon footprint

Fossil fuels are non-renewable energies, which means that the reservoirs of fossil fuels eventually will be depleted. They also increase the concentration of carbon dioxide (CO_2) in the atmosphere. Atmospheric CO_2 is involved in the greenhouse effect, and is implicated in global warming. The largest CO_2 emission comes from coal, the second largest from oil, the third largest from natural gas, and fourth largest from cement production. About 80% of the energy consumed today is derived from fossil fuels[20]. The larger this percentage is, the more we depend upon fossil fuels and the more vulnerable we are when the reservoirs eventually get depleted. Increasing the extraction of fossil fuels helps to increase our dependence upon fossil fuels and thereby makes us more vulnerable. Increasing the use of renewable energy on the other hand, helps to decrease our dependence upon fossil fuels and helps to prepare us for oil depletion.

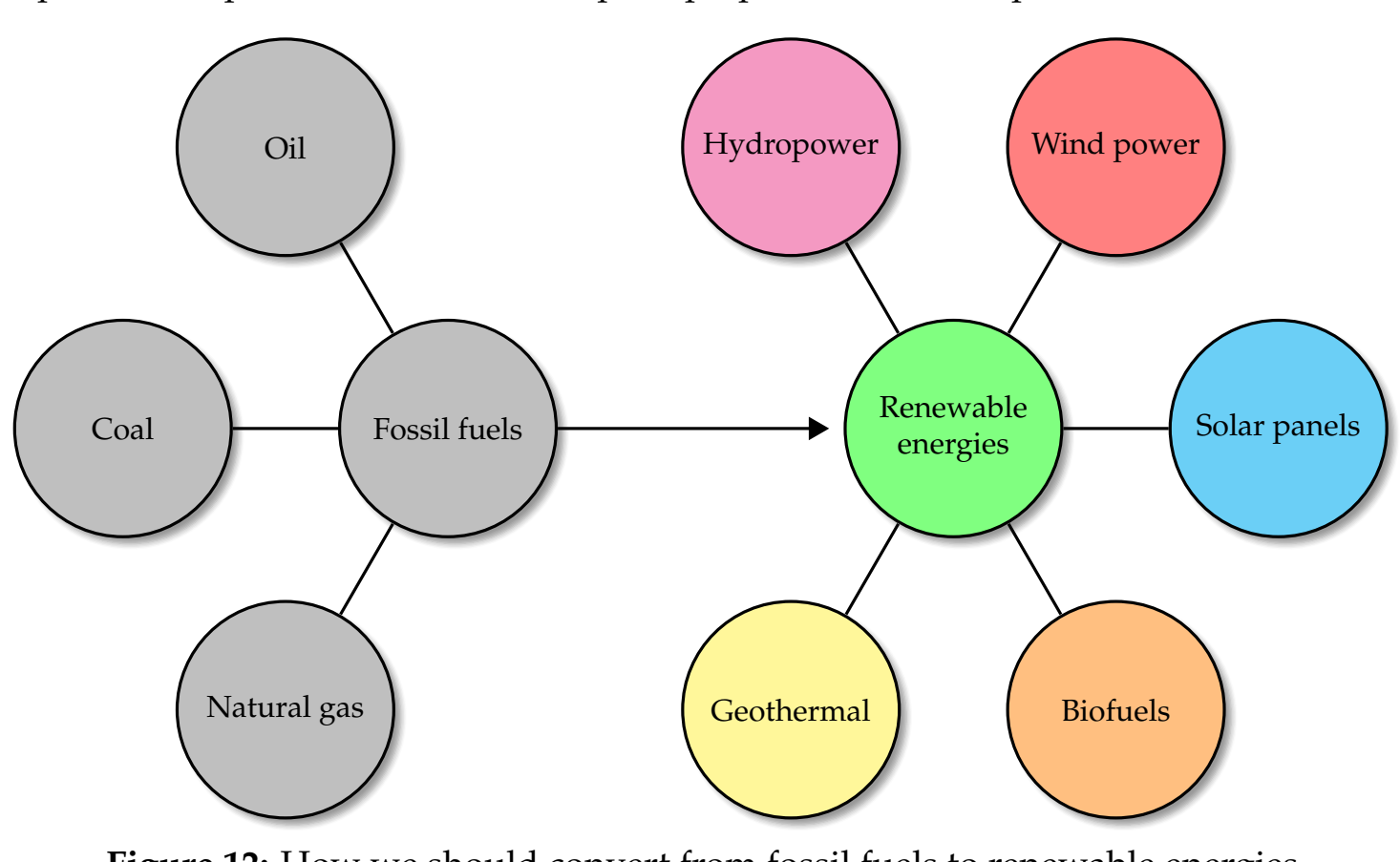

Figure 12: How we should convert from fossil fuels to renewable energies.

If all houses get solar roof panels, we need much less electricity from other sources, such as coal power plants. With electric cars we can charge our cars directly from our houses, and then the impact of oil depletion is not going to be nearly as devastating as if we continue to use gasoline cars.

Figure 13: A house with solar panels on the roof.

Electric cars are also much more energy efficient than gasoline cars. Batteries in electric cars can for example be charged by regenerative brakes, so that every time the brakes are used the batteries are charged a little. Since the electric engines are so efficient, they generate little heat however. This might pose a problem for places with a cold climate. Electric engines are also not necessarily suited for large vehicles, such as ships and airplanes. These vehicles can however use combustion engines with cellulosic biofuel from perennial grasses[21] or biofuel from algae[22]. Biofuels are also a renewable energy source, and they do not increase the concentration of carbon dioxide in the atmosphere like fossil fuels.

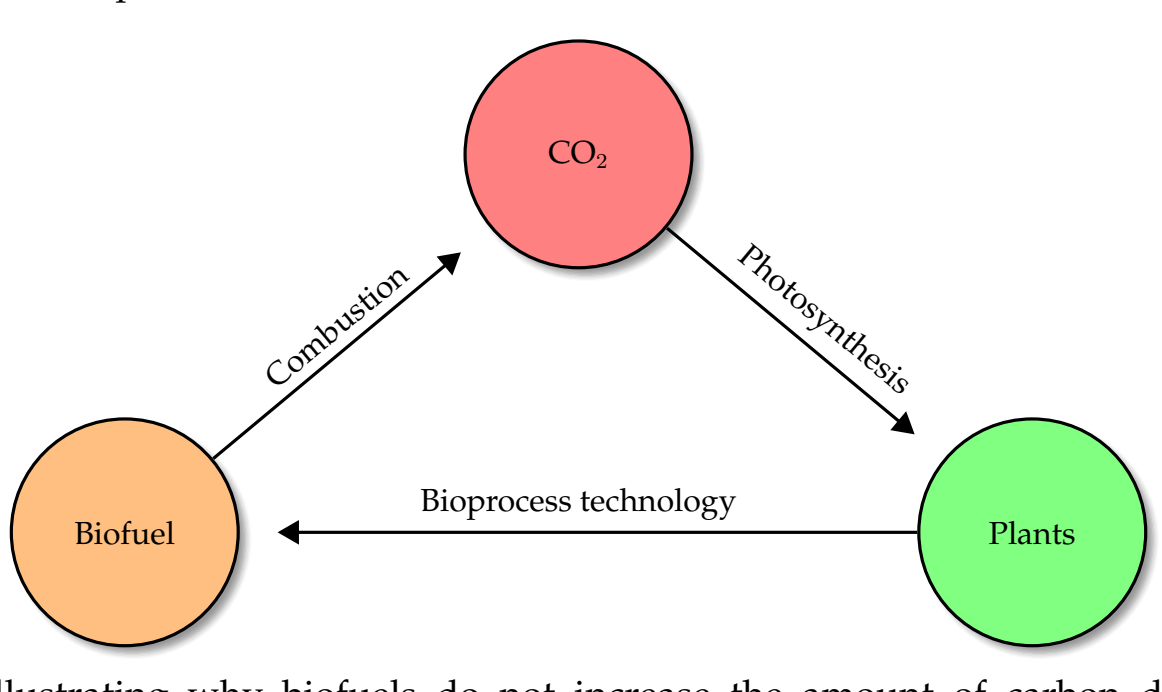

Figure 14: Illustrating why biofuels do not increase the amount of carbon dioxide in the atmosphere.

Increasing the efficiency of solar panels, batteries, and the production of biofuels should be our main objective. This should be done by subsidizing these renewable industries with tax money from the oil industry.

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