

# People vs Resources

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# People vs Resources

## Restoring a world out of balance

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## Preface

# A world in un-balance

Things go well. That is, with people's welfare. Even on a global level, the average wealth is rising, and more people escape poverty. However, at the cost of the systems that should sustain all that wealth. Consider what humans burn and send into the atmosphere and you will agree that the Earth is 'on fire': smoke, CO<sub>2</sub>, and fine-dust from coal-powered plants; smoke from wood stoves in Africa; particulates from forest fires, from cars in cities, and thawing marshes in Siberia and other places. And the signs of disintegration of systems all around us: rising food prices in response to the introduction of bio-fuels, dramatic decrease in global biodiversity, plastic pollution in the oceans, an increase in weather-related disasters, the Arab world in turmoil, and polarization of cultures and religions. China and Russia own increasing parts of resources and fuels, and inequality keeps growing (in money and resources), contributing to mass migration and immense numbers of unemployed young people in many countries. Like the gold rush of the Wild West in the United States. The capitalist economy of the industrialized world is a mess. All these trends are nearly unavoidable on a planet of 7 billion, heading to 10 billion people, all with an insatiable need of stuff and all using economic models that were developed before the industrial revolution.

This is only a selection of the current challenges facing our planet. These are presented not to frighten you, reader, but to illustrate

that we are amidst big changes and that we are or will be forced to get reorganized. Voluntary, or forced. We must reorganize the way we treat each other, the way we deal with religions and cultures, health care choices, dietary patterns, and the use of resources and fuels. We are also currently facing a legal battle between openness and control (such as privacy), primarily in the virtual spaces on the Internet, which challenge our ideas about individualization versus collectivity and the "democratic" struggle for life. Some are asking if democracy, which have changed from power to the people to power to the multinationals, will survive? And will we continue to support trade with bonuses and derivatives, or will we start barter real needs again? Big changes are popping up everywhere in the world, including China, Europe, North America, and in your own neighbourhood. Most changes are not directly recognizable, but everyone gets to deal with the changes. To meet these local and global challenges, we will need to change the way we live and dwell, alter our roles, and reorganize our priorities.

This book is about humans dragging resources across the globe. Humans, in fact, are just like worms in that we move and change resources, our actions part of Earth's physical cycles. Humans might think they are doing highly sophisticated things; however, they are just like all other species, building nests and surviving. Everything beyond survival is luxury. There is no evidence presented so far of any other higher power appointed to humans. But unless a higher power is discovered, human activity is just part of any physical cycle, and those actions must meet the conditions to keep resource cycles closed. If those conditions are not met, the cycles will stop. And that is what this book is about: what resource or energy cycles do humans have to deal with, and how should



humans physically keep resource cycles closed and running? How to manage their habitat in a decent way?

Of course, I, like many others, enjoy wonderful paintings, brilliant movies, and nice parties. While we should all keep enjoying those luxuries, these things have no physical value. And the world runs on physical laws, not on paintings or parties. Similarly, the world does not follow laws of financial economics. These laws are interesting human constructs, but these also have no physical value, and only serve to create financial and resource debt. Because human laws of economics are not based on physical values, they, by definition, neglect the system constraints and do not help meet the current global challenges.

There are some more disturbing things to say about humans who drag around resources only to accommodate themselves: their work has no potential contribution whatsoever to the physical system. Most species have evolved within a web of interactions that is, by definition, a resilient system. Yet modern humans create things from resources that do not add anything to any ecosystem, but instead just consume resources. In fact, humans just change and replace resources in a different order and destroy valuable energy/exergy in doing so, beyond restoring capacity of the systems. Any species that cannot adapt to the current and future physical and cyclical system is doomed. Humans continue to grow in numbers and destroy resources. There has been a time in human history when at least some relation with the surrounding systems existed. This was a time when humans ate berries that grew on bushes, or after the advent of agriculture, worked with the ecosystem instead of against it, like the old ways of agriculture in China [1].

Humans have completely abandoned efforts to work with the ecosystem. For example, humans build skyscrapers, which are dead structures because they do not interact with the surrounding natural environments. It's living like in dead-end streets, the humans inside fully relying on some unknown institution that aggressively grows food in a distant continent and transports the food to their door at the end of the world and 100 stories up. Humans hope that this arrangement will work forever, relying on some paper called money with imaginary value. Well, this arrangement will not work forever, unless humans begin to deal with some physical laws and restrictions.

So, there is work to do. This book tries to find a way out of the slow deterioration of the earth's resources by analysing resource flows and examining how to close resource use cycles, given physical limitations within a closed system like the earth. A more appropriate title for the book might have been: "Its Materials, Stupid!", here on earth, with energy as a daily budget from the Sun. This book analyses the unbalance in the system between humans, welfare and resources availability, and seeks how to create a situation that can be maintained and sustained without plundering stocks or other people's resources. I argue that solutions include bio-based resources, a local economy, and social cohesion and cooperation, largely driven by solar energy.



## Introduction

# The Open Ends of Cycles

Suppose you eat an orange grown in Israel by the well-known Jaffa brand. You might expect there is nothing to worry about since oranges grow in nature and each year a new yield arrives. You consider oranges to be a “renewable resource” since they are part of a circular process, a closed cycle, and every year new oranges grow. You suppose. However, the actual situation is somewhat different. That orange you ate did grow in Israel but did not grow naturally. It was only able to grow because of heavy irrigation.\* Israel is not a water-rich country, so water is pumped from underground ancient aquifers. [1] The aquifer, in this case, is mainly under the Palestinian West Bank. As the aquifer is drained by Israel, Palestinians, who are allowed to extract water only by open wells, see the water level going down until their well dries up. In other words, if you purchase and eat a Jaffa orange, your action might result in a Palestinian lacking drinking water. Even so, the aquifer is hardly replenished, or not replenished fast enough, and might dry up in the future. Consuming a Jaffa orange serves as a perfect example of how resource cycles work and how their effects may be invisible to us as we go about daily life. Everything seems all right to us, as if oranges are part of a stable, closed loop process. Yet in reality, it’s an open-ended process that shifts burdens to humans elsewhere.

\* 1 orange of 100 gr requires 50 litre water: per tree with around 50 kilos, that makes 25.000 litre.

Suppose you want to decorate your house with a carpet, and so go out to find a woolen carpet from the Middle East. As you select your carpet, you check to verify that no child labour is involved in the manufacturing process. When you purchase the carpet, you feel good that you have provided income to those who made the product and you figure that there is nothing wrong with sheep wool. Your suppositions are ill-founded. Sheep produce very little wool per sheep, yielding only about 25 kg of wool per hectare per year. And in areas such as Afghanistan and Iraq, wool producers need huge areas of land for sheep. The sheep might also produce milk or meat, but the land requirements are ecologically devastating, and a large amount of water is used for processing the wool. Grazing and water depletion together cause large-scale desertification.[2] Sand storms are the result, and dozens of villages have already been lost, covered under the sand. As Lester Brown writes in his book *Plan B*, “If you have dust on your car, somewhere in the world food production is in danger...”.

Given these realizations about wool production, even though wool is a good insulator, using wool for insulating houses is not a good idea due to the very low harvests, in combination with huge demands. It is nearly impossible for any consumer to know this all, and you are not to blame directly, but this again is an example of an open-ended system. When you purchase a wool carpet, the burden is shifted to an unexpected corner of the world. It is impossible to prove, but it seems these choices contribute to the turmoil in these countries. Water is at the heart of both the carpet and the orange examples, and it is no wonder water scarcity will soon replace oil as a driver of internal and international conflict. These two examples deal with relatively simple transactions with straightforward products. You can imagine how the chain of shifting burdens works

with more complex products that are compiled from many parts from all regions of the world. In all transactions, the burdens are shifted towards the end (in fact beginning) of the chain, invisible for the person on the street that buys a product. The rivers running dry, the loss of fertile soil, the continuing deforestation, it is all out of sight for nearly all of us here in the industrialised world.

An example of this shifting strategy of depletion is building construction in China. Using bricks for building construction is forbidden in China's northern region. The quantity of bricks required is huge. Due to drought and damming of rivers, river sediment can no longer be used for brick making. In response, workers in China switched to use fertile land and soil to produce bricks, but that became far too costly for agriculture. So, bricks were abandoned altogether, now replaced by huge amounts of concrete. Do you know why the Chinese started building with bricks in the first place, some 150 years ago? They ran out of wood and forests; wood was cut in such huge quantities for construction and other purposes that it became scarce. Thus, history repeats, and we shift from one depleting strategy to another.

On top of that, the river that used to flow through Beijing no longer has any water because of an increasingly dry climate and upstream water usage. To combat the dry climate, the Chinese use rockets to try to make it rain, a process called cloud seeding. We are not talking a rocket now and then; they use many rockets a day spread over the country. And the program will be increased soon, with many more launching installations and airplanes, to increase rain over an area twice the size of France. [3] Even this effort is by far not enough to meet water needs of this area. In addition to cloud seeding, China has constructed a huge aqueduct to transport water thousands of

kilometres from the wetter south to the drier north. This construction involves a huge investment in concrete, with accompanying CO<sub>2</sub> emissions. [4] Here, the water problem replaced by a concrete (resources) problem and a CO<sub>2</sub> problem.

While China diverts water from the south to the north, the Gobi Desert in northern China and southern Mongolia is still growing. An attempt is being made to halt its growth with a green wall, a band of trees planted on the borders of the desert. This green wall, planned for the next 50 years, will require irrigation, thus expanding China's water problem. The Gobi Desert is just one of many examples of desertification. The Sahara Desert in Africa is growing too, and a similar greenbelt of trees over thousands of kilometres is planned to slow the growth. The Colorado River in North America now barely reaches the ocean and will cease doing so at all if construction and water demands in the desert continue to increase. There is an increasing number of examples of rivers worldwide that have ceased flow to the ocean. [5]

Currently, more than 50% of humans live in cities or urban areas, and all these people depend on resources from far away, like China and other parts of the world. We are part of an urban organism, a parasitic "urbanism," working with "open cycles". Take sand for example. It is the second most consumed resource after water. You might think, "Why would sand be ecologically destructive?" What you might not know is that not all sand is the same. Sand for island creation or sand used for concrete needs a particular grain size and shape. Because of the widespread use of sand and the specific requirements for various applications, this resource is in short supply. Useful sand, as Denis Delestrac has shown recently in a prize-winning documentary, is becoming very scarce, and

causing big problems.\* [6] Construction sand is consumed in a rate far greater than what nature can replenish via erosion and similar global processes, as is the case for most resources. Due to illegal harvesting from beaches, it is predicted that by the end of this century you could not lie on beaches any more during your holiday. All the sand is predicted to go towards infrastructure and buildings. And constructing beachfront resorts without beaches.... [7]

One of the most striking examples of illegal sand trade is currently taking place in Singapore. To accommodate Singapore's growing construction ambitions, large amounts of sand are pumped up in specific areas in the Indonesian archipelago and traded illegally. Following this illegal excavation, the ocean currents level out the sand holes in the sea bed, causing neighbouring islands to lose their foundation due to erosion. Some uninhabited islands have already disappeared completely, the sand having been pulled into the ocean. The economic success of places like Singapore and the Arab Emirates, with their enormous hunger for construction activities, destroys nature and living areas in other places on the planet. While Singapore claims to be one of the most sustainable in the world, it is, in fact, relying on resources stolen from others and with devastating consequences.

Given what we know about the sand trade, we can conclude that if you create new islands in front of the coastline in the United Arab Emirates, you will lose an island somewhere else. Literally. That is the balancing act we are trapped in. In fact, you could say that beaches are stolen; new beaches are created, while the original

\* It really is a "sand mafia", as Delestrac told me after a lecture during Dutch design week. He has been threatened often, and on some occasions has had to flee during filming.

beaches on remote islands disappear, robbing the island's people of their ecological resources or potential touristic income. People from eroded islands have probably become refugees, working now in illegal sand mining or immigrating to your country. The overarching problem is that we want to sustain our energy supply and our buildings not by reducing demand, but by applying new technologies that create a fossil fuel or material resource deficit somewhere else. Despite many attempts to reduce our consumption patterns, including more sustainable building practices, all strategies have shown marginal results and usually are overtaken by new trends and rebound effects. Houses might perform better or use fewer resources for construction, but the equipment within houses, decoration, and size of houses is increasing, outpacing the initial performance improvements.

One recent strategy is for leaders of multiple cities to aim for “smart city” technology while failing to acknowledge that this technology is developed in an open cycle. Take the city of Amsterdam. As part of a smart city program, the city introduced an app that assists people in finding empty parking places in the city. The app guides a driver to an open parking spot. This sounds smart and handy, but the citizens of Amsterdam do not like the app. They state that their city is already overcrowded with tourists and fear that the app will attract even more people. Apart from this view, city officials argue that this app should add to city-wide sustainability, reducing overall driving time to find parking spaces. Smart and sustainable technology. But apps require data, and data require data centres. These kinds of apps increase overall data flows, which ultimately leads to building new data centres. One of these data centres was built by Google in the province of Groningen in the Netherlands. During the construction of this data centre, the local energy company was



building a new offshore wind park meant to provide 60.000 households with renewable energy and decrease fossil fuel demand. By the time both the Google data centre and wind park were completed, it turned that out Google had contracted all the energy from that wind park to supply its data centre with “100% green energy”.

So, what in fact has happened in the case of this well-intentioned app? An app marketed as smart and sustainable contributed to increased data use and a huge new construction project necessitating the need for extra windturbine farms. Not a single kWh of energy was saved, only a large amount of materials was invested in extra demand and supply. This is the modern open-cycle approach, while all parties in the chain claim to be (and think they are) smart and green. The stock of natural resources becomes depleted when humans interfere with the cycles, using resources at a speed beyond natural replenishment. Even though we recognize that we are using resources at an unsustainable rate, we do not stop or try to re-balance the system. Instead, we find another stock, then another stock, then a new technology, all to continue chasing our dreams of infinite growth in every facet of our lives. We will keep dreaming of growth, as long as this stepwise process will last. But then how? That is what this book is about.

