Five Pathways Toward Health-Environment Policy in a Wellbeing Economy

WELLBEING ECONOMY ALLIANCE

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The Health-Environment Nexus

Our people and planet are sick and suffering. At the time of writing (1 April 2021), the COVID-19 pandemic has killed 3.2 million people and infected 150 million according to the Johns Hopkins University dashboard[1]. Meanwhile, our planet, our home, is on the brink of collapse. The UN warns that climate change is accelerating much more quickly than expected and is threatening our food, water, and air supply[2]. We are also witnessing the 'biological annihilation' of our wildlife, with biodiversity loss and the rapid extinction of billions of species, resulting in the sixth mass extinction of the plants and animals required for a healthy ecosystem[3].

As the world strives to navigate these global environmental and health crises, much of our failure to effectively respond to both comes from the perceived costs such actions would have on 'the economy'. However, the economy is ultimately just a word for the way that we produce and provide for one another. Every good we produce ultimately comes, first and foremost, from the earth, and every service we provide is valuable in so far as it contributes to our wellbeing. Our economy is not something given. It is us, our interaction with one another and our natural environment, to produce and provide the things we need for a happy and healthy society. And, it is only one facet of the true force behind our prosperity: social cooperation. We must not forget that the economy and the wealth it generates is a means and that the ultimate measure of its success is our wellbeing, now and for generations to come.

The health and environmental crises of our time were not inevitable, but rather a product of our contemporary economic system. Our economies, particularly in the affluent world, drive systems of production and consumption that are exhausting our planet's resources, destroying habitats, and leading human beings to be in much closer contact with potential pathogens such as the COVID-19 virus/SARS-Cov-2. As the 2020 Living Planet Report (LPR) recently outlined[4], 'nearly half of all new emerging infectious diseases from animals are linked to land-use change, agricultural intensification and the food industry'. Furthermore, the industrialisation, urbanisation, and air pollution that come from our current economic system has increased the severity of the impact pandemics have on human health. This illustrates the vital interconnections between our environment, health, and economic system. There is certainly a cost to transition for our economic system, but it is visibly lower than the cost of non-transition.

The Health-Environment nexus: evidence from science

Scholars have long highlighted the positive impact that protecting the environment can have on people's health and wellbeing. While it may feel intuitive to some, there is value in describing what scientists have concluded through research. Please see the Appendix at the end of this paper for a review of evidence from scientific research and citations.

We have the capacity to transform our economy to produce and provide for one another in a way that promotes our collective health, whilst healing our natural environment. But this requires abandoning outdated economic thinking and tools that assess value purely in monetary terms. We need to move away from an economic system which says that Amazon Inc. is worth 1 trillion USD[5], while the Amazon Rainforest is worth nothing, until its trees are cut down and sold as timber, despite being the 'lungs of the earth'[6]. We should worry more about California's dying natural ecosystems than celebrate its thriving digital ecosystems. We must build a system that recognises that there is no trade-off between 'saving the economy' and 'saving lives', nor between 'the economy' and 'the environment.' If we degrade our environment, we destroy our health and the foundations for all economic activity. The real trade-off we face is choosing between the joint preservation of these three valuable dimensions of human existence or all three degrading into irreparable loss.

To paraphrase New Zealand's Prime Minister Jacinda Ardern: the best economic policy is a strong health policy, and, we should add, the best health policy is a strong environmental policy. In fact, New Zealand can be seen as the first wellbeing country of the 21st century, choosing in 2019 to go beyond GDP to put wellbeing front and centre in its budget, choosing in 2020 health as a compass to face COVID-19, with resounding success. The lessons learned from New Zealand apply to the vast majority of nations: the countries which have chosen to allow health indicators to deteriorate in order to preserve economic growth (like France), have faced the double economic and health penalty; the countries that have faced the crisis with health as their compass have experienced both economic and health benefits.

To make this reality more tangible for policy makers, new ways of thinking are needed and available.

It's time to move beyond the **cost-benefit approach**, which continues to dominate our collective actions and decision-making. This approach assigns every aspect of life a monetary value and evaluates our actions and investments in terms of their relative monetary cost vs their relative monetary benefit. A cost-benefit analysis would see the 'costs' of investing in climate change mitigation as outweighing the monetary 'benefits' of continuing business as usual. However, a **co-beneficial approach** recognises the intrinsic value of the health of our people and planet and their role as the foundation for any economic activity. If we take on this perspective, we realise that mitigating climate change is not only vital for our collective health and wellbeing, but it also brings about considerable social savings resulting from improved health, as well as economic gains associated with the creation of an estimated 24 million new jobs by 2030 (see the work done by Mark Jacobson and colleagues at Stanford University[7]). A co-beneficial approach therefore recognizes the intrinsic interconnections between our social and ecological systems as the basis for a just and sustainable economy, with health as the great connector.

In this paper, we offer and illustrate how we can use a co-beneficial approach to help support decision-making to build a Wellbeing Economy that works in service of people and the planet. We illustrate the interconnections of our social systems and natural systems, as a 'social-ecological feedback loop' which reproduces the mathematical symbol of infinity, but also evokes a Möbius strip, a figure that has inspired the design of the recycling logo and by extension, evokes the circular economy.
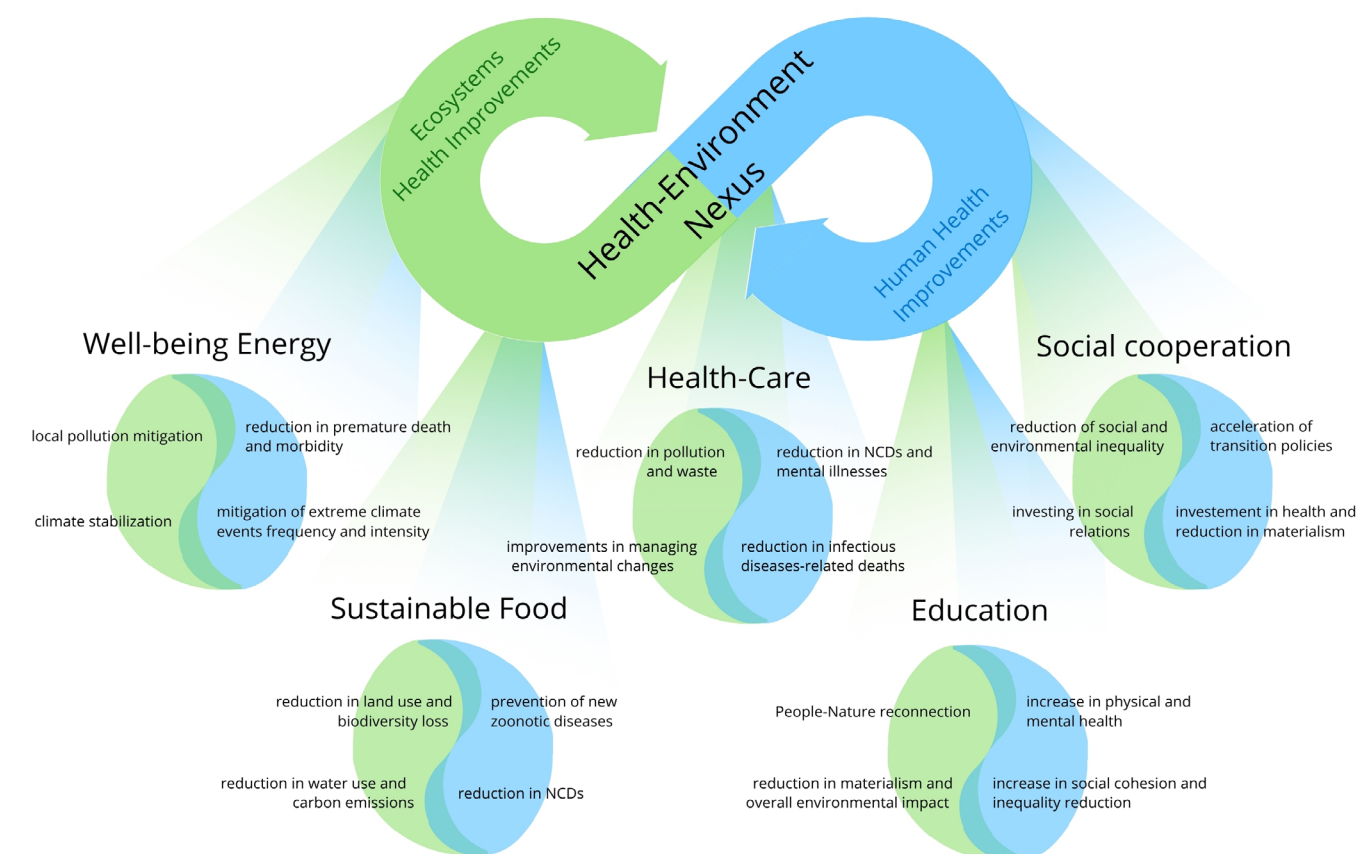

Figure 1: We offer here a multifaceted approach to a new type of public policy: Health-Environment Policy. It relies on a holistic rather than separatist approach to human prosperity on Earth, moving from a cost-benefit approach in which everything is monetised (and therefore devalued) in order to fit with the "economy", towards a co-beneficial approach in which ecosystems and social systems are interdependent. Health and environment are indeed inextricably linked in a Health-Environment Nexus, which we represent here in the form of a feedback loop: preserving life on Earth means preserving human life on Earth. The five key policy areas connecting ecosystems to social systems we have identified range from the natural foundations of our well-being (Food, Energy, Health) to the key pillars of our social systems (Education and Social Cooperation). The approach we present here is specifically targeted to policymakers, hence the notion of "Health-Environment Policy". This is because we believe the change needed to lead us on a sustainable pathway, one which promotes human health by protecting the health of the environment – both key element for the economic functioning of society, too – must not only come from individuals and from a shift in the choices they make, but also from policymakers, who can have a significant impact as we show in this paper on those same choices

We have chosen five key areas to show how a co-beneficial approach can be used to improve social and ecological synergies, and where co-benefits are both substantial and within reach: healthcare, energy, social cooperation, food, and education. There are many other areas, such as mobility, housing, recreation, or culture, that can and should be explored using the co-beneficial approach proposed here. Each section of this paper includes an example case study of the principle in action. Additional case studies are included at the end of the paper.

Our hope is that this paper can be a starting point to visualise and bring awareness to social-ecological connections and how they can be used to help policy makers overcome the great challenges and crises of our time, and build a Wellbeing Economy that delivers social justice on a healthy planet.

Co-benefit policies

Area 1: Healthcare - prevention and mitigation

The healthcare sector plays a central role in a Wellbeing Economy, especially when seen through the lens of how human health and planet health are intrinsically connected. As well as supporting human health, healthcare actions can more broadly support planetary health, and deliver co-beneficial outcomes for both people and the planet. This section uses the healthcare industry as an example of how prevention and mitigation approaches can deliver co-beneficial outcomes.

To start, there is no doubt that the state of healthcare has drastically influenced the pattern of the spread and severity of diseases worldwide. We can celebrate achievements such as the increase of life expectancy, in general terms, and the decrease in maternal mortality thanks to improved healthcare delivery and access. As a side note, while disease is one vector for decreased human health, it is important to remember that our way of living, especially in Western countries, is also a threat: examples range from the release of toxic substances in the environment to stressful working routines that cause mental illnesses[8].

While healthcare's benefits for humanity are many, paradoxically, the healthcare sector is also responsible for negative consequences on the natural environment, and consequently, on the same people's health it aims to protect and restore. For instance, two percent of global plastics products are used within the healthcare sector, with an increase of 6.1 percent every year[9]. According to estimates, plastics account for 30 percent of total healthcare waste, which contributes to a total of 2Gts of CO_2 emissions annually – 4.4 percent of global net emissions[10]. Moreover, in this last year, due to the pandemic, plastic production and waste have dramatically increased, with medical waste, not just plastics, increasing more than three times in countries like Spain and China[11].

The explosion of plastic waste is an opportunity to practice prevention. The healthcare sector should be the biggest advocate and promoter of prevention of waste and pollution because, as an Italian saying reads, 'preventing is better than curing'. History offers an example to follow, with the ban on mercury from medical devices[12]. Mercury has been known to be a major pollutant for decades. Travelling up the food chain or through air and water, it enters the human body, affecting many different organs and in foetuses and children, can lead to brain and nerve system development problems[13]. In the 1990s, the US Environmental Protection Agency identified incineration of hospitals' waste as one of the main sources of mercury release into the environment. This problem pushed some medical professionals to establish the non-profit organisation Healthcare Without Harm, which lobbied for the removal of mercury from medical devices, leading to the Minamata Convention in 2013[14]. The Convention established the phase-out of medical devices containing mercury, such as thermometers and blood pressure devices, by 2030 . Through the intervention of the WHO and Healthcare Without Harm, the European Union committed to an even shorter time scale, banning the manufacture, import, and export of such medical devices by the end of last year, December 31, 2020[15.]

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If mercury can be removed as a harm to humans and the environment caused by the healthcare sector, a solution to healthcare plastic waste can be found as well. When policy puts prevention into practice, great results can be achieved. Another example is when in 2019, the City of London introduced Ultra Low Emission Zones (ULEZ). A few months later, those areas registered a 29 percent decrease in NO_2 concentration compared to no ULEZ[16].

Along with prevention, a second useful policy mindset about the role of healthcare in the Health-Environment nexus is *mitigation* of the future harm and consequences from humanity's actions, including crossing three of the planetary boundaries[17]. Healthcare systems are under unprecedented pressure from climate-change-fuelled heat waves and the emergence of new infectious diseases, such as COVID-19. The current pandemic highlights the importance of being prepared to *mitigate* dramatic changes, as well as the feasibility of major behavioural changes in a short period of time. Knowing what is ahead, healthcare needs to be prioritised in public spending, with the goal of ensuring people's wellbeing.

Therefore, privatisation of the healthcare system, where profit has priority over the health of patients and staff, is a dangerous move that should be avoided. A clear example of two conflicting approaches are the United States and South Korea. The United States has one of the highest spending in healthcare in the world, but it remains, among the high-income countries, the place with the highest maternal mortality rate. One doctor, when facing the US Congress said, 'In all my work, I had one primary duty and that was to use my medical expertise for the financial benefit of the organisation [insurance company] for which I worked' [18]. Conversely, the SARS and MERS outbreaks in South Korea in 2002-2003 and 2015 respectively, led to better preparedness within the government to deal with future disease outbreaks and reduce their likelihood. These efforts culminated in a massive revamping of the Korean Centre for Disease Control, with new clinics and testing facilities, equipment and medical emergency tests [19] [20] [21]. Experience with previous outbreaks has also led to greater willingness among citizens to comply with personal restrictions.

For healthcare prevention and mitigation to function properly, public engagement is needed. The current pandemic has shown us the lack of knowledge within the public about how to deal with the virus, both in terms of protecting oneself and, most importantly, others. Public health education ("health literacy") is not part of most school curricula[22], unless it is a university degree, and it is definitely not incorporated into most workplace training. However, making health knowledge accessible in everyday life will mean that society as a whole will act to protect our health, and the environment that our health depends on.

Area 2: Food systems

Global food systems today are characterised by many anomalies and dysfunctionalities that often reinforce each other, to the detriment of interconnected human and planet health. This section discusses how positive shifts within global food systems offer opportunities for greater wellbeing, including how and what kinds of foods are consumed, and positive related outcomes for both human and planet health -- what we call Health-Environment co-benefits.

In recent decades, the agricultural sector has seen a remarkable increase in productivity, strongly driven by an increased use of synthetic chemical fertilisers, pesticides, and agricultural machinery. However, while these gains have made it possible to grow more food for a greater share of a growing human population, aggressive agricultural practices take a toll on the environment and on human health. The agricultural sector is a significant contributor to climate change, causing 37 percent of total global greenhouse gas (GHG) emissions[23]. Other impacts include deforestation and resultant biodiversity loss, water and air pollution, soil degradation, and increased risk of pathogen spill over. To top it off, the recent improvements in overall productivity are not equally shared: millions of people worldwide still lack access to proper nutrition and productivity gains are expected to slow down in the coming two decades[24].

There are alternatives that offer opportunities for increased wellbeing, starting with a re-evaluation of current agricultural production practices and the integration of strategies that account for the climate crisis as well as food inequalities. New practices include ones that minimise the use of non-renewable inputs, integrate biological and ecological processes, and make efficient use of people's individual and collective capacities[25].

It is widely accepted that the animal agriculture industry is one of the most destructive components of agriculture, with cattle causing more environmental damage than any other non-human species (e.g. GHG emissions, overgrazing, soil erosion, desertification, and tropical deforestation)[26]. Numerous studies indicate that a reduction in meat consumption could deliver environmental, economic, and health benefits, including a decrease in agricultural GHG release, in land clearing and the resultant species extinction, as well as a reduction in the incidence of diet-related chronic non-communicable diseases (NCDs). And yet, no country has implemented any campaigns to significantly decrease animal product consumption.

While no country currently penalises animal product consumption, there are examples of other tax programs aimed at changing what people eat. Over the last decade, several countries including Brazil, France, and Hungary have imposed consumption taxes on food as well as stimulants such as alcohol and tobacco in order to promote healthier lifestyles. In 2010, the Danish government introduced a tax on saturated fat products, a strategy that led to a 10-15 percent reduction in the consumption of these products, as well as the generation of substantial tax revenue [27]. According to recent models [28] [29] [30], a meat tax is a feasible strategy, likely to simultaneously reduce pollutants, as well as improve population health and provide monetary benefits.

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In addition to the dysfunctionalities seen above in the food production systems, there are flaws in the other phases of the food cycle, specifically in the distribution, consumption, and disposal phase. The COVID-19 crisis has served as a harsh reminder of the fragilities of the global food systems, as closed borders and disruptions in the food supply chain have led to food waste and loss on one end, and shortages on the other.

A large problem concerning food systems worldwide is the widespread wastage and loss at all phases of the food cycle. Currently, one third of food that is produced for human consumption is not eaten, as it is either wasted, predominantly at the consumption stage in high-income countries, or lost during the production stage in low-income countries[31]. The wasted food is a sink for natural resources such as agricultural land, water, energy, and fertiliser, as well as a source of emissions, specifically six percent of global GHG emissions, or three times the amount of global emissions from aviation[32]. Cutting food crop losses by half, for instance, would reduce the environmental impact of human dietary choices, while also allowing one billion additional people to be fed at current food production levels[33]. This highlights the Health-Environment co-benefits associated with fixing the food wastage issue.

Another example of the dysfunctionality of the current food supply chain, compounded by income inequality, is the imbalance in dietary patterns, with nearly 11 percent of the world population enduring malnourishment and about two billion suffering from obesity in 2016[34]. Urbanisation, globalisation of food systems, and the homogenisation of food behaviours are causing a shift toward more ultra-processed, protein- and sugar-rich foods, a trend which has been fuelling obesity and non-communicable diseases, as well as putting pressure on the planet's ecological assets. Meanwhile, despite the richness of existing edible crops, plants and the like, our planet's agrobiodiversity, the food most of us eat nowadays comes from just a small number of species (i.e., 12 crops and five livestock species). This intense focus on a few crops and species has a series of impacts, starting with a short-term decrease of nutrients in soil. Longer term, this over-reliance on a few plants and animal species exposes us to the risks of food insecurity and famine. Especially if these species decline, experience drops in their yields, or worse, go extinct because of climate change[35].

Food distribution is not functional either: as of today, more than 55 percent of the world's population live in cities and consumes 79 percent of the global food supply. Only an approximate 30 percent of the world's population manage to source crop-based foods from within 100 km. Most food systems in Europe are highly dependent on food resources from abroad, a dependency characterised by trade-shock related fragilities and lack of resilience, as well as energy inefficiency.

To sum up, global food systems are characterised by many anomalies and dysfunctionalities that often reinforce each other, to the detriment of human and planet health. Still, several wellbeing opportunities are connected with the way in which food is consumed - as dietary choices are among the leading global causes of mortality and environmental degradation[36], and they too can reinforce each other. For example, opting for healthy foods (e.g., fruit, vegetables, beans, and whole grains) more often than not contributes to increasing our planet's health by protecting climate[37] and water resources, thus helping us meet global sustainability targets[38]. In other words, foods known to be associated with improved human health have among the lowest environmental impacts[39][40], while resource intensive and environmentally harmful foods are often associated with the largest increases in disease risk[41][42], thus reinforcing the Health-Environment co-benefits of the food sector.

Further Health-Environment co-benefits could be realised through a shift towards healthier dietary choices, as such shift would substantially lower the rising costs incurred by the healthcare systems of EU member states that are caused by cardiovascular diseases (almost €111 billion in 2015) and diabetes (181 billion dollars in 2017), as well as the non-healthcare costs of decreased labour supply and productivity and lower tax revenues due to people living with chronic diseases[43].

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Area 3: Energy

To put it simply, the current global energy system does not make sense from a wellbeing point of view. The shift toward global and national energy transition strategies that link health, employment, sustainability, and safety co-benefits offers compelling and robust evidence of immediate and long-term gains.

To begin, the sun provides 8,000 times the amount of energy we need to power and operate our economies. Yet we still massively rely on fossil fuels (representing 80% of today's global energy supply 'mix'), which aggravate the climate change that is increasingly destroying human wellbeing.

Even more puzzling is the fact that the 80 percent figure has barely changed in the last fifty years, even as the destructive power of climate change on humans' lives was visibly intensifying and renewable energy competitiveness was increasing to the point of becoming cheaper than fossil fuels. According to IRENA, while solar photovoltaic technology was still more than twice more costly than fossil fuels in electricity generation in 2010, it is now more than two times cheaper[44].

When we take a wider view and consider indicators other than monetary cost and competitiveness, the magnitude of wellbeing gains from the energy transition becomes even more obvious. When all health co-benefits are taken into account, chief among them morbidity and mortality related to air pollution (which recent studies suggest are much higher than previously estimated), the transition to renewable energies leads to saving fifteen times the cost of their deployment[45].

Mark Jacobson of Stanford University and his co-authors[46] have developed a roadmap for the transition to using 100 percent renewable energies for our energy supply by 2050 in 139 countries in the world and 50 US states, showing that this transition would lead to the elimination of 4 to 7 million premature deaths related to air pollution, the mitigation of the main sources of climate change and the creation of almost 25 million net new jobs while stabilising energy prices. Potential health gains in particular are immediate and massive: the transition to low-carbon energy could save 4.6 million lives from premature ending.

Fully developed and detailed national plans for the energy transition also exist, such as the French 2017-2050 négaWatt scenario modelling, which aims to halve energy consumption by 2050, driven by sufficiency (60%) and efficiency (40%), multiply the contribution of renewable sources to the energy supply by a factor of 3.4. This plan would allow France to meet 99.7% of primary energy demand by 2050. Especially interesting in this case study is that this feasible national energy transition plan could do away with all non-renewable energy, including nuclear[47].

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Area 4: Investing in social cooperation

Social cooperation is the main source of human prosperity and the key to sustainability. If this seems like a new idea, perhaps this is because it is not something that is typically measured or included on economic dashboards. But what if it were? Current economic systems tend to increase social inequality as well as social isolation, harming human wellbeing today and in the future. The opposite is true for social cooperation. Investments in social cooperation are intrinsically linked to shared human and planetary wellbeing, with many co-benefits for both people and the planet.

There is growing evidence of a sustainability-justice nexus, which essentially means that it makes environmental sense to mitigate our social crisis (by reducing inequality) and social sense to mitigate our environmental crises (by reducing human pressure on ecosystems)[48].

First, reducing social inequality reduces the need for environmentally harmful and socially unnecessary economic growth that destroys biodiversity and ecosystems. According to Saez-Piketty data, while the GDP of the United States was multiplied by three times between 1993 and 2018, 85% of its growth was captured by the richest 10% of the country. Second, reducing social inequality reduces the ecological irresponsibility of the richest, within each country and between nations. This would include addressing issues like pollution outsourcing, for instance in the Niger delta[49]. Third, reduced inequality, which positively affects the health of individuals and groups, increases the social-ecological resilience of communities and societies and strengthens their collective ability to adapt to accelerating environmental change, as shown by the work of Marmot[50], Wilkinson, and Pickett[51]. Fourth, reducing social inequality fosters collective action aimed at preserving natural resources as shown by Elinor Ostrom[52] in her work. Finally, reducing social inequality increases the political acceptability of environmental protections and the ability to offset the potential socially regressive effects of environmental policies, such as carbon taxation, as the "Yellow vests" revolt of 2018 in France has shown.

When it comes to co-benefits of investment in social relations, it should be said that the link between the quality and density of social life and physical and physiological health is of remarkable robustness. The link between social connection and lesser appetite for material goods is less clear-cut but nevertheless also established[53]. It is likely that people living in a society centred on the quality of social ties would be in much better health, therefore more resilient to ecological shocks such as COVID-19, and less absorbed by material consumption, thus reducing their ecological footprint. Investing in social relations (which can translate into policies such as increasing family and social time, investing in accessible childcare, fostering intergenerational relations, etc.) thus makes sense from the point of view of both mitigation of and adaptation to environmental shocks.

Increasing family and social time, for instance, can be achieved by promoting a shorter working week, which, recent research has found, could have a series of co-benefits for both people and the planet. A reduced working week could in fact contribute to human health by improving employee satisfaction and ameliorating their quality of life; meanwhile, it could also boost productivity while decreasing the scale of human production and consumption activities, thus curbing CO_2 emissions[54].

Addressing social isolation is an important part of such a policy strategy. Understood not as a choice of life, but as an insufficient connection to social networks, or even a total disconnection from sociability, social isolation is growing in strength in a number of wealthier countries, such as the US, the UK and France, with strong Health-Environment consequences. Social isolation is, for instance, a risk factor in case of heatwaves.

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Area 5: Education

The final key area for promoting wellbeing that we offer for discussion is education. We suggest that education can play a critical role in favouring a transition to a sustainable future: by expanding basic sustainability literacy, narrowing social gaps[55], reducing inequality[56], and promoting a decent quality of life. Moreover, educational attainment is the single strongest predictor of climate change awareness[57].

As education and health are fundamental enabling factors of individuals' wellbeing, they should be central priorities in Wellbeing Economy discussions. Mutual relationships exist between them. On one side, education has important social impacts on health and its determinants. People with more years of schooling tend to have healthier lifestyles, thus reducing the need for healthcare, nurturing human development and favouring better personal, family, and community wellbeing[58]. On the other side, although health is usually considered a co-product of education in mainstream public policy debates[53], evidence exists that shows health (and nutrition for that matter) for children and adolescentes plays a factor in enabling educational achievement[59].

Education is thus an important starting point for change, a position reinforced by it being named one of the six key transformations[60] for achieving the SDGs. And modifying current education systems (e.g., via making issues such as climate change, resource use/ overuse, limits-aware and system thinking mandatory at all levels of public education) represents a social tipping intervention[61] to catalyse a social shift towards sustainability. This is especially important as current students will eventually enter the job market and/ or decision-making bodies. In fact, education should not just be about accumulation of knowledge, but it should provide the tools to question how that knowledge can and should, or should not, be used. It should create the physical and mental space to practice critical thinking and explore the concept of responsibility as individuals and society. Through new ways of educating, the importance of sustainability should not be imposed by educators, but rather realised by students. Education has the power to shape the priorities of our society. The philosopher Deborah Osberg says that education should be the place where we experiment 'with the possibility of the impossible'[62].

Unfortunately, most of the current Western education systems have so far failed in providing this space and a disconnect is seen between environmental education and personal responsibility. Outside of classrooms, students fail to link their individual actions with environmental issues[63]. In fact, the aim of the current education system is solely to prepare people for the job market, which means to serve the current economic model, the backbone of the climate crisis and social inequalities[64]. As David Orr pointed out in 1990, 'today's high school or college graduate is poorly prepared for any but a fossil fuel-powered, urban existence'[65]. The dominant way that children are taught, thus ends up fuelling the very unsustainable roots of our way of living. Instead, education can and should encompass trans- and multidisciplinarity, evidence-based approaches, and experiential learning (e.g., schools as living laboratories). The recognition that we are living through a global crisis of values, ideas, perspectives, and knowledge – which makes it also a crisis of education – is the first step towards needed changes in education systems.
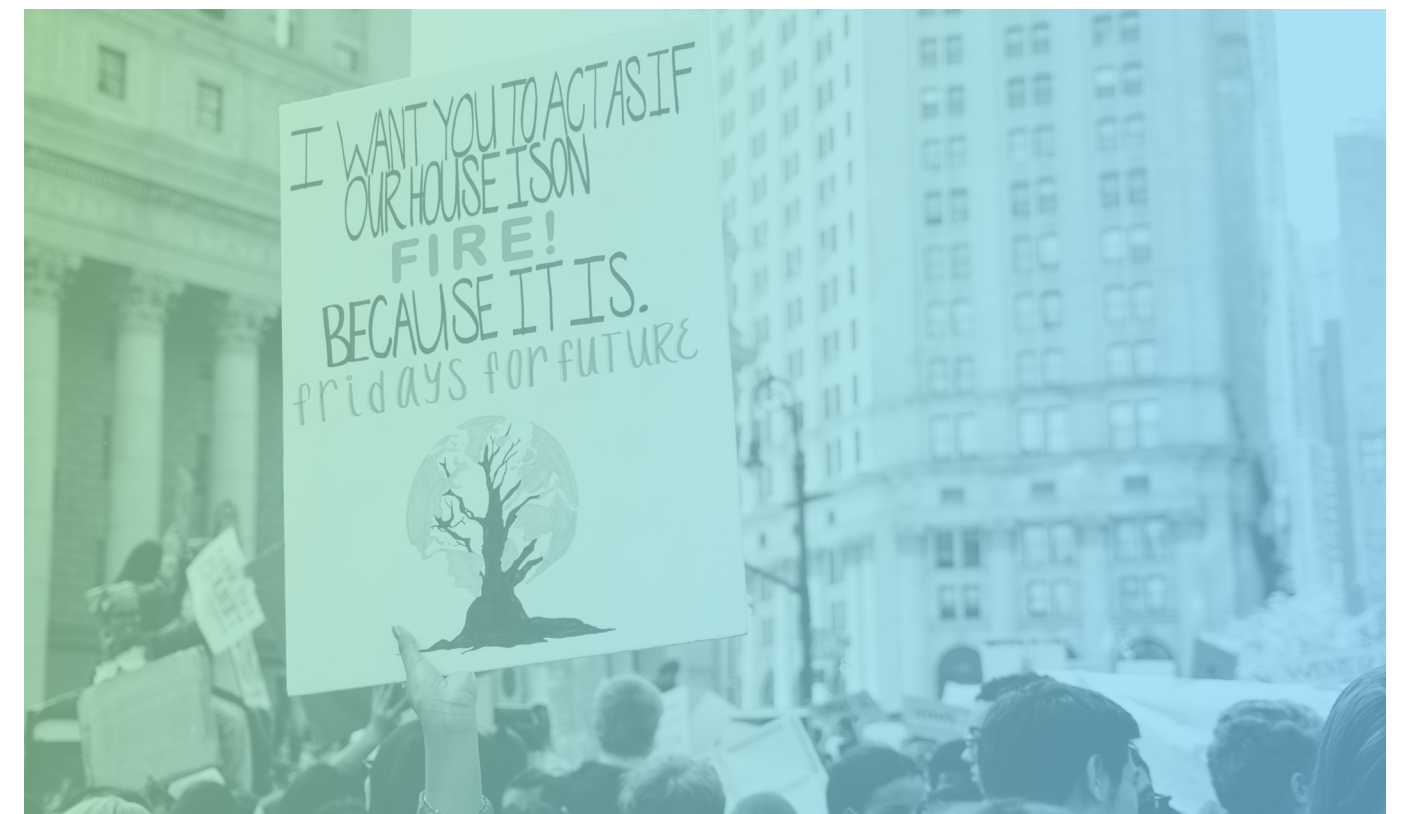
Since the 1972 United Nations Stockholm Conference, the education system has gained a central role in policy attempts to ease the transition to a sustainable world[66], with a particular call for reorienting education towards sustainability, first by Article 36 of the Agenda 21[67], and then by the Global Action Programme on Education for Sustainable Development[68]. More recently, in the United Nations Sustainable Development Goals (SDGs), education has been linked with 16 out of the 17 SDGs and 'education for all' highlighted as one of the main achievements to be reached. However, the economist Helen Kopnina, in an article published in 2020, asked what kind of education we are trying to achieve since the SDGs are still perpetuating the growth economic model (literally, goal 8)[69]. Western education has already been exported to other parts of the world with detrimental effects for the local social fabric[70]. Valuable local knowledge has been lost for the sake of progress. Little time is spent outside the classroom in experiential learning and teaching activities allowing both students and educators to connect with and learn from nature, despite several studies reporting the positive effects of nature in increasing learning and reducing stress, both in children and adults[71].

Even in universities, where critical thinking should be promoted, the growth narrative is embedded in the structure of curricula. Classic economic theory is still taught as a dogma, and no alternatives are presented as valuable[72]. Even in health research, economic competitiveness seems to be the main drive. High proportions of grants are allocated to developing new products and services, which can be commercialised, rather than towards health policy and system change[73]. All of this jeopardizes the critical thinking process necessary to find solutions to complex issues, such as the climate crisis we face.

Rethinking and truly prioritising education will mean we focus on the health of communities in the short-term, through interaction with nature and local knowledge, as well as in the long-term, by increasing environmental awareness and collaborations between different fields. Many young people are already making steps by themselves questioning the purpose of education as it stands now and its use in the current economic system.

"Rethinking and truly prioritising education will mean we focus on the health of communities in the short-term, through interaction with nature and local knowledge, as well as in the long-term, by increasing environmental awareness and collaborations between different fields"

"Education has the power to shape the priorities of our society"

Global Good practices

The proposed interventions in key areas of our economy may seem bold, but we can see such transformations already taking place in communities and countries around the globe. The major shift we require is a movement from measuring economic success by its ability to generate wealth, to beginning to evaluate economic success in terms of its contribution to the health and wellbeing of our people and planet.

The following section outlines examples where policy reforms and initiatives have shifted economic processes to the benefit of our health and environment. We hope these case studies will inspire you to see that a different economy is possible and that we can overcome the dual health and environmental crises of our time through bold economic reforms.

Area 1: Healthcare

Increase recycling of hospital waste[74]
The University Hospital in Leicester ran a study investigating the possibility to reduce the amount of waste going into the incinerator from the Nephrology procedures room, which uses a conspicuous amount of consumables, which contributes greatly to the UK's carbon footprint as well as environmental pollution.

In this study, the simple addition of a recycling bin in the procedure room reduced the incinerated waste dramatically, with around 60 percent of the waste not requiring incineration and with the majority of it being plastic that was potentially recyclable. The results of this short, one month long study show the potential to recycle part of hospital waste, with gains in terms of health, environment, and spending.

Clean Air Plan: the case of Amsterdam[75]
In 2020, Amsterdam launched a new city plan that focuses on the Doughnut Economy concept of remaining within the planetary boundaries while fulfilling people's needs, such as clean air. The City is not new to designing plans to improve the quality of life of its citizens. In October 2019, the city council published its Clean Air Action Plan, which aimed to improve air quality. Due to poor air quality, people in Amsterdam have a life expectancy one year shorter than the average national standard. In the plan, the city aimed to comply with the WHO standard rather than the EU standard for particulate matter, since the EU limits are still too high to not negatively impact the health of people. The plan is structured in three steps:

- By 2022, only emission-free buses and coaches will circulate in the city centre.
- By 2025, taxis, passenger crafts, and municipal ferries must be emission-free within an area that includes the surroundings of the city centre, called A10.
- By 2030, all means of transport, including personal vehicles, must be emission-free for the entire city.

The City of Amsterdam is well known for investing in bike lanes, allowing people to cycle safely. However, the City's plan also aimed to: (1) facilitate the use of e-cars sharing, (2) increase subsidies for the purchase of electric vehicles, (3) improve infrastructure to support e-vehicles, and (4) invest in awareness about addressing air quality, leading by example as a municipality.

Paris as a health-city in the making
Among the world's major metropolises, Paris has the dubious distinction of having long ignored environmental issues. Since the beginning of the 21st century, the city has gradually engaged in urban ecological transition, a transition that has greatly accelerated in the last mayoral mandate, which started in 2014 and was renewed in 2020. What is more, Paris has been able, in recent times, to articulate this new ecological ambition with a concern for social justice.
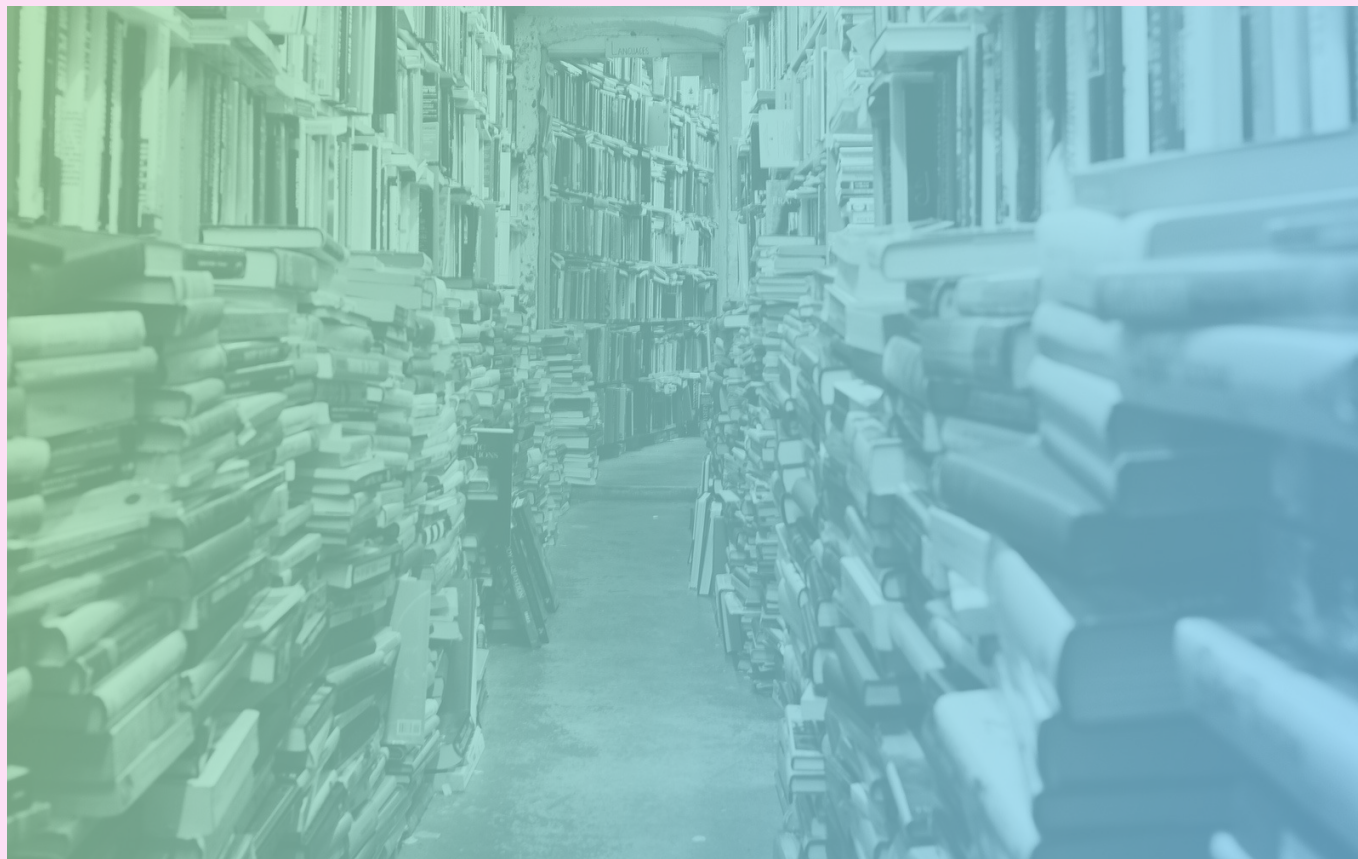
The establishment of a low-emission zone in Paris, enlarged in Summer 2019, has been accompanied by a complete ban on diesel and gasoline vehicles in 2030, a measure without an equivalent in France. Previous measures have greatly regulated car traffic with convincing results: air quality in Paris has been improving by 30 percentage points in less than a decade (in 2019, 70 percent of days were considered to be of good or very good air quality).

The development of cycle paths and practices (practices accelerated by the transportation strike in winter 2019-2020 and the COVID-19 crisis that followed) provides health benefits for both users and pedestrians. It has been accompanied by public financial support: Paris has created a set of around thirty financial aids intended for individuals and businesses willing to switch from vehicles running on fossil fuels to electric vehicles.

Health Literacy: Finland health education[76]
Finland is known to have one of the best education systems in the EU. One aspect of the education system, which is particularly relevant in terms of health prevention, is the inclusion of health literacy as a subject in the national curricula. This is a compulsory subject all through the education system, from primary to high school.

Area 2: Food systems

A roadmap to agro-ecological practices
An example of a sustainable agricultural success story is the inoculation of crops with nitrogen fixing microorganisms in place of fertilisers, improving soil quality and crop production in a non-polluting and cost effective way[77]. Another example is the replacement of pesticide use with augmentative biological control, an agricultural practice consisting of the release of natural pest enemies in order to reduce pest populations[78]. This method has been gaining popularity, as it is an environmentally and economically sound alternative to chemical pest control.

The path to more resilient agricultural production practices has been carefully mapped out by the International Assessment of Agricultural Knowledge, Science, and Technology for Development. The 58 signatory countries agreed with more than 400 world scientists that 'Business as usual is not an option': agriculture must be weaned off of oil, sustainable yield improvements can be found in agroecological practices, and agricultural production can be made resilient through a tightly woven fabric of small family operations. Following on from this report, France and Brazil have updated their agricultural policies, signing pro-agroecology mandates into law and actively promoting their implementation.

Case study: Vila Nova de Gaia
A recently published study investigates the existence of adequate food policies in Portuguese municipalities favouring a shift towards sustainable food systems. The study found the Municipality of Vila Nova de Gaia to be the most policy ready of the investigated municipalities, with policies and activities in place in 4 key policy dimensions: Information and awareness, Administrative and government capacity, Local government functions, and Strategic policies (Galli et al., 2020)[79]. A signatory of the Milan Urban Food Policy Pact, Vila Nova de Gaia has, in recent years, developed an action plan for implementing the Pact. Through this plan, the municipality supports its residents in increasing their awareness of food consumption and production patterns, for instance via the 'Flag to Act' project, which is aimed at both building knowledge on current dietary habits of the population and promoting alternative healthy food habits.

Weekly no-meat and no-fish meals for the students of pre-school and first cycle of elementary education in public schools are promoted. Teaching gardens are available in schools and, since 2018, at least 30% of meals within the municipality's schools include locally produced vegetables. Specific actions are ongoing to evaluate food waste in primary schools and kindergartens, with plans to scale-up this action at a broader level. Vila Nova de Gaia also organizes annual nutrition seminars and periodically tracks implementation of the Action Plan of the Milan Urban Food Policy Pact, which is validated by the General Health Directorate.

Several efforts are also in place to favour trans-departmental structures and coordination among different offices of the local administration to enhance systems thinking: the Social Action, Volunteering, and Health Division (DASVS) promotes, in collaboration with the City Hall's Personnel Department, the implementation of awareness raising actions, evaluations of the nutritional status, and identification of the eating habits of the municipality's professional groups. Favouring the urban-rural interconnection, the Municipality is also equipped with a Food and Tourism

"'Business as usual is not an option': agriculture must be weaned off of oil, sustainable yield improvements can be found in agroecological practices, and agricultural production can be made resilient through a tightly woven fabric of small family operations."

Promotion Action Plan to support short agri-food circuits by 1) promoting urban and peri-urban food production and processing based on sustainable approaches, 2) bringing producers closer to consumers, and 3) promoting other market systems to integrate the economic and social infrastructure of the urban food system. Finally, to incentivise farmer-citizen reconnection and promote regional gastronomy with sustainable production, the municipality has developed the Gastronomic Charter of Vila Nova de Gaia, through a survey of typical dishes and their historical context.

Food waste reduction in France and Sweden
In February 2016, France enacted Loi Garot, a legislation designed to cut the national food waste in half by diverting 5 million tonnes of food surpluses from landfills by 2025. Its main tenet makes it illegal for supermarkets to dispose of food that is still perfectly safe for consumption; instead, they must donate unwanted food surpluses to organisations serving the underprivileged. Italy followed suit with a similar law in August 2016. The EU recently issued the Farm to Fork strategy to build a resilient, equitable, and healthy food system to become the global standard for sustainability.

At the local level, non-profit organisations in countries such as Sweden and Denmark, among others, are aiming to reduce food waste locally and redistribute food resources to vulnerable groups in the community. Rude Food Malmö is the first Swedish, rescued-food based catering service that collects food such as day-old bread, spotty bananas, and bruised apples, and sells them as part of its catering service, as well as redistributes it to migrant and unhomed communities. A similar restaurant is Sopköket in Stockholm, which runs on 50 percent rescued food and offers employment opportunities to marginalised groups.

Food waste solution India[80]
The India Cooling Action Plan (ICAP) is working on increasing the efficiency of the cold-chain (how perishable foods get to market), which might be key to reducing food waste. ICAP analyses different scenarios and provides policy recommendations, which are then implemented by UNEP. A pilot study is currently being undertaken in the state of Tamil Nadu, and it will test whether a zero-carbon packhouse powered by renewable energy, coupled with refrigerated transport, will reduce post-harvest food loss. This project aims to reduce food loss by 75 percent, as well as boost farmer income by profit-sharing. In addition to this project, United Nations Environment Program (UNEP) and the UNEP-led Cool Coalition will also support the national government in an effort to connect local farmers with markets via cold-chains, as well as support other countries in introducing similar plans, drawing on India's methodology.

Milan Urban Food Policy
During the 2015 Expo dedicated to food security and sustainable development, Milan proposed an international protocol aiming to involve a number of world cities in coordinating global food policies. This protocol, called the Urban Food Policy Act, aims to develop sustainable and inclusive food systems that provide healthy and affordable food to all people, while also protecting the environment. The Act also encourages coordination between municipal and community sectors, so as to integrate food security considerations into social, environmental, and economic policy making, and seeks to create coherence between local, national, and global policies, programmes, and initiatives. At its inception, the Act had 100 members. Today, this number has risen to 210 cities around the world, including cities in Italy, the United States, Brazil, the Ivory Coast, Madagascar, China, and Mozambique, indicating the commitment of global municipal actors to a more sustainable and secure future for food production and distribution practices.

Area 3: Energy

Air pollution in India and China
It is hard to overstate the toll that air pollution, resulting from fossil fuel use, is taking on China and India. Together, these countries represent close to 35 percent of the world's population. According to available studies, between 1.2 million and 1.5 million Chinese die each year from air pollution (12 percent of all deaths in the country). In India, the death toll due to air pollution is 1.7 million people deaths per year (18 percent of all deaths). Yet both countries have taken different paths in recent years: while China declared a 'war on pollution' in 2013 and has since, reduced coal use and associated local and global pollution substantially, India has accelerated coal use with an exponential increase in associated pollution.

As a result of Chinese efforts, a recent study from the Energy Policy Institute at the University of Chicago (EPIC) found that 'China's most populated areas have experienced remarkable improvements in air quality between 2013 to 2017, ranging from 21 to 42 percent'. If these reductions in pollution are sustained, authors add, 'the average Chinese citizen would see their life expectancy increase by 2.3 years relative to 2013'. In fact, if China improves air quality to levels recommended by the World Health Organisation (WHO), the increase in life expectancy could reach 2.9 years.

Air pollution and Covid-19 comorbidity in Europe
The most severe and lethal forms of COVID-19 are being experienced by older people and by those with 'comorbidities' (the term being used to define diseases in reference to an index disease or pathology, the comorbidity being able to be the cause or the consequence of this disease, or share the same risk factors). As Richard Horton, Editor and Chief of the scientific journal, The Lancet, put it, COVID-19 is more a 'syndemic' than a pandemic: 'Two categories of disease are interacting within specific populations: infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and an array of non-communicable diseases (NCDs)'.

Air pollution resulting from the use of fossil fuels is thus playing a key role in health vulnerability of Europeans facing Covid-19 while mitigating air pollution in European cities would bring a key health co-benefit: reducing the risk of comorbidity in the face of multiple ecological shocks such as respiratory diseases but also heatwaves, which are becoming more frequent and intense on the continent. Researchers have found that: 'particulate air pollution contributed to ~15 percent of COVID-19 mortality worldwide, and 19 percent in Europe; globally, ~50–60 percent of the attributable, anthropogenic fraction is related to fossil fuel use, up to 70–80 percent in Europe.

Area 4: Investing in social cooperation

Socially compensated carbon taxation

Carbon taxation without social compensation is simultaneously socially regressive, as it hurts the poorest more because energy consumption represents a higher share of their income, but environmentally efficient, because it reduces greenhouse emissions by pricing carbon. Introducing social compensation based on income level and location (rural areas versus urban areas, suburban areas vs. urban centres, etc.) maintains the environmental efficiency of the policy measure (compensation should not be understood as exoneration), but eases its social impact and therefore, its political acceptability.

If revenues from carbon taxation are redistributed, for instance, to combat fuel poverty, it has the power to reduce social inequality while increasing environmental quality, thus mitigating environmental inequality.

Many countries, ranging from Nordic countries to Indonesia and localities have successfully introduced such compensations. For instance, in the province of British Columbia in Canada, a carbon tax was rejected by 43 percent of its residents when it was introduced without social compensations in 2008. Today, it is now supported by a large majority, as support grew when compensations were introduced[81].

Achieving Heath and Environment benefits through community-level social mobilisation

MOO Food is a small organisation based in Muir of Ord, a small village in the Scottish Highlands. It aims to promote environmental sustainability and build community resilience by bringing people together to grow food, knowledge, and confidence.

It does so by organising events and activities throughout the year that give the people of the community, irrespective of their background, access to good, nutritional, and chemical-free food, helping them to also understand the importance of using local produce to reduce food waste and their carbon footprint.

Not only does MOO Food work for the community, but the community works with MOO Food, too. As Emma Whitham, MOO Food's Founder stressed, 'MOO Food is now completely community-led by a board of Trustees, a cohort of volunteers and three members of part-time staff'.

One of the key projects that MOO Food runs is called *Growing Our Future*, which saw the instalment of growing boxes in key spots around the village, as well as the opening of a Community Orchard. Both initiatives enable the people of the community to grow and take any food they need for free. In terms of impact, Whitham calculates that the project has saved a total of 162t CO_2e to date, with an estimated lifetime saving of 487t CO_2e.

MOO Food also works with local schools and partners with the Department for Work and Pensions to deliver a Back to Work programme and with NHS Scotland to deliver a green therapy programme to help people who are suffering from mild to moderate mental illness.

In addition to that, it runs movie screenings, cooking workshops, and a community fridge that was installed in the main square of the village where people can take

> "If revenues from carbon taxation are redistributed, for instance, to combat fuel poverty, it has the power to reduce social inequality while increasing environmental quality, thus mitigating environmental inequality."

(or leave) any food they need (or that they do not need anymore). In the month of August, 2020 alone, this helped save 396 kgs of waste, a 560 percent increase compared to the same month in 2019. The use of the community fridge seems to have increased with the COVID-19 pandemic, which shows the crucial role MOO Food has been playing in the recovery of the village.

This has inspired others to act and start similar projects. Someone from as far as Uganda got in touch with MOO Food to help them plant an orchard in their country and MOO Food continues to support communities across Scotland to develop food-sharing platforms. An example is the Casserole Club Project, which matches cooks with diners so that those who can easily make one extra portion of a hot meal can share it with someone in the village that would benefit not only from the food but also from the social interaction.

At the moment, MOO Food is working on a new project called Scan not Scraps, which is funded by the Scottish Government's Climate Challenge Fund and which aims to further reduce the carbon footprint of the community by 365tCO_2e.

Area 5: Education

Holistic teaching[76]

Johannes Kepler Colegio is a school in Quito, Ecuador, which takes a holistic approach to teaching. Their vision is to form 'world citizens and excellent human beings' who care about their surroundings and initiate change. There is no mention of preparing people for the job market; they focus on growing good human beings who care about their environment and community, by incorporating the UN Sustainable Development Goals in their curricula at all levels, from preschool to high school.

The school was created in 1991, with the purpose of creating a strong link between community and school. Education is seen as the tool to imagine and create a better world. Some important pillars for the school are:

- Close connections with families and the local community;
- All three levels of education are on the same campus, which allows students from different ages to interact;
- The campus is integrated in the natural environment, which includes part of the surrounding forest;
- Several activities are promoted on campus including sports, gardening, and animal farming;
- Students' initiatives are taken into consideration and implemented. For example, last year, students requested the elimination of plastic bottles from the vending machines, arguing it was not a sustainable practice.

EUSTEPs project

Novel approaches to learning and teaching sustainability are emerging in the European Union, especially through the ERASMUS+ program[77]. Among these novel approaches is the EUSTEPs - Enhancing Universities' Sustainability Teaching and Practices through Ecological Footprint project. The project adopts a 'learning-by-doing' approach to equip EU university students and the Higher Education community at large with science-based knowledge, tools, multidisciplinary skills, and the transdisciplinary mindset that enable them to participate in the societal efforts towards sustainability. The novel aspects of this project are, first, that it focuses on the wider academic community, targeting not only students and educators, but also administrative staff and the management bodies. Second, it uses a hands-on, experiential approach to teaching and practicing sustainability, allowing the diverse academic community to understand, independently realise, and learn the full complexity of the economy-society-environment relationships, in an engaging and captivating manner. Third, it complements class teaching with actual sustainability practices (experiential activities). The wider academic community is involved in a participatory process aimed at assessing and ameliorating sustainability and resource management practices within the university. By allowing all those involved to learn what sustainability is about, while experiencing and practicing it first-hand, the project contributes to progresses towards the UN Agenda 2030, particularly on SDG 4, SDG 11, SDG 12, and SDG 13.

Case study: Italy's education reform

Italy has become the first country in Europe to make sustainability and climate crisis compulsory subjects for school children in the age ranging from 3 to 19 years old. In August 2019, law number 92, proposed by the former Minister of Education Lorenzo Fioramonti, was approved. According to this new law, schools within the country are required to dedicate roughly 33 hours per school year to teaching these two subjects and incorporating elements of the UN Agenda 2030 into schools subjects commencing in September 2020, while also adapting the teaching of subjects such as geography, mathematics, and physics, to incorporate the perspective of sustainability. The ultimate goal of this reform is to put the environment and society, their relationship, and the impact the human society is placing on our planet at the core of the Italian education system. The reform aims to turn schools into sustainability reference centres for their territories and the communities that inhabit them.

Appendix 1: The Health-Environment nexus: evidence from science

Scholars have long highlighted the positive impact that protecting the environment can have on people's health and wellbeing. While it may feel intuitive to some, there is value in describing what scientists have concluded through research.

From a micro-perspective, several different benefits of being exposed to, or of carrying out, certain activities in nature as opposed to indoor or synthetic environments have been repeatedly found. These include: lower levels of negative emotions such as anger, frustration and sadness, reduced mental fatigue, stress and cortisol levels, reduced incidence of respiratory diseases such as asthma and reduced mortality from stroke, increased physical activity, happiness, and self-esteem as well as many other cognitive, psychological, and physiological benefits[1]. This is in addition to a vast category of other benefits: social (e.g. easier interaction), economic (e.g. increased value of properties surrounding areas such as parks) and spiritual (e.g. increased inspiration)[2].

A pioneer study carried out in 1984 found that even simply looking at nature had a positive impact, with hospital patients recovering earlier and requiring less strong drugs if their hospital room window faced leafy trees instead of plain bricks[3]. More recently, some studies are also starting to investigate the extent to which technological advancement and modern devices could increase human interaction with nature, although this field is still under development and many questions remain unanswered[4].

From a macro-perspective, the nexus of health, development, and the environment has been the subject of several books and reports in the 1960s and 1970s — notably Rachel Carson's *Silent Spring* and The Club of Rome's *The Limits to Growth*. Also, a conference on the Human Environment, which also happened to be the first global environmental governance conference ever, was organised by the United Nations in 1972.

Yet, it is perhaps the publication of the *Our planet, **Our health*** report by the WHO in 1992 that really marked a turning point in this discussion. Tasked with the responsibility of analysing the interconnection between health and the environment at the international level, the authors stressed very clearly the importance of having healthy ecosystems for a healthy life – or, to put it differently, of respecting the environment to improve people's health conditions[5]. With so many issues affecting both developed and developing countries, they called for greater cooperation to prevent deaths due to pollution and other diseases such as malaria, to ensure everyone had access to basic resources, and to reduce risks from biological or chemical hazards.

From that moment on, and particularly since the 1994 *Helsinki Declaration* and its annexed *Charter*[6], the WHO has continued to stress the importance of promoting what it refers to as environmental health.

More recent publications, such as the 2019 *Lancet Countdown Report* have widely re-affirmed the deep interconnectedness between health and the environment[7]. The authors focused particularly on climate change, arguing that despite growth experienced in fields such as those of renewable and low-carbon energies, 'current progress is inadequate'[8].This lack of progress could 'result in a fundamentally altered world' where the health conditions of people of all ages are affected[9], thus reinforcing previous work indicating that the passing of key planetary thresholds could trigger a series of cascade effects causing continued warming of the Earth climate despite reductions in human GHGs emissions[10].

One clear example is that of heat waves, whose consequences can affect both the elderly (with e.g. heart failures) and younger people (with e.g. respiratory diseases). Given the large health benefits of healthier ecosystems, the authors thus see tackling the climate emergency as a 'transition from threat to opportunity'[11] and indeed external commentators framed it as 'the greatest global health opportunity of the 21st century'[12].

The strong nexus between health and the environment was also at the heart of the World Happiness Report (WHR), published in the midst of the COVID-19 pandemic. The WHR re-launched first of all, the findings of a World Gallup Poll, which showed that a large majority of respondents consider the environment as a policy priority and global warming as a threat to them and their family[13]. The authors then showed how higher incidences of pollution, such as particulate matter in the air, and maximum temperature levels decrease people's overall life satisfaction ratings in OECD countries. Using London as a case study and analysing the *Happiness* data set, they also showed that walking, doing sports, or gardening outdoors significantly increase people's happiness, as do temperatures above 25° (whereas windy and rainy days act the opposite way).

In light of all the benefits of living or working in a natural environment discussed so far and pollution being the cause of almost half-a-million deaths every year in the European Union alone, the European Environment Agency recently called for 'systemic change through visionary policies' in order to protect the environment and improve the health and well-being of European citizens[14].

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WELLBEING ECONOMY ALLIANCE