

Sustainability, population and reproductive ethics

Udržitelnost, populace a reprodukční etika

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Summary: Introduction: The paper explores the links between sustainability, population and reproductive ethics, because sustainability goals and population matters both imply ethical commitments. **Materials and methods:** This article is based on a critical analysis of current scientific and philosophical literature on sustainability, population and reproductive ethics. **Results:** The idea of sustainability, as enshrined in the United Nations *Sustainable Development Goals*, is a concept whose goal is to protect the environment, strengthen human communities and foster prosperity; in other words, to create a world in which all can thrive and prosper. However, humanity is moving quickly in the opposite direction. The main causes of unsustainability are excessive human numbers and the excessive human economic activity to which they lead. Sustainability is achievable, but it requires a sustainable human population. According to the latest studies, that is somewhere around three billion humans. Reaching this goal requires targeting all four reachable roots of the population's growth. Supportive measures, such as voluntary family planning, education and empowerment, combat (1) unwanted fertility and (2) coerced fertility. However, (3) population momentum and (4) wanted fertility also must be addressed. **Conclusion:** The latter two can be approached through promotion of reproductive ethics of small families, ideally one-child families, as a new global ethical norm.

Key words: sustainability – population – overpopulation – consumption – *Sustainable Development Goals* – contraception – family planning – reproductive ethics – one-child ethics – philosophy of overpopulation

Souhrn: Úvod: Článek zkoumá vztahy mezi udržitelností, lidskou populací a reprodukční etikou, protože jak cíle udržitelnosti, tak populační otázky obojí implikují konkrétní etické závazky. **Materiál a metodika:** Práce je založena na kritické analýze současné vědecké a filozofické literatury na téma udržitelnosti, populace a reprodukční etiky. **Výsledky:** Udržitelnost, tak jak je vyjádřena v *Cílech udržitelného rozvoje OSN*, je koncept, jehož cílem je ochránit životní prostředí, posilovat lidské společnosti a podporovat prosperitu; jinými slovy, vytvářet svět, ve kterém budou moci všichni vzkvétat a prospívat. Nicméně, lidstvo se pohybuje velkou rychlostí opačným směrem. Primárním důvodem je neudržitelná velikost lidstva a jím podmíněná neudržitelná lidská ekonomická aktivita. Dlouhodobá udržitelnost je dosažitelná, ale vyžaduje udržitelnou lidskou populaci, což jsou podle posledních studií zhruba tři miliardy lidí. Dosažení této velikosti populace vyžaduje zacílení na všechny čtyři realizovatelné pilíře populačního růstu. Dostupnost antikoncepce, vzdělání a emancipace žen jsou nejlepší prevencí pro (1) neplánovanou/nechtěnou těhotenství a (2) vynucenou plodnost. Je však nutné zaměřit se i na (3) populační moment a (4) chtěnou plodnost. **Závěr:** Poslední dvě jmenované mohou být úspěšně adresovány pomocí podpory reprodukční etiky malých rodin, ideálně etiky jednoho dítěte jako nové globální normy.

Klíčová slova: udržitelnost – populace – přelidnění – spotřeba – *Cíle udržitelného rozvoje* – antikoncepce – plánované rodičovství – reprodukční etika – etika jednoho dítěte – filozofie přelidnění

Introduction

Sustainability is frequently discussed, yet almost always without linking it to human numbers. That is unfortunate, for without a sustainable human population there can be no sustainability in general, no sustainable development

in particular, and no chance of achieving *Sustainable Development Goals*. This paper explores the links between sustainability and population, putting population back into a sustainability discourse. Furthermore, it links both with ethics, because sustainability goals and

population matters both imply ethical commitments.

Sustainability Sustainability as an ideal

In ecology, sustainability is the capacity of biological systems to sustain diver-

sity and productivity in the long term. In a broader context, sustainability is the capacity of systems and processes to endure over a relatively long time. In the 21st century, sustainability generally refers to the capacity for the planet's biosphere and human civilization to co-exist.

Sustainability as a policy concept has its origin in the *Brundtland Report* of 1987. This document dealt with the tension between the aspirations of humanity towards a better life on the one hand and the limitations imposed by nature on the other hand. Over time, the concept has been re-interpreted as encompassing three dimensions, namely environmental, economic, and social [1]. The goal of sustainability is to “create and maintain conditions, under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations” [2].

A sustainable approach is a systems-based approach that seeks to uncover the interactions existing among environmental, economic, and social pillars in an effort to protect the environment so as to strengthen human communities and foster prosperity [2]. As such, sustainability is a process characterized by the pursuit of a common ideal. By approaching it dynamically and persistently, the process can result in a sustainable system [3].

Unsustainability as a fact

However, humanity is not getting any nearer to this goal. On the contrary, it is going the opposite way despite many scientific warnings, such as *The Population Bomb* (1968) [4], *The Limits to Growth* (1972) [5], *Doctors and Overpopulation* (1972) [6], *World Scientists' Warning to Humanity* (1992) [7], *World Scientists' Warning to Humanity: A Second Notice* (2017) [8], *Scientists' Warning of a Climate Emergency* (2019) [9], and more.

There is vast literature indicating that humanity is going astray such as official

United Nations' (UN) documents. The *United Nations' Global Environmental Outlook* warns of a steady progression of unprecedented ecological damage, the principal driver of which is excessive human population. According to the UN, the human population of 2018 “had reached a stage where the amount of resources needed to sustain it exceeds what is available” [10]. The current population is nearly half a billion larger, increasing by 80 million per year.

The World Wildlife Fund's *The Living Planet Report 2020* is clear when stating: “Our relationship with nature is broken. Biodiversity – the rich diversity of life on Earth – is being lost at an alarming rate. The impacts of this loss on our well-being are mounting. And catastrophic impacts for people and planet loom closer than ever.” [11]. Humanity is on track to use more than 200% of the planet's total biocapacity (forestry, fishery, croplands) by 2050 – clearly an unsustainable trajectory [11].

A sixth major extinction is under the way, and for the first time in history, it is caused by a single species – humans. The Intergovernmental Panel on Biodiversity and Ecosystem Services states in its *2020 Summary for Policymakers* that “the extinction rate of other living species is now 100-times higher than before humans rose to prominence on this planet, and many remaining species are rapidly decreasing in number” [12].

This rapid displacement of other species, according to Philosophy Professor Philip Cafaro [13], constitutes interspecies genocide. Consider today's total land mammalian biomass, where 96% is now the mass of humans and their livestock, leaving just 4% for all remaining wild mammals put together [10]. This unsustainable trajectory towards our worldly dominion is predicted to continue, according to a 2020 study in *Nature* [14].

Similarly, the Food and Agriculture Organization of the United Nations, in its 2019 report *Meat & Meat Products*, states

that by 2030, the global middle class is expected to reach 5.3 billion people; i.e., there will be two billion more mass consumers of meat products. For this reason, the consumption of meat products is projected to double by mid-century [15]. This agriculture and livestock expansion will happen at the expense of the remaining wild species and their habitats [16].

In summary, major problems humanity is causing to nature include: climate change, environmental degradation and pollution, resource depletion, increase in municipal waste, biodiversity loss, deforestation, desertification, and mass species extinction (species genocide). Major problems humanity is causing to itself include: water scarcity, food insecurity, starvation and malnutrition, pandemic emergence, inadequate education and healthcare services, increased poverty, slowing economic growth, inadequate housing, forced migration, climate refugees, radicalization, extremism, widespread conflict, resource-driven wars, and more [17].

The main causes of this unsustainability are excessive human numbers and the excessive human economic activity to which they lead. An ever-growing human population is also a major obstacle to achieving UN's *Sustainable Development Goals*.

Sustainable development goals

The *United Nations' Sustainable Development Goals* (SDGs) were approved on September 25, 2015 as successors to the previous *United Nations' Millennium Development Goals*. Countries have adopted a set of goals for the global population to survive, thrive, and prosper. These 17 SDGs seek to end poverty, protect the planet, and ensure prosperity for all as a part of a new sustainable development agenda [18]. These official goals are:

1. no poverty;
2. zero hunger;
3. good health and wellbeing;
4. quality education;

5. gender equality;
6. clean water and sanitation;
7. affordable and clean energy;
8. decent work and economic growth;
9. industry innovation and infrastructure;
10. reduced inequalities;
11. sustainable cities and communities;
12. responsible consumption and production;
13. climate action;
14. life below water;
15. life on land;
16. peace, justice and strong institutions;
17. partnership for the goals [18].

Heads of governments have undertaken the responsibility of helping to achieve these goals in their own countries, regions, and the world by 2030. Humanity has only eight years left to meet these 17 goals of achieving decent lives for all on a healthy planet. However, as things stand, the world is not on track to meet these goals. Many of them are very likely to be missed. Worryingly, the world is going backward in some crucial goals (namely 6, 12, 13, 14, 15) [19]. A main reason is that an excessively large human population has gotten even bigger, making it more difficult to achieve the goals and undermining global ecosystems when the goals are met. This is because many of the goals, like ending poverty and ensuring adequate food, water and shelter, demand increased resource use. On a finite planet, only a limited number of people can live materially adequate lives.

During the past three decades, the word 'population' disappeared from the general public's mind and from the agendas of governments and international organizations, becoming a taboo subject. Population has been relegated to only one sub-sub-goal, *Sustainable Development Goal 3.7.1 Contraceptive Use*. Officials assumed that fixing the unmet need for contraception was all that was needed for populations to naturally stabilize by themselves [20]. While meeting this need is necessary, it is not

sufficient to achieve such stabilization, particularly if couples continue to want large families.

While SDGs are noble in their aspirations, they cannot be achieved or sustained with an ever-increasing population. In fact, they demand a significantly smaller population than the current one. If the goals are to be achieved, a holistic approach is essential, and a greater emphasis must be given on the impact of population on the environment. For the world to survive, thrive, and prosper, the human population needs to be sustainable. In the presence of population unsustainability, environmental sustainability is just a fragile theoretical construct.

SDGs are interdependent, but they all are dependent on the denominator; i.e., population size. For this reason, the missing denominator must be put back into the sustainability equation and addressed.

Population

The greatest equation

The most famous equation in history was formulated in 1905 by Albert Einstein and describes the relationship between mass and energy in a system's rest frame: $E = mc^2$. But the greatest equation in history was formulated much later, during 1971, by Paul R. Ehrlich and John P. Holdren. Together they identified the relationship between population and environmental impact. The equation explaining the fundamental causes of environmental degradation was developed into this formula: $I = P \times A \times T$, where I is the environmental impact, P is population (the number of humans), A is affluence (material resource consumption and concomitant pollution per person), and T is technology (or the relative efficiency with which consumption and production are achieved) [21].

Population's effect on the other two factors is multiplicative. Reducing (P) reduces environmental impact even if the other factors are constant. However, the concern and talk are currently mainly

about (T) as the cause and exclusive solution of all our ills, while (P) and (A) are ignored or dismissed. But fixing only one factor out of three is not enough, particularly when increasing one of the others (A) is the primary goal of world governments. All three factors need to be addressed to solve global environmental challenges and prevent catastrophic scenarios.

The greatest question

Whereas the greatest equation was formulated in 1971 by Ehrlich and Holdren, the greatest question ever raised was formulated in 1995 by Joel E. Cohen at the inaugural lecture of Columbia University's Earth Institute. It was later turned into the title of his book: *How many people can the Earth support?* [22].

Christopher Tucker, who answered this question in his article *We Know How Many People Can the Earth Support*, has written: "Joel Cohen's 1995 question is the most important question that every citizen and leader should be asking themselves and each other, every single day. Yet, a quarter century has gone by, and we have collectively failed to take it seriously. For a variety of reasons that have been exhaustively covered elsewhere, population growth has not been a mainstream topic of discussion since the 1970s. The doubling of the world population since 1900 was openly discussed as we approached the first Earth Day in 1970 (i.e., from 1.6 billion to nearly 3.7 billion). Since the first Earth Day, a half century ago, we have become transfixed by an endless stream of ecological catastrophes and human tragedies, somehow remaining silent on what has become yet another doubling of the world population from nearly 3.7 billion to more than 7.7 billion." [23].

Estimates have been made but it is necessary to realize that the 'maximum' population the Earth can bear is not the same as the 'optimal' long-term sustainable population. Human beings do not want to just live, but to live well. The question is not what is the 'maximum'

human population the Earth can bear, but what is the 'optimal' long-term sustainable population?

Sustainable population as an ideal

There are studies estimating an optimal human population based on various criteria and assumptions. However, they do not deal with the lower bound of the human population, i.e., the 'minimum' viable population, as humanity has crossed well above this limit.

In 1994, Daily et al. included access to resources, preservation of biodiversity and cultural diversity, sufficient wealth, universal human rights, and support for intellectual, artistic, and technological creativity. They estimated the amount of energy necessary to satisfy human needs while keeping ecosystems and resources intact, and calculated the optimal population size of about 1.5–2 billion people [24].

In another study, also 1994, Pimentel et al. estimated the optimal population size based on the minimal land needed for food production (0.5 hectares per person) and soil conservation. Depending on the assumed per capita production that would satisfy everyone's needs, they calculated an optimal population size of about 3 billion people [25].

In 2010, Pimentel et al. recalculated their previous estimates when they considered a consumption based on European living standards, suggesting that only 2 billion people are the appropriate size of humanity [26].

In 2016, Lianos and Pseiridis estimated the optimal population size using an objective criterion designed to assure that human resource use does not deplete the Earth's natural capital. Based on the unitary value of the ecological footprint-biocapacity ratio, they concluded human population needs to be reduced to 3.1 billion people [27].

In 2019, Economist Sir Partha Dasgupta in his book *Time and the Generations: Population Ethics for a Diminishing*

Planet calculated that an optimal human population is within a wide range between 0.5–5 billion people [28]. Among other factors, a key one was per capita income, as a proxy for per capita demands on the environment. The higher the per capita income, the lower the sustainable population size.

Also in 2019, geographer Christopher Tucker in his book *A Planet of 3 Billion* used a geographical approach. He concluded that the optimum population size, which would enable high human wellbeing coexisting with healthy and diverse ecosystems, is 3 billion people [29] but only if humanity greatly improves its efficiency of resource use, deals much more effectively with waste, and rewilds much of the planet.

The above studies develop a range of plausible answers to Joel E. Cohen's question, all showing humanity has long ago exceeded Earth's long-term sustainable population. Surely, more studies and discussion on the ideal size of the human population are needed. Nevertheless, one thing is crystal clear: humanity is far beyond any possibly sustainable or optimal size.

Unsustainable population as a fact

In November 2022, the human population has reached 8 billion people and will keep rising, with growth of over 80 million a year [30]. Despite a decrease in fertility rates and a slowing in the rate of population growth in recent decades, the global population continues to grow hugely in absolute terms. There is no sign of it decreasing sufficiently to achieve long-term sustainable numbers. According to the latest 2022 UN projections, humanity will reach 8.5 billion in 2030, 9.7 in 2050, and will peak in 2086 at 10.43 billion, and then, start slowly declining to 10.4 billion in 2100 [30]. Even a much more optimistic scenario published in 2020 in *The Lancet*, predicting human population peaking at 9.7 billion in 2064 and then declining to 8.8 billion

in 2100 [31], does not predict anything like sustainable human numbers. So far, the most promising prediction was released in July 2022, estimating that – due to increased mortality rates and decreased fertility rates – the world's population could peak at 8.94 billion in 2053 and then start declining [32].

Roots of our unsustainability

There are five roots of a population's growth:

1. declining mortality rates;
2. population momentum (caused by a population 'bulge' of earlier-born young people continuing to enter the reproductive pool);
3. wanted fertility;
4. unwanted fertility;
5. coerced fertility [33].

Obviously, root (1) mortality decline is desirable and curbing it would be unethical and unacceptable. (2–5); however, all have potential to be reduced by appropriate, ethical policies.

Measures to achieve population sustainability

There are two basic groups of measures:

1. restrictive measures can have various forms, such as economic measures (taxation of additional family members), forced regulations (forced sterilizations), or policies limiting family size (such as China's one-child policy);
2. supportive measures can also have various forms, such as voluntary family planning, education, and empowerment [33].

Restrictive measures are unethical and should be avoided; thus, they are not discussed here. On the other hand, supportive measures are ethical and should be supported and promoted, especially by specialists in our fields. This was discussed in greater depth in the previous article *Doctors and Overpopulation 48 Years Later: A Second Notice* [33]. Supportive measures are important in them-

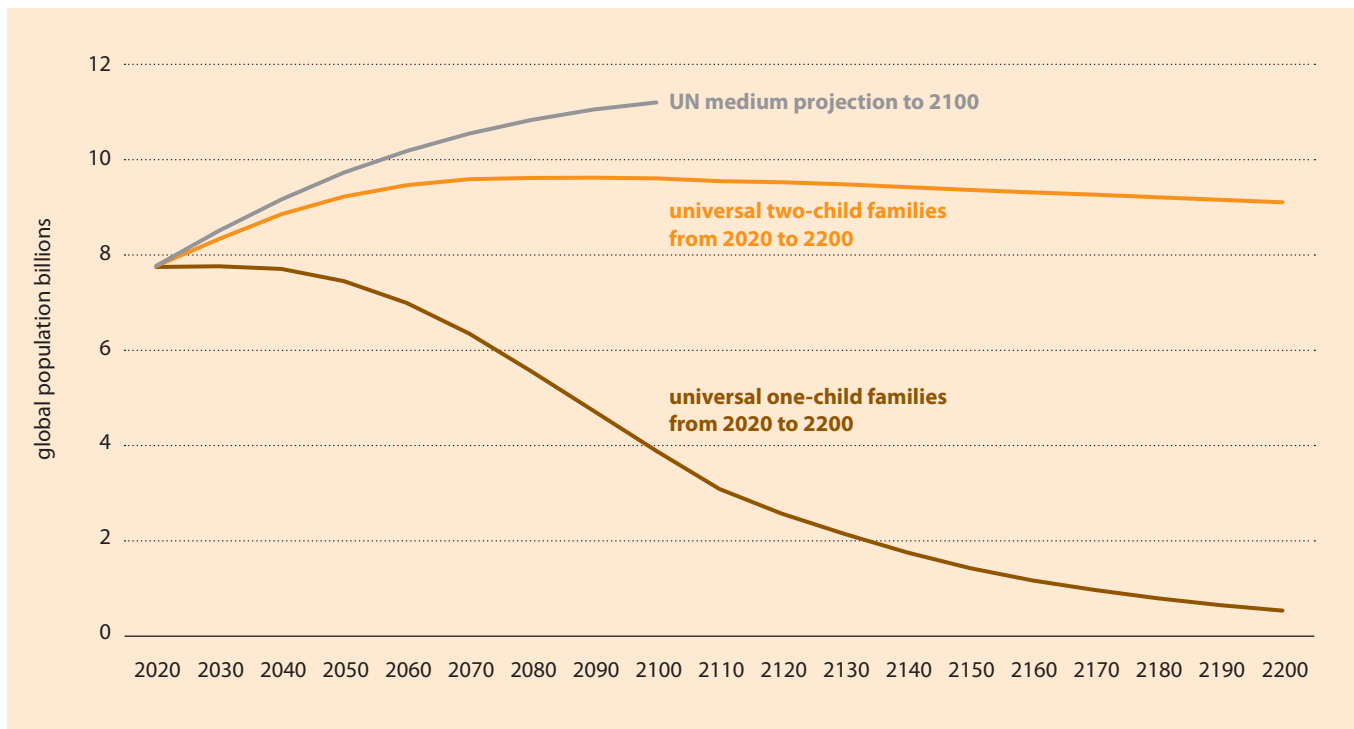


Fig. 1. Comparison of two-child and one-child families up to 2200 with UN medium population projection up to 2100.

Obr. 1. Porovnání rodin se dvěma a jedním dítětem do roku 2200 s populačními prognózami OSN do roku 2100.

selves in helping individuals and are crucial for curbing unwanted and coerced fertility (roots 4 and 5), thus helping to achieve sustainability and improve people's lives further.

However, supportive measures target and combat **only** (4) unwanted fertility, and (5) coerced fertility. But (2) population momentum and (3) wanted fertility also must be addressed. If substantial percentages of people continue to want large families, reducing unsustainable human numbers will be impossible.

One child understanding

In 2017, Ferguson and Rimmer calculated the world population for universal two-child and one-child families from 2020 to 2200 and compared these projections with the UN medium population projections at the time [34]. They mention the remarkable fact that a UN projected fertility decrease, down from a total fertility rate (TFR) of 2.4 in 2020 to below 2.0 by 2100, will result in a steadily increasing human population: 11.2 billion by 2100. The reason for that

is that decreasing fertility is counterbalanced by a higher population base over time; i.e., by population momentum.

The chart above compares universal two-child families (a hypothetical assumption that by 2020 all families throughout the world are convinced to have two children) with the UN medium projection showing that the universal two-child family figures are much lower (Fig. 1). Nevertheless, this study further calculates that even though this hypothetical decrease to two-child families would stop the global population from rising above 10 billion, at this rate of average reproduction, it would take until 2480 to return to a 2020-level population [34]. That is much too slow to achieve sustainability.

The study reveals the arithmetical fact that the only solution is embracing universal one-child families (a hypothetical voluntary, global agreement from 2020 that all families throughout the world agree to have just one child), leading to a steep and desirable decline in the world's human population [34].

Ferguson and Rimmer provide a very strong case for having small families, as only universal one-child families help the human population to get down to sustainable numbers in a reasonable timeframe. However, this study only looks at 2.0 and 1.0 fertility averages. Thus, objections may arise that it is too simplistic, to say 'the only answer' is 1.0. Another, perhaps more achievable solution could be a 1.5 average, as Christopher Tucker proposes. Tucker states: "Bringing the global TFR down to 1.5 would set us on a course to achieve a global population of around 3 billion much sooner than current projections anticipate." [23]. He goes on to propose that "an 18th SDG should be added, as a capstone, that calls for an end to the runaway population growth that is undermining our accomplishment of the other 17 SDGs" [23]. He suggests that "the 18th SDG should call for 1.5 TFR by 2030" [23].

Nevertheless, how can we convince people to have small families? How to convince people to limit the size of their families voluntarily and ethically, without coercion? Philosophers are of

great help here, as they have started promotion of small-family ethics as a new ethical norm.

Reproductive Ethics

Reproductive ethics of small families

Given the plethora of environmental problems mentioned above, there has been in recent years a significant increase in philosophical attention to reproductive ethics. There is a growing list of literature on the environment and population, which discusses the ethical dimension of human procreation. While these books are primarily aimed at philosophers, they are relevant to anyone interested in population matters and environmental sustainability.

Toward a small family ethic

In 2016, Travis N. Rieder published his book *Toward a Small Family Ethic: How Overpopulation and Climate Change Are Affecting the Morality of Procreation* [35]. Rieder covers a wide range of arguments in the debate over procreation, arguing that family is a serious decision on every scale, from the individual to globally. This results in a solid case for a 'small-family ethic.'

Rieder connects individual deeds to collective efforts, declaring that individual actions, such as procreation, have a significant effect on global problems, such as climate change. Given the total size of humanity, a single birth may seem to be irrelevant. Still, Rieder argues that global problems such as climate change generate individual obligations.

He explores three moral principles:

1. the duty not to contribute to harm;
2. the duty of justice to other people;
3. the obligation to our possible children, and concludes that they oblige us not to reproduce over replacement fertility rates.

In other words, these three principles each provide a clear justification for small families.

Rieder acknowledges that humans have procreative rights, but underlines the fact that these procreative freedoms are limited by the interests of others. Given the problems human numbers are causing, our procreative rights diminish with more than one child. Rieder states that there are very good reasons to limit our procreation, while there are no good reasons to ignore those limits. Finally, he concludes his book by stating that "we are left with a moral burden to have small families. ... The case for having one child seems fairly compelling. Might some people be justified in having more than one? Perhaps. But the burden is on them to make the case" [35].

One child: do we have a right to more?

In 2016, Sarah Conly published her book *One Child: Do We Have a Right to More?* [36], in which she explores population ethics and policy. She argues that given its importance, ignoring the population represents a shaky moral ground. Conly begins her book by stating that despite many who claim that excessive consumption, not population, is causing our environmental problems: "It is both – the growing per capita consumption of an ever more growing number of capitas" [36].

Conly argues that global environmental problems are significant enough to justify limiting human freedom to procreate. She acknowledges the right to a family and the right to control one's body. Still, she says, these rights do not entail a right to have more than one child, because these rights can be fulfilled and met well by having only one child.

Indeed, some people may desire to have more than one child, but still, this desire must be balanced by considering potential harms to the environment, current society, or future generations. Like all rights, Conly says, the right to have a family is not unlimited. In the same spirit, the right to control one's body as

respect for autonomy may be limited if one's behavior threatens to harm others – again, the environment, current society, or future generations.

Humans are not justified in having more children than the system can bear. For this reason, under current circumstances, humans now have a right to have only one biological child. At the end of her book, Conly argues that we must consider possibilities that if freedom is about to lead to great misery, it should be limited. As such, it may be better to limit reproductive freedom now while it is still possible to avert such misery [36]. "Mild population self-regulation now might spare our children and grandchildren more intrusive self-regulation in the future." In any case, "we need to realize that having children is just not a private matter anymore" [36].

Save the earth ... don't give birth

In 2018, Jonathan Austen published his book *Save the earth ... Don't give birth* [37]. Here he argues that the best thing we can do to help the environment, by far, is to have a small family, or even better, not to have children at all. Despite its title, however, the book's goal is not to discourage readers from having any children; instead, it encourages them to have children (ideally just one) intelligently, while understanding their own and their children's ecological footprints.

Like Conly, Austen notices that a focus on consumption only is insufficient. He recalls a recent study, according to which the best way a person can reduce their carbon emissions, by far, is to have one fewer child [37]. By choosing not to introduce another life into the world, one has prevented an entire lifetime's worth of pollution, waste, carbon emissions, and consumption (plus that of their offspring, ad infinitum) [37].

As such, Austen asks what has a priority: our rights to give birth (and our freedom to have as many children as we want) or the rights of the planet? Aus-

ten is convinced that the planet's rights should take priority over human rights, because our human rights depend on a flourishing planet. He even says that *"rights of nature and the environment should be revalued to equal, or surpass, those of humans, as we cannot survive without nature"* [37].

For these reasons, our decision to have one fewer child is a small sacrifice that benefits everyone [37]. If someone craves a large family, Austen has a very humane and compassionate solution. There are over 130 million orphans in the world waiting for a new home. Austen is right, saying: *"Bringing up someone else's child through adoption is one of the greatest things anyone can do"* [37].

To kid or not to kid

In 2018, Maxine Trump released her documentary *To Kid or Not to Kid* [39], in which she breaks the common taboos and explores the issue of reproductive choice to be child-free. Trump challenges the gender imbalance where women often face pressure to have children and are explicitly encouraged or forced to do so by male religious and political leaders. Whereas men who have or want to have no children are rarely viewed negatively, women often are. Trump asks: *"Why is this not the same for women? They should not be made to feel they have failed as women or are in some way unfulfilled. It is time to challenge what has long been accepted as the norm."* [38]. And she does.

First, Trump states that 'child-free' is a much better word than 'child-less', which can have negative connotations. She refuses common myths and perceptions that living child-free is weird, selfish, or somehow wrong. On the contrary, she points out that being child-free should be viewed in an overpopulated world as something positive.

Trump states that the choice to have or not to have children is the biggest decision in one's life and, thus, one should not feel coerced to have children or

forced to keep one's decision hidden. She also mentions that parenting is difficult and may not be suitable for everyone. As such, Trump concludes that it is a human right, not a duty to have children, and there should be no criticism or judgement if one decides to stay child-free.

Women who refrain from childbearing should not be stigmatized but supported in their autonomy. Here again, we, as specialists in sexual and reproductive healthcare, can contribute to get this topic on the table and support women's decisions to be 'child-free'. It's right for them and right for the Earth.

Environmental Ethics

Whereas reproductive ethics deal with the population directly, environmental ethics do so indirectly. Although environmental ethics can be viewed as a wider philosophical discipline, for the purposes of this article, it is mentioned after reproductive ethics to support the former's claims.

Ethics beyond our lifespan

In 2008, Larry R. Churchill published his article *Bioethics Beyond the Lifespan* [39], in which he confronts the current paradigm in bioethics. He notices that in this field, the single lifespan was presupposed as the relevant frame of reference and thinking beyond the individual lifespan has been largely absent [39]. Churchill states that *"ethics without a beyond-the-life-span perspective is increasingly problematic as current humanity leaves a larger and larger environmental footprint,"* and that we need *"beyond-the-lifespan-thinking, in which individuals and groups are encouraged to think about their responsibilities to a future that will not include them"* [39]. He recalls a powerful theme of religious environmentalism, i.e., *"the idea the Earth is not our possession, but that we are caretakers of it so that a major benchmark of ethics is stewardship of resources that are essentially given in trust, to be passed on to future*

generations. Thus, caring for a future beyond our lifespan is a way of living responsibly in the present" [39].

In the perspective of bioethics, Churchill calls for moving attention from medicine to public health, and shifting our focus from personal medical services towards creating sustainable health policies. He concludes his article by stating that *"the legacy of bioethics beyond the lifespan lies in the realization, or the failure to realize, that health is not just about the current wellbeing of individual organisms, but population (species) survival"* [39]. This has obvious relevance in a world threatened by numerous self-inflicted global environmental dangers [40,41].

Ethics beyond our species

In 2021, Johan H. Mackenbach published his article *Inter-Species Health* [42], in which he discusses the phenomena of human altruism. In the distant past, humans were only concerned with the well-being of their family and fellow villagers, but in more recent times, they developed a concern for all their countrymen. Currently, human altruism in its ideal form includes all humanity, as can be seen in the programs of public health, which include everyone in their effort to improve health – rich and poor, minorities, etc. However, he believes, *"there is no rational argument for limiting our altruistic concerns to the human species"* [42].

Mackenbach notices that *"while human life expectancy rose, whole species of other living beings have become extinct. The extinction rate of other living species is now a hundred times higher than before humans rose to prominence on this planet, and many remaining species are rapidly decreasing in number"* [42]. For him, this raises two ethical questions:

1. Can further lengthening of human life, and more generally, further improvement in human health, remain a priority now that we see other species being completely erased?

2. Should public health not expand its 'circle of concern' to other living species and morph into a form of 'planetary health' that encompasses all life on Earth?

He answers these questions with a 'no' and a 'yes.' *"If we want to preserve biodiversity for its own sake,"* he writes, *"it is necessary to set limits on the pursuit of our own interests. If we are serious in our altruism, we can no longer restrict ourselves to pursue 'intra-species health equity,' but must also strive for 'inter-species health equity'"* [42]. So, we should strive for 'planetary health' that acknowledges the importance of other species and their well-being.

For a species right to exist

The aforementioned message can be backed-up by another paper. In 2012, Winthrop Staples III and Philip Cafaro published their article *For a Species Right to Exist* [43], in which they argue for other species' intrinsic value and right to continue their existence on Earth. Just as humans deserve respect, which we show them by upholding their rights and promoting their interests, so do other species.

The authors start with an excursion into the realm of rights: *"The right to life is a fundamental human right. Without it, our lives and projects hang by a thread. Without it, other rights have little point or purpose. ... In the same way, the right to continued existence is the first and most important right to uphold on behalf of other species. The right against untimely extinction is paramount."* [43]. They continue: *"Such a right to continued existence is a powerful trumping claim that should outweigh nonessential human interests."* [43].

Staples and Cafaro defend other species' right to exist because it is the right thing to do (1) for them and (2) for us. (1) Species, they argue, in general, *"are primary examples and repositories of organic nature's order, creativity, and diver-*

sity" [43]. That justifies a judgement that they have great intrinsic value, which we are bound to respect. (2) The second reason we should defend other species' right to exist is because it is in humanity's interest. All humans, both present and future, have an equal moral right to know, experience, and connect to wild nature. Our children and their children have a moral right to learn about these species and appreciate them.

The authors realize that *"establishing species legal rights to exist necessarily involves some burdens on people limiting our freedom of action; bringing economic costs as well as benefits"* [43]. For these reasons, they propose that humans (1) strictly limit their use of key resources on which non-human species depend, (2) restrict certain economic activities that endanger other species, and (3) humanly stabilize and then gradually reduce the human population. Only this can help us preserve sufficient resources for ourselves and other species in perpetuity. Staples and Cafaro conclude by saying: *"Thus and only thus, we claim, will we have any chance to create genuinely sustainable societies."* [43].

Environmental Literacy and Education

The problem is that environmental literacy and the awareness of the consequences of procreation are absent from mainstream environmental conversations, including about climate change. When asked, people rarely put 'having a small family' on 'top ten' lists of things that they could do to save the Earth, when in fact, it is the most important one. Due to this ignorance, people may think, as Austen puts it: *"We're just people, doing what people have always done. We're not hurting anyone – but put us all together and look at the results and we are hurting something – the planet's own life-support systems"* [37].

Environmental education provided by media to **all** of the public is crucial as it helps to raise environmental literacy.

It can demonstrate to people the environmental consequences of vast and unsustainable human populations, excessive production and consumption, and also what needs to be done to decrease human numbers and the size of human economies. These are the sine qua nons of environmental sustainability. While consuming less, living car-free, avoiding flights, using green energy, or going vegetarian are praiseworthy, they will truly succeed in their aims only if humanity reins in procreation and reduces the number of producers and consumers [44]. There is hope, since population literacy has been successfully promoted in many countries through radio and television 'soap-operas' which educate people through popular characters [45], helping change people's behavior to lower fertility.

Last, but not least, another effective measure to curb the effects of overpopulation is to educate people about lengthening generations; i.e., women delaying their first child, for example waiting until their thirties. Though it can be a controversial recommendation, as individual fertility decreases and pregnancy and delivery complications increase with higher age, given its positive demographic effect, it should be openly discussed and considered. It is essential, especially in settings with higher fertilities and frequent adolescent pregnancies [46], where such education can be rightly viewed as positive and ethical rather than the opposite.

Conclusion

Sustainability is achievable, but it requires a sustainable human population. Without this, there can be no sustainability in general, no sustainable development in particular, and finally, no chance of achieving the *Sustainable Development Goals*. A sustainable humanity is achievable, but requires targeting all four reachable roots of the population's growth, including population momentum and wanted fertility. This can be

done through promotion of reproductive ethics of small families; ideally one-child families.

While it is not likely that voluntary one-child ethics will be globally embraced in the short-term, it should be widely promoted among healthcare providers. We should emphasize that a one-child ethics (or at least a fewer-child ethics) is, alongside adequate reductions in our production and consumption patterns, ultimately the only ethical way to achieve sustainability. To conclude this paper, let's paraphrase Chris Tucker: small, educated, and prosperous families should be held up as the hallmark of modernity and progress, instead of runaway population growth [23].

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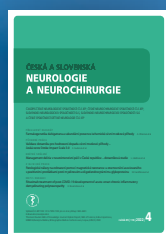
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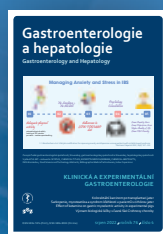
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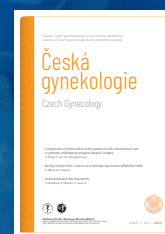
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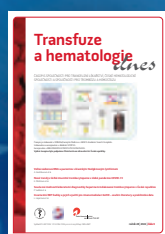
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