

Shifting the Population Debate: Ending Overshoot, by Design & not Disaster

The need to #MoveTheDate

Every year Global Footprint Network marks Earth Overshoot Day, the day each year that humanity has used up our planet's regenerative budget. In 2021, Earth Overshoot Day landed on July 29th.¹

At Global Footprint Network, we envision a world where everyone thrives within the means of our planet's ecological budget. We strive to get there by design, otherwise we will get pushed out of overshoot by disaster, a process that will cause massive human suffering. Overshoot will end regardless of our decisions. Our choice is how.

Through forward-looking decisions, we can turn around natural resource consumption trends while improving quality of life for all. [We have identified the five key areas](#)² that are most forcefully defining our long-term trends, all of which are shaped by our individual and collective choices:

- **PLANET** - How we help nature thrive: focus on conservation, restoration, regenerative use. Given rapid erosion of biodiversity and ecosystem health, we need to protect nature since we vitally depend upon it.
- **CITIES** - How we design and manage cities: encourage compact & integrated versus sprawling & segregated cities. This determines both heating and cooling needs as well as mobility.
- **ENERGY** - How we power ourselves: We phase out fossil fuels and bring in renewables and boost efficiency. Energy currently makes up the biggest share of our overall Footprint.
- **FOOD** - How we produce, distribute, and consume food: move to local, vegetable-based diets, and away from industrial animal-based diets. Currently food production alone uses over half of our planet's biocapacity.
- **POPULATION** - How many of us there are: key is to empower women and girls, and to make safe and affordable family planning available to all. The larger our population, the less planet per person. Empowering women is positive in itself. It also leads to smaller and healthier families with more educational opportunities.

In this overview document we seek to highlight the significance of the “population factor.”

¹ <https://www.overshootday.org/2021-calculation>

² The mathematical logic of these domains is simple. The “healthy planet” represents the supply side. The demand side is captured by the other four dimensions. Overall consumption is divided into two parts, food, and non-food. The non-food dimension is what we call ‘cities’ – how we live, house ourselves, move about, and require products and services. We also focus on energy, which is transversal to all domains. Since food, non-food, and energy is often described in per-person terms to make it more accessible, we also have the population dimension to make the assessment mathematically complete. This is the dimension discussed in this overview report.

The significance of the population factor

Humanity currently demands 73% more from Earth than its ecosystems can renew. These are estimates for [2021](#). To maintain 85% of the world's biodiversity, human demand can only use half of what our planet can provide.³ This means that current demand exceeds this goal **by at least a factor of 3**.⁴

One of the most mathematically significant factors behind this growing imbalance is the steadily increasing human population.

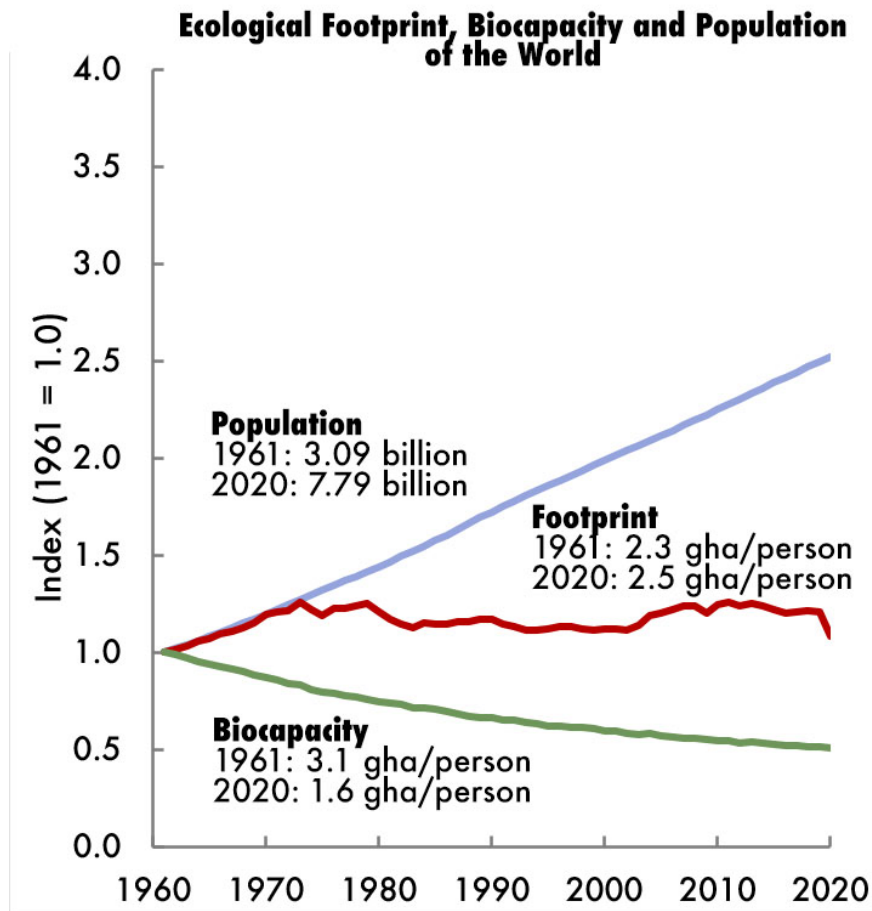


Figure 1: Population, per person Footprint and per person biocapacity trends for the world. It demonstrates how significant population expansion has been over the last 6 decades as compared to average per capita demand (or Footprint).

Figure 1 compares the development of the per person Ecological Footprint against biocapacity availability per person and population growth. All current values are indexed against 1961. These

³ <https://www.half-earthproject.org/discover-half-earth/>

⁴ 1.73 Earths / 0.5 Earths > 3

numbers demonstrate that the average per person Ecological Footprint over this time period has not changed dramatically, even excluding the 2020 drop due to COVID-19.

While our National Footprint and Biocapacity Accounts conclude that our planet's biocapacity has slightly increased, [according to UN statistics](#), boosted by the increase of agricultural productivities, overall population growth has been much larger, leading to a shrinking over time of the biocapacity available per person.⁵ While the average per person Footprint has not changed much, this does not take into account the vast differences in consumption among people. Nevertheless, even the grotesque inequities we witness today do not change the conclusion that average per person resource consumption has shifted far less over the last 6 decades than population numbers.

Still, there are powerful reasons not to talk about population

David Roberts explained in [VOX](#) that he is “*an environmental journalist, but I never write about overpopulation. Here's why.*” He concludes that “*there's much downside and not much upside to talking about population.*” But how likely are we to succeed in not running down the planet without turning around the population trend, especially if we advocate for high levels of human development for all? How likely are we to succeed in turning the trends if we are not even able to talk about them?

Clearly, it is absolutely essential to start recognizing the ills of many population debates, as has the Sierra Club, which has started to acknowledge the [reprehensible sides](#) of its founders. There are good reasons why progress in addressing the demographic factor has been slow.⁶ Even as we address the topic generously, with love and compassion, many pre-existing population debates have made the discussions more difficult because of:

⁵ The fact that Global Footprint Network's National Footprint and Biocapacity Accounts show an increase of global biocapacity over the last half century may well exaggerate real trends. This is due to those accounts' reliance on UN data sets, which cover the increase of agricultural yields, but lack consistent accounting of degradation such as soil erosion or groundwater depletion. With these aspects fully included, the accounts would present an ecologically even tighter picture.

⁶ A friend wrote to us: “*Living above our means is culturally engrained -- individually, nationally, and globally. Helping people to break out of that and examine resource scarcity is an enormous challenge. For instance, a significant piece is the question of motivation and how it affects certain outcomes. I've observed that when predominantly male leaders decide to increase women's access to education and healthcare for population reasons, they're often looking for the most cost-effective ways to get the desired result (smaller families) instead of genuinely trying to create an even playing field. As a result, the dark side of human nature which led to horrendous practices in the past hasn't gone away.*”

Given that reality, I think there's merit to the argument that when gender equality is motivated or justified by population concerns, there are good reasons to be skeptical. Since it's possible to achieve the same results by framing gender issues in terms of human rights and economic progress, it's probably not worth it to drag population and all its baggage into the mix.

Yet, it is also true that gender equality is a marginalized issue. Morally, I feel that the human rights case is the strongest, but practically, I know deep down that the economic case is what political leaders care about. There are a variety of other incentives to empower women, and population isn't really at the top of the list. Aging populations seem to be a bigger concern – one that leads to policies that are boosting rather than reducing family sizes.”

- **A moralistic narrative** (focusing on “what people should do”). Such narratives often trigger a moral combat debating “who is responsible” rather than a common inquiry about what would be best for all humans. By focusing on the responsibility question, the population dimension gets rightly challenged by those pointing out that consumption levels also matter. But sometimes, this truth is used to pit the consumption argument against population. This is unproductive and misses the point.⁷ **Rather**, the debate needs to be framed around the benefits of investing in smaller families. It needs to be explained around the ways that a shrinking population contributes to securing the best lives possible for future generations everywhere.
- **Gruesome past experiences.** In the name of stabilizing population, inhumane policies and practices including forced sterilizations have been imposed, particularly on women, and nearly all in low-income populations.⁸ Many of these occurrences have also been associated with eugenics. **Rather**, any future action must be for the love, and in service, of all people. Policies need to particularly ensure that they empower, work with, and support women and low-income groups.
- **Economic fears** that economic expansion, pension schemes, or relative economic power require expanding populations, **rather than** recognizing that in an overused world, shrinking populations can have a competitive advantage.
- **Insensitive to downright racist communications** that are perceived as blaming the most vulnerable, **rather than** compassionate communication that focuses on how all people, particularly those with fewer economic possibilities, can be listened to and served best.
- **The non-representative spokespeople.** There has been an oversupply of older white men from high-income countries advocating for the benefit of smaller populations. **Rather**, the main voices need to be young people from around the world, from all ethnicities, all walks of life.
- **Using off-putting trigger words.** Successful communications NEVER advocate for “population control” as it triggers unproductive debates and reignites old fears. Casting the discussion as some controlling others also reflects a morally flawed approach. Effective approaches are never about some people controlling other people. **Rather**, turning around demographic trends is all about empowerment and respect, including respect for human life, fellow human beings, future life, and the rest of the planet.

⁷ For instance, often the point is raised that “one Bangladeshi has 10 times less Footprint than an American - who has a population problem?” This narrative is based on the premise that sustainability is about allocating blame, and that countries, regions and cities do not have skin in the game and are supposedly caught in a pure “tragedy of the commons”. **Rather**, the question is: What is the advantage for Bangladesh or for the US? See also comparison of per person growth rates and population growth rates [here](#).

⁸ This is not to say that the majority of efforts have been negative. There have also been many empowering, positive reproductive health initiatives. But it is important to acknowledge that there also have been harmful attempts.

- **Being caught in “religious” or “ideological” debates** that can easily lead to the amplification of polarizing, derailing, and unproductive “wedge issues”.⁹ Examples include a singular focus on abortion, **rather than** sticking to broader principles and a language of true compassion. Religion does not have to be a barrier, as [demonstrated in Iran](#). Iran implemented a highly effective demographic shift some decades ago that was home-grown rather than imposed from abroad.
- **Making population a singular issue** that explains everything **rather than** embedding it in the larger context of various factors contributing to ecological overshoot. Unsustainability is the sum of everything, and conversations about sustainability, rather than focusing on population only, require recognizing the total realm of solutions that need to be implemented in order to succeed.
- **False or absolute statements** such as “population reduction is the only thing that matters”¹⁰ or “population reduction is the most effective way to combat climate change”, **rather than** using accurate statements that recognize all factors. In the short term, investing in smaller families has only social benefits and does not lead to immediate reductions in carbon emissions. For instance, the need for 45% carbon emission reduction by 2030 (against 2010 levels), as recommended by IPCC, cannot be achieved through population shifts alone, unless enormous tragedies - such as large portions of humanity dying off - unfold before then. In fact, for this target, shifts in population can only contribute a minor portion. However, over larger time horizons, population shifts have the potential to outperform anything else. For example, if today the world adopted German, Japanese, Spanish, Portuguese, or Italian reproduction rates, the 2100 world population would be under 5 billion, rather than 11.6 billion (median UN projection) or 16 billion (upper UN projection). The implications for available biocapacity per person are dramatic. Yet 2100 is not that far away: babies born today are expected to live beyond 2100.¹¹

Global Footprint Network’s journey

Global Footprint Network has advocated for taking the population dynamic seriously, throughout the organization’s history. The commitment has always been to fair, compassionate, and generous strategies. In addition, we seek to recognize the pain that racist, sexist, and paternalistic approaches have caused.

The question Global Footprint Network pursues is not “who is to blame?”, but given ecological constraints, how can we best support those who will have to operate on this planet for many decades to

⁹ Wedge issues are Issues that energize political support by driving emotionally charged divisions into public opinions. See also https://en.wikipedia.org/wiki/Wedge_issue

¹⁰ To put the entire weight of the sustainability transformation on population is unreasonable and not credible.

¹¹ Global Footprint Network simple [population cohort model](#), based on UN data allows one to calculate the population implications of various fertility rates. It is a simplified model that builds on the UN statistics summarized by five-year age segments. It also assumes constant age-specific mortality rates, and no shift in average age of mother when child is born.

come. What are the most helpful scenarios for humanity so all can thrive within the ecological constraints of the biosphere?

Ecological Footprint, Biocapacity and Population for High-Income, Upper Middle-Income, Lower Middle-Income and Low-Income Countries, 1961 - 2016

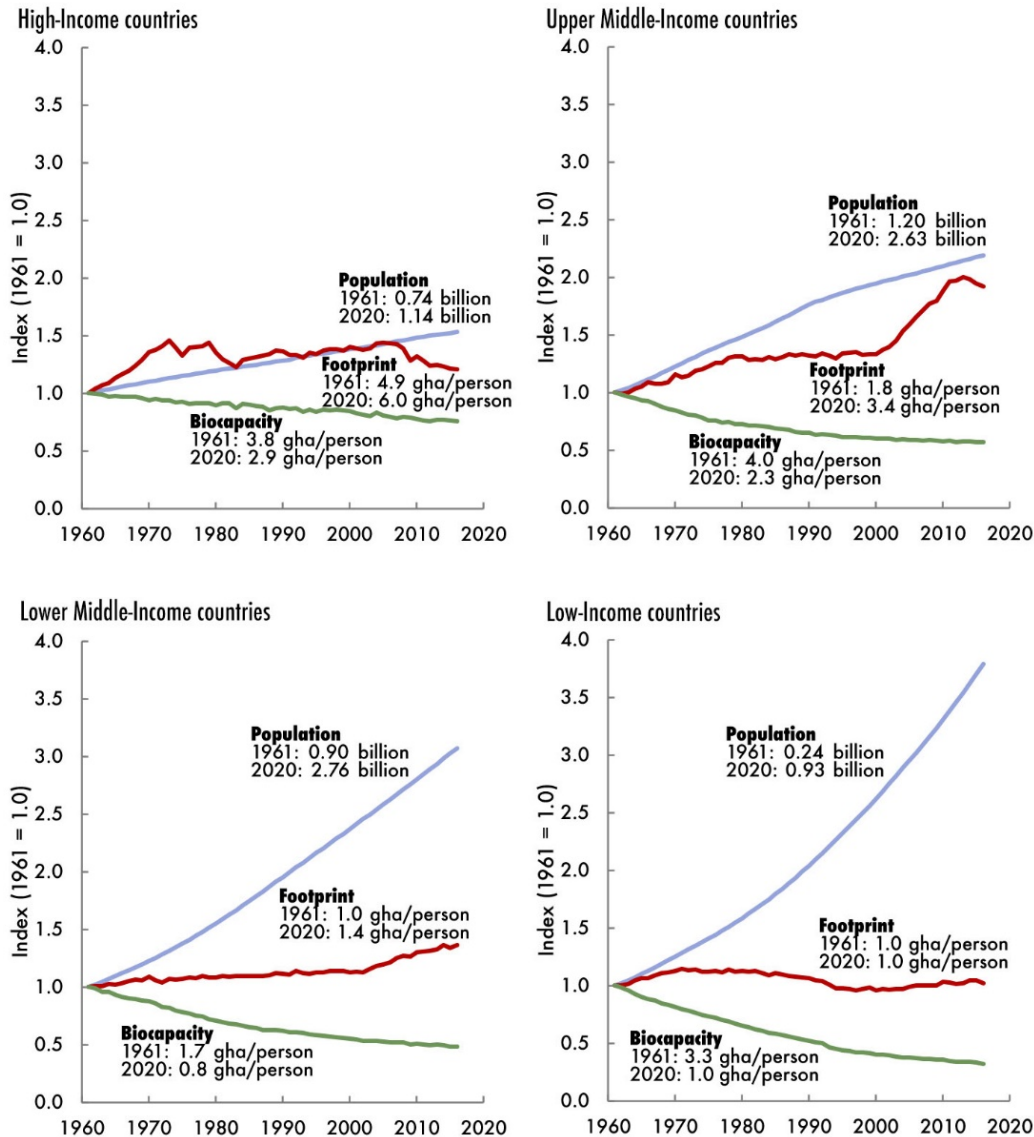


Figure 2: Population, per person Footprint and per person biocapacity trends for four income groups. None of the regions has had a more rapid increase in per person demand (Footprint) than the population increased. This is not to deny that distributions within countries have been grotesquely uneven.

Global Footprint Network’s approach is consistent with the one proposed by Holdren, Ehrlich & Ehrlich, which they called the [IPAT](#) approach, or what in climate debates is now often called the [Kaya identity](#). The Ecological Footprint translated this concept into real numbers using [Ecological Footprint and](#)

[biocapacity accounts](#).¹² They capture all competing demands on the biosphere, and thereby illustrate the overall imbalance between human demand and what Earth can regenerate, as well as how the various factors have contributed to the overall demand.

Global Footprint Network's approach counteracts the common perception that we are caught in a "[tragedy of the commons](#)" where the right action is necessary for humanity, but little of the benefit comes back to the individuals. In contrast, we demonstrate how sustainability actions have an immensely positive effect on everyone involved.

What this makes evident is that rapid population growth in low-income countries hurts first and foremost the societies where the growth occurs, not humanity as a whole. For instance, rapid population growth erodes the possibility of young people where the growth occurs, as it dilutes educational opportunities, jobs, and quality health care.

Figure 2 shows the Footprint, biocapacity and population trends for country groups, organized by income category. What is clear is that those with the least economic means exhibit the highest population growth rates and a flat if not falling per person Ecological Footprint. Characterizing the acceleration of the demographic transition to be a noble, altruistic deed would be a misrepresentation. It has so much potential to generate benefits to all involved.

Global Footprint Network has been working to help shift the discussion around population to be compassionate and productive. This has included helping larger organizations reframe their population debate. For instance, we reintroduced the population discussion back into WWF over a decade ago in its [2008 Living Planet Report](#). Global Footprint Network also participated in a seminar on biological extinction at the Pontifical Academy of Sciences (2017), where about 1/3 of the time was occupied discussing the population dynamic (the findings are now published in a Cambridge University book, edited by Peter Raven and Partha Dasgupta, called [Biological Extinction](#)).

Global Footprint Network's most influential campaign, [Earth Overshoot Day](#), currently reaches about **4 billion media impressions** per year.¹³ Even Pope Francis commented on it,¹⁴ as did President Macron, EU Commission President von der Leyen, Greta Thunberg, and many others. The campaign emphasizes the #MoveTheDate [solution space](#) with the five key domains mentioned, one of which is [population](#). [100DaysOfPossibility.org](#) was launched on Earth Overshoot Day 2021 to demonstrate scalable solutions

¹² Most importantly, Global Footprint Network has consistently emphasized the population factor as a key determinant. For instance, key to the National Footprint and Biocapacity Accounts is that they compare human demand against what is available. It is not helpful to just document per capita demand without showing that per capita supply is shrinking as well in most countries because population numbers are increasing faster than the biological productivity of their ecosystems.

¹³ Earth Overshoot Day reached 4.5 billion media impressions in 2019 through 6'500 documented media stories in 120 countries up from over 3 billion media impressions the year before. In 2020, despite the media's COVID focus, Earth Overshoot Day reached about 4 billion media impressions as well through over 4'000 documented media stories. Preliminary assessments for 2021 point to about 5'000 media stories.

¹⁴ "The fact that has shocked me the most is yet another: The Overshoot Day [...]. From July 30 we started to consume more resources than the planet can regenerate in a year. It's very serious. It's a global emergency." Pope Francis in [La Stampa](#).

from around the world, including solutions in the population domain. The [solution space](#) is also one of the landing pages for our popular [Footprint calculator](#) points to. The calculator is visited by over 3 million new people per year (and growing).

To explore this dilemma, we have invited a selection of predominately young people to present their respective perspectives on the population discussion. We asked them: “Is it helpful to discuss population?”. You can see their diverse responses here: <https://www.overshootday.org/solutions/population/>

Our trajectory is not merely fate

Making the case for embracing population topics and seriously and compassionately discussing the positive impact of investments in turning the population trends, has been difficult. Even though it has some of the highest, cost-effective long-term benefits, not just for the environment, but for health and educational outcomes, it is also tightly linked to equal rights for all people independent of sex, gender, sexual orientation, age, etc., which we at Global Footprint Network would advocate for even if it had no environmental benefits.

One angle to emphasize is **the economic argument** – the link between shrinking populations and competitiveness. There is a strong misconception that growing populations are an economic advantage. However, shrinking industrial populations have a better dependency ratio¹⁵– meaning they can be economically more cost-effective. In fact, using a simple spreadsheet-based population model, it is easy to show that dependency ratios are more favorable in shrinking than in growing societies. Download the spreadsheet [here](#).

There are also many other benefits that GDP can hide. For example, ever higher housing costs because of crowding are not a real increase in wellbeing, even though they boost GDP (as the apparent “value” of housing and the imputed rent amounts increase). In fact, in a truly sustainable society average housing costs should not go up, just as houses should not be able to appreciate in value just by sitting there. Appreciation only represents the ability of an older generation, who owned the real estate first, to “tax” the larger younger generation who increasingly has to compete for the housing stock.

It is time to infuse some empowering facts into the public debate. We hope that our Ecological Footprint analysis, including our [simple population module](#), based on UN population statistics, can provide such facts to decision-makers. For instance, that there is a humane choice whether there will be 4 or 11 billion people sharing our planet in 2100.¹⁶

¹⁵ The dependency ratio is that of the non-productive population (children and elderly) to the productive population. As longevity increases, there may be an increasing need to also increase retirement age, something reasonable given that older people are also healthier than in the past.

¹⁶ The mean age of first mothers is about 30 years in Portugal, and lifetime fertility (TFR total fertility rate) has been as low as 1.23. Even if the mean age of mothers only increased 5 years, and fertility dropped to 1.4 children per woman, a rate similar to that in Portugal, Japan, Italy, Spain, or certain provinces in India (Kerala or Goa), we’d be under 5 billion people by 2100 (babies born today have a good chance to be alive then). The current UN median projection is 11.6 billion. So, this makes a big difference to the possibility of those living in 2100. The calculation spreadsheet to play with scenarios can be downloaded [here](#).

Appendix: additional materials

Calculation sheet for world population

Download a simple EXCEL Worksheet that allows you to run population projections based on assumptions <https://www.overshootday.org/content/uploads/2021/08/population-cohort-model-2021.xlsx> of changed fertility rates, mortality and average age of mothers.

It is based on UN statistics from the past. It uses world average mortality rates, computed directly from the population statistics.

For feedback or interest in supporting a more sophisticated version, please contact info@footprintnetwork.org and include POPULATION CALCULATOR in the subject line.

Possible questions for class discussions

1. What is holding back the conversation on the impact of population size on global overshoot? Should we even have a conversation, or is it counterproductive?
2. If you were the head of the World Bank how would you approach the problem?
3. What are the main upsides and downsides of addressing population trends?
4. Is it fair to address population? Many say it is just about consumption. Or distribution.
5. Is there an economic advantage for a country to grow its population or could a shrinking one have a competitive edge, particularly in times of global overshoot?
6. Which examples inspire you most?
7. Should this be a topic for a youth parliament?
8. Would it be okay to push back retirement as we continue to live longer, or is it better to continue growing the population in order to pay for retirement?
9. How does the topic of population link to your own life?
10. How can we make the topic of population inviting?

11. Is it true that it is more about women rights than economic development that turns population trends?
12. Is it reasonable to call population shrinkage cultural suicide?
13. How do you talk about population issues with friends?
14. Global Footprint Network and the Center for Biological Diversity produced Footprint condoms to [break the ice](#) in [conversations](#). Is that offensive?
15. Which solutions do you think are most viable? Which ones least?
16. Is it morally acceptable to [promote higher birth rates](#) (as in the case of 66% of European countries) in a time of massive ecological overshoot?
17. “Population control” is the wrong approach. After all, it is not about controlling people but rather empowering them. Which words should we use? What is a good example you have seen?
18. What irks you when organizations talk about population? What irks you if they don't?
19. What is the role of schools, health care, religious institutions, and NGOs to drive the population topic?
20. How do you deal with the horrendous perspectives on population that have and still do circulate, from racism to sexism and colonialism?
21. Is talking about population anti-human?
22. What solutions might work in your country? Check the case of [Iran](#), a particularly interesting one.
23. Is birth control a human rights?
24. Is abortion a necessary topic within the population discussion? Or, is it a distraction?
25. What do you think about UN world population projections? Are they too limited and self-fulfilling, given that Japanese/German/Italian fertility rates would lead to a 4 billion-strong population by 2100 rather than nearly 11 billion as the UN median projection claims?

Reflection on Lancet study of July 2020

With the prominence of the recent population projection paper published in *The Lancet* we would like to contextualize the paper as it may have given rise to the idea that past population projections were incorrect, or that a slow-down in population growth is of bigger concern than a growing population.

This is the paper:

Prof Stein Emil Vollset, DrPH, Emily Goren, PhD, Chun-Wei Yuan, PhD, Jackie Cao, MS, Amanda E Smith, MPA, Thomas Hsiao, BS, et al. (2020) **Fertility, mortality, migration, and population scenarios for 195 countries and territories from 2017 to 2100: a forecasting analysis for the Global Burden of Disease Study**. *The Lancet*. Published: July 14, 2020 DOI: [https://doi.org/10.1016/S0140-6736\(20\)30677-2](https://doi.org/10.1016/S0140-6736(20)30677-2)

Its main finding is that, according to its projections, global population would peak in 2064 and decline to by 8.8 billion people by 2100.

The environmental dimensions are treated quite superficially, with little recognition that a larger population will require significantly more resources than a smaller population, and that future populations will have to make do with no fossil fuel.

Robin Maynard, Executive Director of Population Matters, points at many weak spots in his assessment:

"No one should be whooping with joy or pressing the panic button as a result of these projections - no population forecast can be relied on entirely. However, these do show that it is possible to avoid the worst-case scenario of a global population growing into the next century, and they offer hope of our numbers being more in line with what our planet can sustain - if we also address the unsustainable consumption of the richest parts of the world.

"None of that can possibly come about unless we robustly pursue the policies that empower people to choose smaller families, such as family planning and women's empowerment, especially as investment in and delivery of those are currently under huge strain because of the impacts of COVID-19. The authors rightly note the further, appalling danger that governments may even restrict women's empowerment and reproductive freedom to address exaggerated concerns about lower or ageing populations. We're already seeing that in Iran, and it's a subtext in the rhetoric of nationalist, populist politicians from Hungary to Tanzania.

"Ageing populations and the economic risks and opportunities they signify must be planned for and can be planned for, without abusing people's rights, catastrophising and alarmism. We have the ingenuity and resources to face demographic challenges. True catastrophe lies in a population too big for our planet to sustain, with climate change uncontrolled, biodiversity decimated, too little food and water for everyone's needs, and billions more trapped in poverty."

To Global Footprint Network, it is particularly surprising how much more concerned the authors seem to be about the threat of having to restructure pension systems in high-income countries, rather than to recognize the plight of billions of people in countries with rapidly expanding populations being faced with utterly brutal levels of resource insecurity.