

## **Answers to questions often asked about the book**

### **2052 – A Global Forecast for the Next Forty Years**

Jorgen Randers<sup>1</sup>

#### **1. You were part of the original *Limits to Growth* study in 1972 and each follow up of that study. Why did you decide to do a new forecast and write this book?**

I spent the forty years between then and now trying to save the world from global unsustainability, with limited success, and I had become very curious about what will actually happen over the next forty years. So I decided to try to find out, and *2052* contains the result.

*Limits to Growth* and its follow-up studies were scenario analyses describing a number of different futures, discussing their relative merit, and recommending policy that would make the future less unsustainable. *2052* is a significant deviation from that: it simply states what I believe will happen, on a broad scale, between now and 2052. The forecast is driven by a computer model, but also tempered by my best guess at how human decision-making will play out over the coming years.

In reality, I have been worrying about the future for decades, and I wrote this book for peace of mind. The future I found is not the future I would hope for, but knowing what lies ahead does give me peace of mind.

I also think people need a glimpse of the probable future for two reasons. The first, of course, would be to change it. Humanity may be likely to play its hand in a stupid manner, but it doesn't have to. The second reason is to prepare people for how to live in the world that likely awaits us. So, in the final chapter of *2052* you will find advice that should make your life—or your children's or grandchildren's lives—in the future world more comfortable.

#### **2. Do you feel optimistic or pessimistic about the future? What do you see as the greatest threat to humanity? What do you see as hopeful for humanity?**

I am afraid that humanity will decide to create a future for itself that is much less attractive than what could have been achieved if we decided to run the world according to rational policy. But pessimism is not the best description of my feelings. The best description is sadness: I am sad because global society is likely to make a

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number of wrong judgements and decisions in the decades ahead. And as a result it will willfully create an unattractive future world. Our greatest threat is self-reinforcing climate change, and the greatest downside in our future is brought on by increased warming up to 2052 that will lead to runaway climate change in the second half of the century.

But it really does not matter how I feel--optimistic or pessimistic, happy or sad. What matters is that the conclusion to be drawn from the 2052 forecast is simple and straightforward. We need to continue to work for a better future, If the future looks gloomy, dedicated effort by forward-looking people will help make it less gloomy. It is much better to act, than to let the future roll in unimpeded.”

**3. In the book, many scientists and economists and sustainability leaders do something they don't often do: make predictions about the future based not on what could happen, or what should happen, but what they think will happen. This is a brave step. What led you and them to take it?**

Experts are often loathe to make specific predictions about a point in time, but I asked many to join me in taking the leap to envision life in 2052 so that we could get the most skilled look possible at the future. The 40 contributors that provided their own personal glimpses into our coming world in 2052 are leading thinkers on global economy, resources, and other key factors. I think that kind of response shows that the people who know the most are truly worried about what lies ahead. Many of us in the sustainability arena tend to shy away from saying what we really think will happen. It's a risk. Will giving an honest assessment of our likely future squelch hope, and thus action? We tend to focus on what's possible, not what is probable. But sometimes a wake-up call is necessary.

**4. Is there any evidence that any countries are taking measures to cut greenhouse gases? If so, which ones and will it help to curb global warming?**

Yes some countries – especially within the European Union – have actually cut their emissions in accordance with the Kyoto Protocol, which calls for an 8 percent reduction in emissions, from 1990 standards, between 2008 and 2012. As a totality, the EU is likely to satisfy its obligations under Kyoto. But most countries have done little or nothing. For example, the United States increased its emissions by 16 percent from 1990 to 2010. The total result is that global greenhouse gas emissions grew faster in the 2000s than in the 1990s – in spite of all the talk about climate action.

It is clear that national cuts do reduce global emissions to below what they would otherwise have been. But it is a sad fact that the action of a few responsible countries is not enough to counteract the increase in the emissions from all the other nations. So even after an 8 % cut in the EU, global greenhouse gas emissions in 2010 were 45 % higher than in 1990.

**5. Can technological advances, including the development of clean energy sources, help to curb the greenhouse gases and our reliance on fossil fuels? If so, how aggressive must those measures be put in place to have a positive effect?**

“In principle it is simple to solve the climate problem. To stop the temperature from rising, we need to halve man-made greenhouse gas emissions by 2050. This cut can be achieved easily with known technologies and at a surprisingly low cost. Solving the climate problem would cost only a couple of percent of the GDP – meaning that the average world citizen would be as rich in June 2020 if we decided to solve the problem, as he or she would be in January 2020 if we decided not to.

The problem is that global society appears to be unable to make the decision to act. Why? Because acting would mean moving from the current, well-tested, and cheap solutions (like coal-based power and cars running on gasoline) to more expensive solutions (like wind and solar power, or coal and gas with carbon capture and storage). Neither the voter, the politician, nor the capital markets are much in favour of moving from a cheap to a more costly solution. Therefore it does not happen, at least not quickly.

But this is what needs to happen. We need to agree to introduce solutions that are more expensive (at least temporarily more expensive, until the new technology evolves and becomes cheaper over time). We need to increase energy efficiency in all human activities. We need to replace fossil fuels with renewables. And we need to stop cutting the world’s forests, both tropical and boreal, thereby avoiding release of their huge stores of CO<sub>2</sub>.

**6. How will climate change most affect our ability to feed ourselves and our food systems? What parts of the world will see their food systems most affected by global climate change?**

“The increased level of CO<sub>2</sub> in the atmosphere accelerates plant growth; photosynthesis speeds up when there is more CO<sub>2</sub> around. So if this were the only effect of man-made CO<sub>2</sub> emissions, the effect on food growth would be positive. But the CO<sub>2</sub> also leads to higher temperatures, and heat reduces plant growth, at least in most places. (In my own home region, in northern Europe, cold is the limiting factor for plant and tree growth, so both will grow faster when the climate warms).

The total effect on global agricultural yields will be limited over the next 30 years, but then yields will start to decline because the heat effect will overwhelm the CO<sub>2</sub> effect. But there will be huge regional variation, and exactly how agriculture will be affected in a specific locality is not yet known by science. There is speculation that corn in the United States and wheat in India may suffer most. But farmers will change to other crops in response – and when there is nothing else around, consumers will have to adjust their tastes to the new stuff.

In sum I believe that the world will be *able* to supply the food that is demanded in 2052. The problem will be then, as now, that many people will starve because they cannot afford to pay for the food they need.

The dominant factor on the world food scene will be poverty, not constraints on land, water, and fertilizer. In 2052 billions will still be poor, and many of them unable to afford enough food – even though this food could have been grown on available land.”

**7. In the book you are critical of the dominant Western political model of democracy and capitalism as limited. Why, and what economic models do you think will best meet the challenges of the future?**

I believe that the main problem today, is the fact that humanity is excessively short term in its outlook. Our current action is dominated by its effect over the next ten years – at most. We do not heed the long-term effect of our current action, and this is the basic reason that we will continue to emit greenhouse gases to such an extent that we risk triggering self-reinforcing climate change in the second half of this century.

The short-term genetic disposition of humans is reflected in our institutions – and especially in democratic decision-making (which rarely looks at consequences beyond the coming electoral period) and the capital markets (which have an even shorter time horizon). The point I am making is that it is unlikely that these two institutions will come up with a solution to the long-term problem of climate change.

Short-termism in the financial markets and in democratic parliaments – both resulting from the short-term nature of the normal citizen – makes it unlikely that the market will put in place the necessary solutions in time, and that the governments will pass the necessary regulation that could have forced the markets to do so, that is, to allocate more money into climate-friendly solutions, at the cost of reduced consumption.

What we need is a system of governance that puts more emphasis on the interest of our children and grandchildren – that is, on future generations. We need stronger government that can force us all to be more long-term in our current action. I believe the current centralist Chinese government has many of the desirable characteristics in this context: it is seeking to allocate capital in ways that bolster the long-term future of China, even when this means lower growth in disposable income.

It is interesting to note that it is not only communist societies that have chosen to make decisions independent of the popular will. For example, most democratic governments have decided to delegate the authority to decide on the size of the national money supply. This decision is normally delegated to a central bank run by technocrats, outside democratic control in the short term. I support the idea of a Global Central Bank for Control of Climate Emissions, with supernational power to determine national emission strategies based on advice from the UN Intergovernmental Panel on Climate Change, and ideally funded through a global tax on climate emissions.

**8. Are there generational differences in terms of how the young and old view the future, and is there a risk that one generation will be pitted against the other during a time of contraction? Can that be avoided?**

I do believe there are generational differences between the outlooks of young and old people. The young have always tended to look forward while the older tend to look to the past. What is new, I think—and now I am talking about the rich world, the OECD countries—is that today's young are in a less attractive situation than the young in the post World War II period.

Today's young are faced with the unattractive task of having to pay dearly for their parents' pensions and their parents' national debt, while at the same time facing high unemployment and expensive housing. It won't seem like a fair deal, and I expect the youth to rebel. In some cases this will be resolved peacefully simply by reducing pension benefits or increasing the pension age. Or, by splitting the cost of down-payment of national debt across all citizens in an equitable manner. In other constructive cases, society will ensure that the unemployed youth actually is given opportunities. But in sad cases democratic decision-making won't be up to the challenge. The older majority will not take sufficient care of the young minority, and violent reshuffling of the cards will result. Which in clear language means that some pensions will not be paid and some debt will not be repaid. Or in other words, there will be an intergenerational conflict that the young will win.

**9. How do you see the future in China? Will the transition to an economic dominance by China be a peaceful one?**

I think the next forty years in China will be a very positive experience for the Chinese. By 2052, China will be the economic superpower of the world – the hegemon. The average per capita income will grow tremendously, most poverty will disappear, and China will be far along on its path toward national self-sufficiency in energy and food and other essential resources. Self-sufficiency has always been the goal of the Middle Kingdom, and it will be achieved again. The main reason is that China's 2000-year-old tradition of a strong central government will survive. This will enable the Chinese to engage in decision-making that focuses on the long term, not the short term. China will be able to use its economic muscle to develop solutions to the societal problems they are facing. They will not need to wait until investments in new solutions become profitable. I agree there is a chance that corruption and huge income differentials may break the spell; but I don't think it will, because the current leadership is so very much aware of this threat to Chinese progress.

Luckily I think the transition to economic dominance by China will be peaceful, because the prime interest of China is to establish a sustainable and happy society on Chinese territory. This will be made simpler by the fact that the Chinese population will be declining already in 2020. China will pay for the resources they need to import with their abundance of competitive manufactured products, like the United States paid for decades for oil from the Middle East. China won't need to occupy foreign lands in order to ensure progress. It will simply buy what it needs.

## **10. How do you think the United States will fare?**

I think the United States is in for a long period of stagnation. Forty years down the line, the purchasing power of the average American will be more or less the same as it is today. This stagnation will make it simpler for other nations to catch up with the United States. For example, I believe that the per capita consumption in China in 2052 will be at least two thirds of that of US citizens. For all practical purposes they will be “equally rich.”

The reason for this is first that the United States is the most mature economy of the world, and will have increasing difficulties in sustaining growth in its productivity. It is more difficult to increase productivity in services and care, than in manufacturing. But this is still what the United States must do. Secondly, the decision-making capacity of the American society is sadly lacking. The nation has developed an antagonistic culture which makes it near impossible to pass even the most obvious legislation. Its deep distrust of a strong state will make the United State dysfunctional in an era where a strong government is what is needed. And thirdly, high levels of the internal inequity will make it even harder to achieve the peaceful restructuring (for example the shift from consumption to investment which is necessary to reduce the huge US national debt).

So all in all, the US will move sideways over the next 40 years. And this will not be due to resource constraints or inclement weather. It will be due to inadequate societal decision making.

## **11. How do you think the European Union will fare?**

Europe will see many of the same developments as the United States, but much softened by a stronger tradition of strong government, helped by better social safety nets. Europe will be facing the same problems of maturing economies, accentuated by scarcity of some resources, but Europe’s ability to handle its challenges is stronger than that of the United States, I believe. This does not mean that the decision-making of the European Union is perfect and smooth, but it is still faster than the American variant. And Europe has a better (although far from perfect) ability to handle distributional inequity—as well as an economic structure that limits its external debt. As a result I believe that per capita consumption levels in Europe will grow some towards 2052, although not much. But Europe will lead the United States in shifting toward a climate-friendly economy.

## **12. In 2052 you describe a group of countries as the BRISE group (Brazil, Russia, India, South Africa and ten other big emerging economies). How do you think they will fare?**

These countries contain some 2.5 billion people and there will be great variation within the group, but I think that on average this group will progress at historical rates, so that its GDP will treble over the next 40 years, about the same as it did over the last forty years. This will feel like “progress as usual” and will not be take-off China style (except in a few of the centrally controlled countries in BRISE), nor will it

make its citizens particularly rich by 2052. The advantage to the rest of the world is that this “normal” growth rate will help limit the growth in the human ecological footprint, and help postpone the climate crisis.”

**13. You describe in the book how we are currently ‘overshooting’ the earth’s resources. How far will we overshoot before we begin to contract, and what will be the impact?**

Humanity has already overshoot a number of limits, and in some cases we will see *local* collapse before 2052. One example is the likely loss of coral reefs, another is the likely loss of the tuna. But the most worrisome overshoot is that caused by our ongoing overshoot in climate gas emissions-- one approaching global collapse. We are emitting twice as much greenhouse gases every year as is being absorbed by the world’s forests and oceans. This overshoot will worsen and not peak until 2030 in my forecast. Only then will humanity begin to reduce its annual global emissions – because only then will the ongoing human effort to reduce energy use per unit of GDP and the carbon emissions per unit of energy be so successful that global emissions will go down in spite of continued growth in GDP.

The effect of this overshoot will be a significant increase of CO<sub>2</sub> in the atmosphere, with consequent warming. And sadly, enough warming by 2080 that it is likely that we will trigger self-reinforcing climate change. For example as the tundra melts it will emit huge amounts of methane, which will further warm the atmosphere and melt even more tundra. This process will not stop until all tundra has melted and the world has become “unpleasantly” warm.

Some will be surprised that I do not think humanity will overshoot conventional resource limits – for example oil, food, water - by 2052. The main reason is that I believe the human economy will grow much more slowly than most people think. Hence we will have better time to evolve substitutes for scarce resources. The lower-than-expected GDP means lower use of resources.

**14. What can individuals do to both prepare for the future and help to avoid the most extreme impacts of these forecasts? Can you list five things that people could, or should, do?**

Most of us have heard that population will grow to 9 billion by mid century. What does your forecast show?

I forecast the world population to peak at 8.1 billion in 2042. After that it will decline rapidly and be back to current levels by around 2075.

Much of the decline will be due to increasing urbanization. As more of the developing world industrializes, more and more of us will live in cities that will be increasingly densely populated. People living in cities, both in rich and poor countries, will choose to have fewer babies. The trend has already been clear for decades, and will accelerate as it becomes less and less attractive to have children—either because it makes life difficult for parents with formal jobs or because it simply increases family cost

without increasing family income when you live in an urban area. The downwards trend in fertility will more than compensate for the gradual increase in life expectancy which will be caused by better health care.

My forecast is similar to the lowest UN population scenario. For many it will be a surprise that several countries are already near or past their population peaks.

**15. Your book paints a very different picture of megacities of the future. Can you tell us a bit more about them, and how much of the future population will inhabit them?**

Already 50 percent of us (3.5 billion) live in cities. By 2050 70 percent (5 billion) of us will. So, almost all the population growth from now to 2050 will end up in cities. Many cities will be very big – twenty million people and more. Some will be well managed, many will not. People’s daily life will be strongly influenced by the ever-present internet and fantastic virtual entertainment. There will be sinking political interest in the rural parts of the country and in undisturbed nature. The well-managed cities will provide improved protection against climate change for its citizens, compared to the raw exposure to calamities by people in countryside.

**16. What can individuals do to both prepare for the future and help to avoid the most extreme impacts of these forecasts? Can you list five things that people could, or should, do?**

*2052* contains 20 pieces of advice on what you personally might want to do in order to live better in the future world, where a society will make a number of silly choices. Where should you live? What should you do for a living? What you should teach your children? Where you should invest? It tackles these and other questions.

The book also reiterates the common calls for rational global action to reduce the risk of climate calamities and to reduce global poverty. At the very highest level this means:

- Reducing the number of children (particularly in the rich world, where each child has a big footprint).
- Reducing the ecological footprint (particularly the greenhouse gas emissions per person-year – and first in the rich countries which have the highest per-capita emissions)
- Building a low-carbon energy system in the developing world. The rich world should organise and pay for the construction of large-scale hydro, wind, solar, and biomass plants for production of electricity and heat in the countries where there are the highest needs.