

Faced with today's food and energy crisis, how can society improve its well-being?

Summary: There are two major concerns about the global food and energy crisis. One is to secure enough food for the world's booming population in the future while the other is to distribute food and energy resources more evenly throughout the world. The former issue requires the greater investment in scientific research through public and private funding and greater participations from scientists. The latter issue involves a drastic change in the mindsets of people in all levels of society. I believe that through working globally as one and harnessing the potentials of science and technology, we can improve society's long-term well-being.

It seems ironic to me that the people, who are concern about global food and energy crisis, are mostly those living in the affluent parts of the world where they can hardly feel, as strongly as those living in poverty, the urgency and intensity of the crises. This imbalance in the perception of the crisis and the power to make a change can dangerously mask the true nature of the crisis. The crisis is like a cyclone; the calmness before it hits will give us a false sense of security and if we do not act in time, the effect will be catastrophic. Imagine the inevitable mass urbanization of millions of Chinese and Indians in the coming decades all competing for the limited food and energy resources. It is simply impossible to satisfy the insatiable demands of the world's population, given the current trend in population growth and the current methods of food and energy production. But there is yet another deeper crisis: the global distribution of food and energy. An insightful study at the inequality of today's world reveals that the source of the crisis lies fundamentally in humanity. Therefore, I believe that the key in improving society's well-being lies in a shift in society's mindset and the use of science and technology.

History has shown that we are not the first generation to grapple with a food crisis. The English economist Thomas Malthus in the late 18th century critically highlighted that the exponential population growth will eventually outpace the linear growth in food supply, thus resulting in what is known as the "Malthusian Catastrophe". However, history has unfolded in many ways that were in contradiction to Malthus' predictions. He failed to consider the creative capacity of human beings to vastly increase agricultural outputs. This is manifested in the intense agricultural research during the Green Revolution, which led to the deployment of high-yielding crop varieties, modern agricultural facilities and the development of infrastructures. This resulted in a rapid growth in food production that even exceeded population growth. But from the 1980s to 2000, many developed countries became complacent and reduced the funding into agricultural research and this led to the decline in the world's agricultural growth and stockpile¹. In this overcrowded planet, the only way to have enough food for everyone is to keep increasing the food yield per hectare of land. If there was any lesson we can learn from the Green Revolution, it is that scientific research plays a key role in solving our food crisis.

The global economy is heavily dependent on fossil fuels. As the unimpeded population growth continues to accelerate our energy consumption, the fossil fuel energy reserves are depleting at a rate much faster than it can be replenished. Oil is projected to dry up in 2057² while coal, one of the dirtiest energy sources, is likely to deplete in 163 years³. With the current environmental problems, it is clear that the only solution out of this energy crisis is to shift our reliance on fossil fuels. The answer lies in researching and developing efficient means of harnessing and storing renewable sources of energy. Our obsession with fossil fuels has obscured the true

abundance of renewable energy sources. The amount of solar energy reaching Earth's surface in an hour is enough to meet the world's current annual energy needs⁴. A recent MIT report calculated the world's total extractable geothermal energy resources to be over 2,000 ZJ which is sufficient to last us for several millenia⁵. But in order to fully utilize the potential of alternative energy, our infrastructures and systems have to be redesigned to fit the supply of such energies. For example, the realization of a hydrogen economy will require the building of supporting infrastructures such as hydrogen pipelines and refilling stations. Besides that, alleviating the energy crisis also involves designing innovative, sustainable and energy-efficient technologies, industrial processes and infrastructures.

In my opinion, to continue securing enough food and energy in the future, the society has to invest more on education to produce the human capital to engage in relevant research activities and promote multi-disciplinary collaborations to holistically tackle these complex issues. Simultaneously, more public and private funding should be directed towards those relevant research areas such as renewable sources of energy and higher-yielding grain varieties.

Unfortunately, the stark inequality in today's distribution of resources reflects a crisis that science and technology can never solve. The crisis requires a drastic change in the mindset of people across the spectrum of the society. Governments should move beyond the narrow-minded view of a dog-eat-dog world and understand that today's globalized world is too crowded that any crisis often spills beyond national borders. They should recognize the importance of global cooperation in solving today's crisis and align their national interests with global interests. Policy-makers should acknowledge that market forces alone are inadequate to encourage any substantial change. The current incentive-driven and free-market economy shifts the focus of scientific research and impedes the deployment of existing technologies to the poor yet needy countries. For instance, many African farmers cannot afford the high costs of high-yielding seeds or fertilizers. Therefore, governments should intervene to steer the market on the right direction. For example, legal measures can be enforced to allow market segmentation, where companies provide technologies or products at a nonprofit price for the poorest countries while earning patent-protected profits elsewhere. Similarly, multi-national companies should embrace a culture of corporate responsibility and harmonize profit-making with considerations to societal well-being. At the ground level, citizens should move beyond racial, cultural, national or religious differences and develop the compassion to see each other as the inhabitants of the same planet who share a common destiny to the future. Citizens should pay attention to global issues, understand the stakes and act responsibly. We should ensure our governments abide by their commitments by voicing out any shirking of responsibilities.

Such a collective change in mindset, with investments in scientific research and development will be crucial to improve society's well-being.

References

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