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# *Systemic Problems — Systemic Solutions*

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When we look at the state of the world today, what is most evident is that none of our global problems — energy shortages, environmental degradation, the climate crisis, economic inequality, violence and war — can be understood in isolation. They are systemic problems, which means that they are all interconnected and interdependent.

Let us take the climate crisis as an example. As we all know, climate change is caused by excessive emissions of greenhouse gases — CO2 emissions in the burning of fossil fuels and emissions of methane in the management of livestock. And since fossil fuels power virtually all industrial and economic processes, climate change now interlinks all these processes — from energy policy to agriculture, transportation, manufacturing, and so on. In other words, climate change is a systemic problem.

The excessive heat trapped by the greenhouse effect has resulted in the global warming of the Earth's atmosphere beyond safe levels. Warmer air means that there is excessive energy and moisture in the atmosphere, which can lead to a wide variety of consequences — floods, tornados, and hurricanes; but also droughts, heat waves, and wildfires. Indeed, during recent years we have seen an intensification of all these climate catastrophes.

Droughts, hurricanes, and floods result not only in billions of dollars of damage, but also in millions of climate refugees, which often trigger political unrests, violence, and war. For example, the catastrophic civil war in Syria originated in a historic drought in 2006, which resulted in 1.5 million farmers migrating to the cities where they exacerbated already existing political tensions[1]. So, we see that both the causes and the effects of climate change are all interconnected.

The fundamental dilemma underlying our global problems seems to be the illusion that unlimited growth is possible on a finite planet. The belief in perpetual economic growth amounts to a clash between linear thinking and the nonlinear patterns in our biosphere — the ecological networks and cycles that constitute the web of life. This highly nonlinear global network contains countless feedback loops through which the planet balances and regulates itself. Our current economic system, by contrast, is fueled by materialism and greed that do not seem to recognize any limits.

1 Kelly et al. 2015.

In this economic system, perpetual growth is pursued relentlessly by promoting excessive consumption and a throw-away economy that is energy and resource intensive, generating waste and pollution, depleting the Earth's natural resources, and increasing economic inequality. These problems are exacerbated by global climate change, caused by our energy-intensive and fossil-fuel-based technologies. Again, we see how all these problems — economic inequality, pollution, resource depletion, and so on, are systemically interconnected.

It seems, then, that our key challenge is to shift from an economic system based on the notion of unlimited growth to one that is both ecologically sustainable and socially just. "No growth" is not the answer. Growth is a central characteristic of all life. But growth in nature is not linear and unlimited. While certain parts of organisms, or ecosystems, grow, others decline, releasing and recycling their components which become resources for new growth.

This kind of balanced, multi-faceted growth is well known to biologists and ecologists. I call it "qualitative growth" to contrast it with the concept of quantitative growth, measured in terms of the undifferentiated index of the GDP, used by today's economists. In fact, most of what is called "growth" today is waste, which means that we have an economy of largely waste and destruction. Qualitative growth, by contrast, is growth that enhances the quality of life through generation and regeneration. In living organisms, ecosystems and societies, qualitative growth includes an increase of complexity, sophistication, and maturity[2].

The qualities of a complex system are properties of the system that none of its parts exhibit. Quantities, like mass or energy, tell us about the properties of the parts, and their sum total is equal to the corresponding property of the whole, e.g. the total mass or energy. Qualities, by contrast, like stress or health, cannot be expressed as the sum of properties of the parts. They arise from processes and patterns of relationships among the parts. Hence, we cannot understand the nature of complex systems such as organisms, ecosystems, or economies if we try to describe them in purely quantitative terms. Quantities can be measured; qualities need to be mapped.

Therefore, what we need to assess the health of an economy, are qualitative indicators of poverty, health, equity, and so on, none of which can be reduced to money-coefficients or aggregated into a simple number. Indeed, several economic indicators of this kind have recently been proposed. They are discussed extensively on the website of the European organization "Beyond GDP" (www.beyond-gdp.eu).

So, we need to qualify growth. Instead of assessing the state of the economy in terms of the crude quantitative measure of GDP, we need to distinguish between "good" growth and "bad" growth and then increase the former at the expense of the latter. From an ecological point of view, the distinction between "good" and "bad" economic growth is obvious. Bad growth is growth of production processes and services that externalizes social and environmental costs, is based on fossil

2 Capra – Henderson 2009.

fuels, involves toxic substances, depletes our natural resources, and degrades the Earth's ecosystems.

Good growth is the opposite of all that. It is growth of more efficient production processes and services that involve renewable energies, zero emissions, continual recycling of natural resources, support of local communities, and restoration of the Earth's ecosystems.

The focus on qualitative growth is fully consistent with a new scientific conception of life that has emerged in science over the past thirty years[3]. At the forefront of contemporary science, the universe is no longer seen as a machine composed of elementary building blocks. We have discovered that the material world, ultimately, is a network of inseparable patterns of relationships; that the planet as a whole is a living, self-regulating system. The view of the human body as a machine and of the mind as a separate entity is being replaced by one that sees not only the brain, but also the immune system, the bodily tissues, and even each cell as a living, cognitive system. Evolution is no longer seen as a competitive struggle for existence, but rather as a cooperative dance in which creativity and the constant emergence of novelty are the driving forces. And with the new emphasis on complexity, networks, and patterns of organization, a new science of qualities is slowly emerging.

The realization that the major problems of our time are systemic problems, all interconnected and interdependent, means that they require corresponding systemic solutions — solutions that do not solve any problem in isolation but deal with it within the context of other related problems.

Here is an example of a systemic solution *par excellence* from the field of agriculture. If we changed from our chemical, large-scale industrial agriculture to organic, community-oriented, sustainable farming, this would contribute significantly to solving a whole array of big problems. It would greatly reduce our energy dependence, because we are now using, at least in the United States, one fifth of our fossil fuels to grow, process, and transport food. The healthy, organically grown food would hugely improve public health, because many chronic diseases — heart disease, stroke, diabetes, and so on — are linked to our diet. And finally, organic farming would also contribute significantly to alleviating the climate crisis because an organic soil is rich in carbon, which means that it draws down CO2 from the atmosphere and locks it up in organic matter.

This is only one example of a systemic solution. Over the last few decades, the research institutes and centers of learning of the global civil society have developed and proposed hundreds of such solutions all over the world[4]. They include proposals to reshape economic globalization and restructure corporations; new forms of ownership that are not extractive but generative; a wide variety of systemic solutions to the interlinked problems of energy, food, poverty, and climate change; and finally, the large number of systemic design solutions known collectively as ecodesign, which embody the basic principles of ecology. These systemic solutions pro-

3 Capra – Luisi 2014.
4 Capra – Luisi 2014, cap. 18.

vide compelling evidence that the transition to a sustainable future is no longer a technical nor a conceptual problem. It is a problem of political will and leadership.

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