4. PhD Progress Report – February 2020

Official PhD topic: The place of ecology in undergraduate economics education; the case in three European countries (La place de l'écologie dans l'enseignement de premier cycle en Science Economique: le cas de trois pays européens) - Ecole Doctorale, Università di Corsica

In my own words:
(a) Why does the mainstream theory of economics ignore ecology?
(b) What is the place of ecology in the undergraduate level education in economics, in three European countries?

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Overview: What happened since August 2019?

1. Presentation with a discussion session at the University of Akdeniz in Antalya-Turkey on the 14. November, 2019: Rethinking Economics (→ presentation slides); more presentations and discussions at different universities in Turkey are planned
2. I attended another seminary about *Rethinking Economics* in Bern organized by WWF Switzerland, on the 25. September 2019. There was an interesting workshop about the *power of words* in economic teaching (→ my comments twitter@tuncalik, → www.aufzuneuenufern.org/)
3. Critical (unorthodox) economics literature edited by Edward Fullbrook: Economics and the Ecosystem (book with articles), A Guide to What's Wrong with Economics (book with articles), Real World Economics (book with articles). Most of these articles are published also in the website of *Real-World Economics Review* (→ www.paecon.net/)
4. Books and interviews (on YouTube) of two critical economists: Michael Hudson (book: J is for Junk Economics) and Steve Keen (book: Debunking Economics)
5. Literature in history of neoliberalism: Masters of the Universe by Daniel S. Jones, A Brief History of Neoliberalism by David Harvey (esp. how neoliberal think-tanks and foundations influenced the economics education)
6. Literature in history about the foundations and evolution of agrarian state (mechanistic and reductionist simplifications related with ecological ignorance), and the Western ideology of progress: Seeing Like a State by James C. Scott, Against the Grain by Richard Manning, The Omnivore's Dilemma by Michael Pollan, The True and Only Heaven by Cristopher Lasch
7. Research for the economics education in Switzerland, Germany and UK (not yet complete)
8. I wrote new sections including influence of neoliberal think-tanks, secular religion of economism (a utopian growth and progress ideology which is very resistant to change), seeing forests like a state (i.e. forests as timber factories), the reductionist NPK-mentality in agriculture, Western idea of progress

It was a period of extensive reading for me since August 2019. The information that I've collected for the part (a) of my PhD "why economics ignores ecology" has reached a level of saturation. I think, I have now almost all the information (and my own notes) that I need to write the first part (a) of my PhD. The detailed chronological history of my research can be found in my twitter account (→ @tuncalik).

Since August 2019 (→ 3rd progress report), I've collected considerable amount of new information about the undergraduate education of economics in Germany and UK. These are all research reports and surveys about the education system in these countries. I am expecting a new report for Germany until March 2020.

I've tried to get more information about the economics education in Swiss universities (because I live in Switzerland), but this endeavour has proved to be quite cumbersome; economy departments of the Swiss universities (Zurich, Bern, St. Gallen) behave more like private business schools with commercial secrets rather than public institutions that are supposed to be open, helpful and transparent. So far, my impression is (unless further information proves the contrary), they want to stick to their mainstream (neoclassical/neoliberal) teaching (status quo, business as usual) as long as possible, with some insignificant but showy reforms for the sake of formality to numb the public pressure for radical change. It should be remembered that the global neoliberal community was founded in Switzerland (Mont Pelerin Society) with the financial support of Swiss business people.

In summary, I am almost complete with the first part (a) of my PhD. What remains to be done is maybe researching the ideas of Piero Sraffa (→ see my note below). I plan to collect some more information about the part (b) of my PhD, like the analysis of mission statements, lectures and lecture books in some selected universities. I plan to submit the first draft of my PhD work in the summer of 2020.

This fouth progress report is a collection of facts, opinions, arguments and citations rather than a fluent and coherent narrative, and deliberately so: I will use these ideas as raw material to write my final PhD thesis in a more fluent and coherent style, with fewer direct quotations.

Note: Steve Keen, author of "Debunking Economics", the book I include here as a reference, is one of the heterodox economists who was much influenced by Piero Sraffa. Unlike many critical economists like Veblen or late Keynes, Keen is not an opponent of mathematization in economics, but he thinks, a correct and dynamic mathematics (i.e. time-dependent; including the time dimension instead of building static models) should be used to explain certain economic phenomena. Keen claims, even the mainstream practice of simply adding up individual price-demand curves to obtain the aggregate demand in a market is provenly wrong mathematics.

Why does mainstream economics ignore ecology? Four more reasons…

In my previous (3rd) progress report, I had listed three primary reasons for the minimal place of ecology in mainstream economics.

1. **Industrial paradigm** as the mainstream ideology; humancentric, mechanistic and reductionist, imperial (exploitative) and money-oriented worldview. Modern urban and artificial lifestyle that is largely isolated from agriculture and nature (i.e. industrial lifestyle and education), and Western-style consumerism can both be regarded as a part the industrial paradigm.
2. Short-term and money-oriented **business interests**: Big corporations have the power to influence the whole education system including the education of economics, and corporations like easy profits without obstacles like environmental concerns or state regulations.
3. **Career path dependence**: Ecological literacy has no value in competitive education, academy and job market for economists. There is strong (adverse) selection for mainstream economists (who don't ask inconvenient questions) in academy, private sector and government.

In this (4th) progress report, I add four more factors to the list:

4. Influence of **neoliberal think-tanks**, foundations and global organizations on the academy and education of economics since 1950
5. The reductionist mentality of agrarian **state as tax collector** and wealth/power accumulator
6. **Ignoring imperialism**: Seeing the world from the perspective of West Europe and USA; ignoring or downplaying global effects of economic activities like global-scale ecological and social destruction for extractive earnings

7. All **ideological pillars** of mainstream economics (progress, growth, development, modernity, free market, consumerism, individualism, physics envy and premature mathematization) are in conflict with historicity, broadband view to economy and *ecological literacy*; some directly, some indirectly…

Neoliberalism (4) could actually be a sub-topic handled in short-term business and state interests (2). However, because neoliberalism (as a complete package of free market ideology) is much more than short-termism and pecuniary greed, I thought it deserves its own bullet point.

Similarly, reductionist mentality of state (5) could be a sub-topic of (1); one of the primary driving forces of the cultural evolution of the industrial paradigm. I decided to make it a high-level topic in order to emphasize the similarities between the state and corporate mentality.

Notions like "progress, economic development, economic growth, free competitive markets, individual freedom and modernity" seem to be the main pillars of the dominant ideology of mainstream (neoliberal/neoclassical) economics. I will analyse the relationship between these notions and ecological literacy.

I will also explain, why ecological literacy is closely related with the sense of history (i.e. historicity); that is, being aware of the big changes (sometimes uniform and steady, sometimes revolutionary) caused by cultural and biological co-evolutions in human history.

Does mainstream economics really ignore ecology?

Yes, definitely. You may check:

- Mainstream (neoclassical) textbooks for undergraduate students (like Principles of Economics by G. Mankiw)
- Lecture plans for economy students at universities, content of these lectures
- Mission statements of economy departments (main goals and priorities)
- Job market: Primary requirements on economists (and selection criteria)
- General school education and media that shape public opinion (industrial paradigm)
- The scope and content of mainstream economic journals

As an illustration, following words don't exists in Principle of Economics by G. Mankiw (7th Edition, 850+ pages), one of the most popular undergraduate textbooks:

Ecology, ecosystem, biodiversity, symbiosis, anthropology, coevolution, adaptation, Georgescu, entropy, thermodynamics, Daly, complexity (in the sense of unpredictable, nonlinear complex systems), emergent, Schumacher, Rachel Carson, DDT, (soil) fertility, humus, Veblen, Marx, primary producer

Why should economics include ecology?

Aristotle defined economics as follows: Household (**oikos**) or government management to provide for all the (material) needs of a household or government unit, like food, water, housing, cloth, furniture, tools for daily life and production. Interestingly, Aristotle made a distinction between economics and "money making".

Modern definition: Economics is a social science concerned with the production, distribution, and consumption of goods and services. It studies how individuals, organizations, governments, and nations make choices on allocating resources to satisfy their wants and needs.

What is the ultimate purpose of economic policies? A possible and sensible answer would be **sustainable wellbeing** for all (i.e. wellbeing for all including future generations).

Many mainstream economists might perpetuate the fallacy that economics is a positive (i.e. not normative) and analytical science; leave the purpose and ideology to politics. In my work, I claim like many other critical economists, that the highest goals of economics must be openly discussed and stated. Otherwise, they will be hijacked by narrow business interests with misleading proxies like economic growth (Raworth K, 2017).

If sustainable wellbeing is the ultimate purpose, what is the purpose of economic education?

Acquiring all the necessary knowledge and skills to develop successful economic policies that aim sustainable wellbeing for the society.

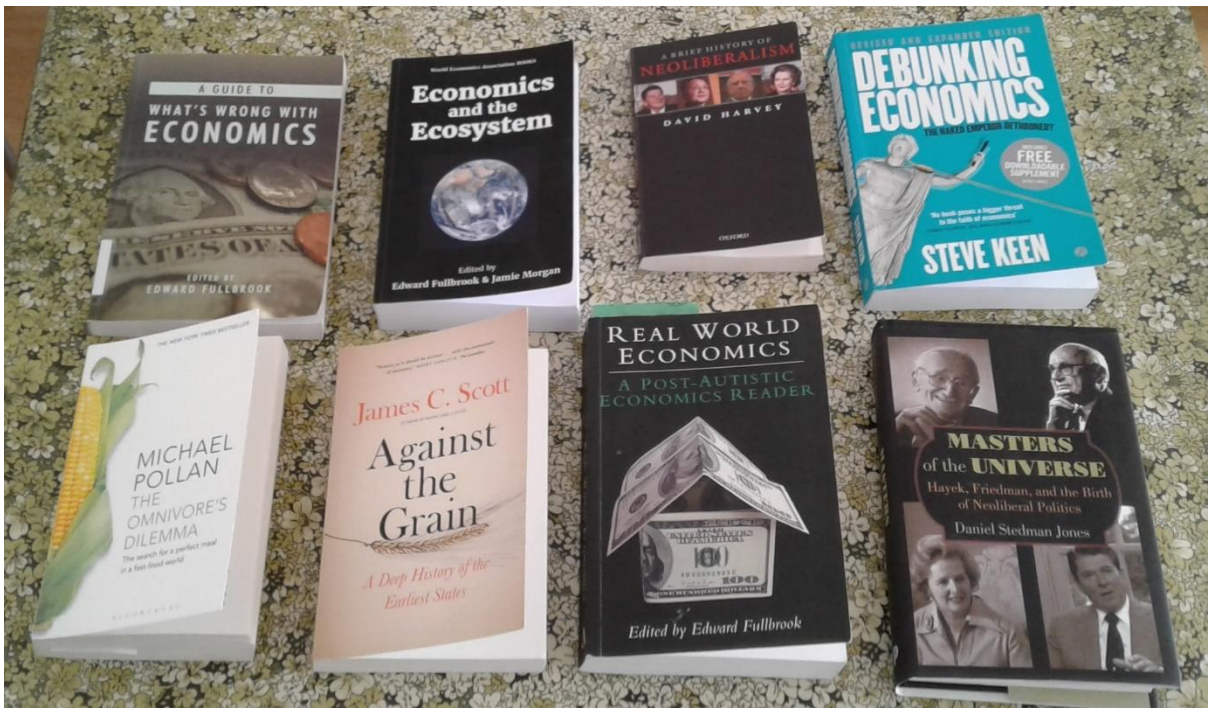
Typical **inquiries** for *sustainable wellbeing* are:

- What are the most basic needs of people? Which basic needs depend on culture or environment, which needs are universal?
- How do people live considering different cultures and environmental conditions? What kind of different cultures and lifestyles are there? How did these cultures and lifestyles evolve?
- What makes a lifestyle (or production) sustainable or unsustainable?
- What makes people happy, or unhappy? What kind of policies are required for the happiness of the majority?
- What kind of technologies serve to the wellbeing of the majority? What kind of technologies serve only to the interests of a minority?

Looking at these inquires, I come to the conclusion, that evolutionary (cultural & biological) **anthropology** should be at the centre of economic education. Other relevant fields are biology, ecology, physics, chemistry, geography, history of economic thought, sociology, psychology, history of civilizations etc. As Veblen said, economics should be an evolutionary science based on a broad knowledge of history.

Influence of neoliberal think-tanks on the academy and education of economics

In my previous progress report, I had mentioned the foundation of **Mont Pelerin Society** in Switzerland in 1947, and the potential influence of neoliberal think-tanks on the academy and education of economics. Cognitive scientist Joe Brewer raises following central question: "If economics tried to be scientific, why didn't it update its theories with biology and ecology?" (Brewer J 2019, → video: 2019 Conference Day 2 Village 3, at 17:00)



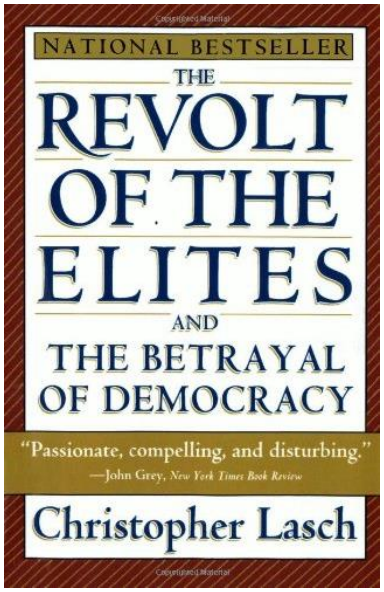
After reading several books and articles about the history of neoliberalism, I've come to the conclusion that neoliberal think-tanks and foundations like William Volker Foundation (WVF), American Enterprise Institute (AEI), Foundation for Economic Education (FEE), Institute of Economic Affairs (IEA), Center for Policy Studies (CPS), Adam Smith Institutes (ASI), Heritage Foundation and Cato Institute (all spinoffs of the Mont Pelerin Society founded in 1947) had a profound influence on the mainstream academy, politics, media and education.

These neoliberal think-tanks, institutes and foundations, backed by powerful business interests and a handful of wealthy individuals, had such an influence on the academy and education (especially on the most prestigious universities in US and UK) that many heterodox thinkers like Michael Hudson, Naomi Klein, Edward Fullbrook, Joseph Stiglitz and David Harvey came to equate mainstream economics to **neoliberal economics** after 1990.

Perter Söderbaum is one of the many unorthodox economists, who think, there is not much difference between neoclassical and neoliberal economics: "The neoclassical paradigm is specific not only in scientific terms but also in ideological terms. The ideology of neoclassical theory and method is close to *market fundamentalism*. In terms of ideological orientation, the neoclassical theory and conceptual framework has contributed to legitimize neoliberalism." (Söderbaum P, 2019, → Toward sustainable development: from neoclassical monopoly to democracy-oriented economics)

Eloquent and concise, *The Brief History of Neoliberalism* (2005) by D. Harvey is a highly recommended book to understand the history of neoliberal thought and its global application. *The Revolt of the Elites (1995)* by the historian Christopher Lasch is another brilliant book that explains

the social and ideological foundations of neoliberal (and post-modernist) order, first in USA, then in the world:



How did the majority of US voters give their consent to neoliberal policies (by electing Reagan as president) against their own economic and democratic interests? Why couldn't the left wing assess the tension between individual freedom and social justice properly, and timely react to pending neoliberal (anti-collectivist, anti-welfare-state) policies with viable alternatives? Why were the elites of the left-wing disconnected from the majority? How was **neo-conservatism** of the Reagan or Bush era, that easily colluded with neoliberalism, different from the older real conservatism that also tried to protect nature and lifestyle along with traditional values?

Because neoliberalism came to power by collaborating with the new kind of conservatism (e.g. neoconservatives in USA) the neoliberal world order cannot be thought independently of neoconservatism (Lasch, 1995). Neoconservatism added reckless Anglo-American (Western white man) imperialism and militarism to the already exploitative flavour of neoliberalism, as we have witnessed in the occupation of Iraq. Accordingly, neoliberal economics was further evolved to ignore or downplay the role of imperialism (and military force) in economic analysis.

Most popular introductory textbooks (like Mankiw's Principle of Economics) gives the impression to unsuspecting students that we live in an ideal and benevolent world (not necessarily benevolent by intention, but benevolent by the invisible hand of the competitive market), in which all institutes, states and firms (deliberately or not) work for the good of all societies.

If neoclassical economics limited the scope of the classical political economy through formalization and mathematization (especially by Marshall, Menger, Walras and Jevons) toward the end of 19th century (based on a series of unrealistic assumptions like utility-maximizing rational consumer and competitive market equilibrium), **neoliberal influence** carried this process of sterilization several steps further toward the end of the 20. century, to the degree of expunging subject matters like "history of economy" and "history of economic thought" from the curriculum of economics (i.e. further sterilization, ossification and isolation of mainstream economics from competing ideas and body of knowledge like history, ecology and anthropology).

Even compared to the foundations of neoclassical economics, **neoliberal economics** seems to have increased the degree of ideological blindness to ecological and social realities of life, and especially to many drawbacks of corporate monopolies or oligopolies in the context of market failures.

"Both theories (public choice and rational choice theory) are built on the assumptions of neoclassical economics; especially the concept of individual as a rational utility-maximizer. Too often in the accounts of its critics, such as Naomi Klein, David Harvey or Andrew Glyn, neoliberalism has been assumed to be little more than a reflection of the dominance of neoclassical economics." (Jones Stedman D, 2012, page 88)

Basic features of neoliberal economics (i.e. mainstream economics after 1990) are:

1. Limiting the scope of economic analysis to business realm only; that is, market, state, firms and consumers alone, ignoring or downplaying the complex social and ecological realities of life
2. Reducing all economic transactions to momentary exchange in the market; ignoring the past and future (i.e. lack of long-term view into the past or future), ignoring the historical and evolutionary aspects of life
3. Free market fundamentalism with the delusional idea of quasi-static equilibrium in its centre (i.e. reducing dynamic events in real life to mere statistical analysis), as if free markets with fair competition could solve every social and ecological problem in life
4. Blind belief in technological progress (technological fundamentalism) as if technological progress can solve every kind of social and ecological problems
5. The delusional idea of linear continuous progress in human history; from hunter-gatherers (most primitive) to agrarian states, from agrarian states to industrial digital societies (most advanced and civilized)
6. Strong emphasis on individual freedom, which is conceptually reduced to *individual choice* in the context of market, and which is in practice equated to freedom of profit-oriented extractive corporations (that are somehow denoted as private individuals despite their size and structure) against all kinds of democratic and collective regulations (in the name of free markets, free trade, free private enterprise, the sanctity of private property etc.)
7. Not bothering much about the problem of oligarchies (i.e. market failures caused by monopolies or oligarchies) as long as these oligarchies are controlled by wealthy investors and investment funds (finance, rentier class).
8. Growth fetishism; misusing the concept of economic growth (i.e. increase in GDP) as a measure of development and well-being
9. Sticking to the limitless world paradigm (i.e. ideology of continuous growth and progress) despite all evidence (including climate change)
10. Though strongly against central economic planning and regulation directly by state, not necessarily against (indirect) central planning and regulation by global organizations like World Bank, World Trade Organisation or IMF that usually serve to the interests of big investors multinational corporations.

All these points above are attributes of the **neoliberal worldview** that began to dominate mainstream economics since 1980 (Hudson M, Keen S, Harvey D, Klein N, Jones Stedman D).

"… business schools that arose in prestigious universities such as Stanford and Harvard, generously funded by corporations and foundations, became centres of neoliberal orthodoxy from the very moment they opened." (Harvey D, 2003, page 54)

In fact, most mainstream (neoclassical) economists takes rational utility-maximizing individuals and general equilibrium theory (demand, supply, price in a market) for granted. These fundamentally flawed theories are used for the **scientific justification** of the neoliberal ideology (free market fundamentalism); "leave it to the free (unregulated) market which distributes wealth optimally for the common good if left to its own devices."

Ecological economist William E. Rees writes: "Neoliberal models incorporate a stinted caricature of human behaviour (i.e. Homo economicus, the rational utility-maximizing consumer), virtually ignore socio-cultural dynamics and make no significant reference to the biophysical systems with which the economy interacts." (Rees WE, 2019, → End game: the economy as eco-catastrophe and what needs to change)

After 1980, neoliberal-minded economists begin to dominate **international organizations** that shaped the economic system of the world:

"The principles of neoliberalism were adopted by economists and policymakers of the International Money Fund (IMF), the World Bank (WB), the World Trade Organisation (WTO), the EU, and as part of the North American Free Trade Agreement (NAFTA)." (Jones Stedman D, 2012, page 8)

Ecological economist Herman Daly writes, IMF, WB and WTO serve to the interests of "global economy", which in practice means, to the interests of transnational corporations (Daly H, 2019).

For many critical-minded economists like Peter Söderbaum, international organisations like EU, IMF, WB and WTO played an important role in spreading and protecting the neoliberal ideology:

Söderbaum: "In [even allegedly democratic] nations such as Sweden and globally, an economic growth [growthism] and market ideology is dominant to such an extent that one can refer to this specific market ideology as a **kind of dictatorship**. Behind this are, as I see it, university departments of economics (with neoclassical theory in a monopoly position) but also international organizations such as the European Union (EU) with its specific organizational infrastructure, the World Trade Organization (WTO), the World Bank and the International Monetary Fund (IMF). Transnational corporations with their lobbyists also play a role in defending this market ideology." (Söderbaum P, 2019)

The **neoliberal world order** of free extraction and free exploitation (by corporations and their investors) in the name of free market, free trade and free private enterprise is explained in detail in books like Auf Kosten Anderer (at the cost of others in English) and Imperiale Lebensweise (imperial lifestyle in English, → The Limits to Capitalist Nature by U. Brand and M. Wissen). Note that these sociologists equate industrial urban lifestyle (coloured by consumerism) to imperial lifestyle, because they think, such a high-consumption lifestyle can't be sustained without some kind of economic imperialism.

An important trickery was legally and rhetorically equating a multinational corporation (which can be a giant, strictly hierarchically organised bureaucratic organization with thousands of employees, central planning, business associations and politically influential lobbies) to a **private individual**. In that way, freedom of corporations could be defended in the name of individual freedom, whereas individual freedom in turn was reduced to *consumer choice* in the limited context of the market (Foster JB, Clark B, York R, 2010).

Chief promoters of the neoliberal ideology (neoliberal economists and business interests) saw **economy departments** of elite universities and business schools like Princeton, Harvard, Chicago, MIT and London School of Economics (LSE) as strategic intellectual centres for the further perfection and propagation of their teaching:

"Charting the spread of ideas is always difficult, but by 1990 or so most economics departments in the major research universities as well as the business schools were dominated by neoliberal modes of thought." (Harvey D, 2003, page 54)

How did these think-tanks influence academy and education of economics? So far, I've identified five **primary means** that are deployed (deliberately or not) to influence the academy and education.

1. Adverse selection of students; noticing the narrow, reductionist, unrealistically abstract and dogmatic way of teaching, most perceptive students tend to leave the profession (Reardon J, Keen S, Hudson M)
2. Adverse (biased) selection in academy (universities and business schools) which is dominated by the neoclassical and neoliberal thought
3. Prestigious academic journals whose selection processes are dominated by the mainstream school of thought
4. Endowment of disproportionate and undeserved scientific respectability to neoliberal economists like M. Friedman, F. Hayek, R. Coase and G. Stigler through Nobel Prize of Swedish Central Bank (→ The fake Nobel Prize that helped neoliberalism conquer the world)
5. Determining the priority and direction of research by funding only favourable research projects

Economist Michael Hudson, the author of *J is for Junk Economics,* says: "As Veblen had also pointed out, in The Higher Education in America, business interests want to promote an economic doctrine that celebrates them and rationalizes their behaviour as being good for the economy (hence, growing pie and trickle-down theories), not criticizes them." (→ History of Neoliberal Economics, at 3:30 in video, → transcript of the interview).

Here, M. Hudson, like Veblen, implies that mainstream economics has become a **business ideology** through cultural evolution; a process that cherished favourable ideas, and rejected inconvenient insights, critiques and even entire fields of knowledge like history, ecology and anthropology.

Free market fundamentalism (or deception) of neoliberalism has already started with the advent of neoclassical economics, with the idea of efficiently allocating (Pareto optimal) competitive markets based on a series of crude and unrealistic assumptions like "rational utility-maximizing consumer (Homo economicus) with independent and fixed preference order".

Söderbaum: "The present kind of capitalism is largely made legitimate through the domination of neoclassical economics as economics paradigm and neoliberalism as [political] ideology. It should be made clear that neoclassical economics and neoliberalism are not totally separate but rather overlap" (Söderbaum P, 2019).

According to M. Hudson, mainstream economics has become "junk economics" with lots of deceptive language and double talk (after the style of Orwell's 1984). Hudson says, free market meant for **classical economists** like Smith and Mill, a market which is free from rent; free from the landlord, free from the monopolist, free from the bank, free from undeserved (parasitic) earnings… After 1890, the rentier class fought back and distorted the meaning of free market (which was politically associated with individual freedom) to make it "free from government regulations, free from tax; free (unregulated) earnings for every kind of private property owner (including patents), landlords, monopolists and banks." (→ video: Michael Hudson explains Junk economics, at 15:00)

Business interests were quite successful in their campaigns; following cliché is one of the best-established doctrines of the mainstream economics and politics: "What's good for the business is also good for the society", as if the interests of corporations and societies were perfectly aligned, without any conflicts of interests at all (→ Lauderdale Paradox).

According to this doctrine, fostering a "good business climate" (i.e. strong private property rights, free market and trade without annoying public scrutiny or state regulations) is one of the foremost duties of a state (Harvey D, 2003).

Hudson explains the relationship between **financial interests** (i.e. big investors), influential government posts and mainstream economists as follows:

Hudson: "In a similar way (→ deception tactics of big tobacco companies, Merchants of Doubt by Oreskes & Conway, Whitewash by Gillam), economists have been mobilized to serve, wittingly or unwittingly, as public relations lobbies for global financial interests. Chicago graduates and their clones (i.e. neoliberal economists), trained in strategy at Goldman Sachs or similar financial breeding grounds, monopolize the staffs of finance ministries, treasury departments, central banks and the leading global financial institutions." (Hudson M, 2017, J is for Junk Economics)

Economist Neva Goodwin thinks, the dominant economic theory is used to justify the global economic system that produce sub-optimal results for the majority, though benefitting the short-term gains of the rich and powerful (Goodwin N, 2019).

Goodwin argues furthermore, that the free market ideology was misused to eliminate all kinds of controls and **regulations** that limit the hands of big corporations: "From this (free market ideology) emerged the truly suspect idea that market actors (especially large, powerful or rich economic actors) should be free to do whatever they choose; any meddling from non-market forces (such as governments) would divert the economy away from the best possible outcome." (Goodwin N, 2019).

A **contempt and distrust for state regulations** is one of the most distinctive features of neoliberal economics, especially if these regulations are unfavourable for business interests.

Economist Richard B. Norgaard draws attention to the often-overlooked fact that corporations can be giant bureaucratic and hierarchical organisations that are run by "command and control", just like states. And many corporations do *central planning*, sometimes even global planning, together with their international allies like World Bank (WB), IMF and World Trade Organisation (WTO). For example, plans of global corporations like Monsanto have been imposed on several 3rd world countries by WB and WTO in the context of industrial agriculture (→ Who Really Feeds the World, Vandana Siva).

Norgaard: "People, with the help of the economics profession, have come to worship markets and condemn the supposed inefficiency of governmental *command and control*. Yet we ignore the phenomenal rise of the large **corporations** that employ us and provide us with our daily goods and services. Corporations large, many larger than nation-states, as well as small are organized and supposedly run efficiently by command and control." (Norgaard RB, 2019)

Vandana Shiva describes the evolution of neoliberal state as follows: "Governments mutate from welfare states to *corporate states* as they deregulate corporations and over-regulate citizens. This is then defined as 'free market democracy." (Shiva V, 2013, page 21)

Michael Pollan, author of brilliant books like *The Botany of Desire* and *Omnivore's Dilemma*, makes in one of his speeches a very interesting remark (in the context if food regulations for public health) that shows how deeply the neoliberal beliefs are ingrained in the values of the society (→ video: How Cooking Can Change Your Life, at 15:48): "We recoil at **social engineering** by the government, but for some reason, we accept it by the industry [through mass media, education and advertisements]."

In the absence of rigorous regulations, all an extractive venture needs, is manufacturing public consent (unless it is reckless enough to use coercive force). In order to obtain the public consent, and numb all defensive reactions, the extractive venture must somehow be able to appear as *benevolent contributor* to the society.

I had mentioned the notion of "extraction (**parasitic earnings**) in the disguise of value creation" in my previous progress report (Mazzucato 2018). Inspired by the parasitism in biology, Hudson builds a revealing analogy between biologic and economic parasites:

"In biology, parasites avoid detection by masquerading as part of the host's body, using enzymes to take control of the host's brain to block it from taking counter-measures to defend itself. Similarly, rentiers and monopolists masquerade as contributors to the production process, as if their revenue is earned (i.e. deserved). Their intellectual enzyme is *junk economics* (i.e. neoclassical economics) demobilizing governments and academic studies." (Hudson M, 2017)

In this analogy, parasitic investor or property owner is a parasite in the cloak of a benevolent contributor or cooperator. In the language of biology: Parasite masquerading as symbiont

False cleanerfish (Aspidontus tractus) which mimics the real cleanerfish to deceive its hosts is a typical example of biologic parasite (→ False Cleanerfish – Facts and Photographs). Its deception tactic is very similar to the tactic of a parasitic investor: Benevolent appearance

In similar vein, Vandana Shiva says ironically "they (investors) always do us a favour while they steal our resources." (→ Rethinking development in the 21st century, begins at 33:00 in video)

Just like parasites in disguise, investors with their extractive undertakings (like dirty industry/mining/energy projects or industrial agriculture) need refined and well tested deception tactics to deceive the gullible majority. The deception tactic they generally employ is, using the elusive and misleading concepts of mainstream economics like "economic growth & development, technological progress, job creation, modernisation" that divert all the attention from the social and environmental destruction (invisible externalities) to the imagery of progress and short-term monetary income (Shiva V, Klein N, Foster BJ, AufKostenAnderer.org).

So, how does neoliberal ideology clash with ecological literacy? In other words, how does neoliberalism profit from **ecological illiteracy**, and how does it protect and foster this particular kind of *useful ignorance*?

If we consider (1) free competitive markets (2) individualism (3) technological fundamentalism (4) belief in continuous progress (5) consumerism (6) contempt for all kinds of collective actions against business interests (7) contempt for state regulations against business interests (8) growthism; belief in limitless growth, extraction and expansion (9) mechanistic and reductionist worldview and premature mathematization (10) lack of historical consciousness (11) limited scope of economic inquiry which is limited to business realm only, as **main pillars of neoliberal economics**, we can claim that ecological literacy is in conflict with all these ideological pillars, where the conflict is most obvious and direct with following pillars:

(3) technological fundamentalism (5) consumerism (8) growthism (9) mechanistic and reductionist worldview (11) limited scope of economic inquiry

If we take **growthism** as an example, teaching ecology (including planetary boundaries) and "limitless growth" at the same time in a school is like teaching evolution theory and intelligent design (religious creationism in disguise) simultaneously. The fanatic adherents of creationism would

certainly do everything in their power to discredit, censure and abolish evolution theory, as they actually do in some ultra-conservative (and neoliberal) states of the USA.

The secular religion of economics (economism): Every disturbing idea or body of knowledge is conveniently rejected, ignored, shifted, distorted or belittled

Introduction of the book "A Guide to What's Wrong With Economics" provides a very good overview to the student reactions and petitions against the teaching of mainstream (neoclassical/neoliberal) economics (→Introduction: Broadband Versus Narrowband Economics, E. Fullbrook).

The movement (**pluralist economics**) has started in 2000 in Paris, with the petition of a handful of economics students pleading for a reform of their economics curriculum. They wanted to escape from imaginarily worlds, and they wanted to have a pluralist and broadband economic education instead of the current narrowband one:

"Most of us have chosen to study economics so as to acquire a deep understanding of the economic phenomena with which the citizens of today are confronted. But the teaching that is offered, that is to say for the most part neoclassical theory or approaches derived from it, does not generally answer this expectation."

"Too often the lectures leave no place for reflection. Out of all the approaches to economic questions that exist, generally only one is presented to us. This approach is supposed to explain everything by means of a purely axiomatic process, as if this were THE economic truth. We do not accept this **dogmatism**. We want a pluralism of approaches, adapted to the complexity of the objects and to the uncertainty surrounding most of the big questions in economics…"

This student movement was quickly spread to other universities and countries. In 2015, 64 student associations from more than 32 countries published an **Open Letter**:

International Student Initiative for Pluralism in Economics (published at www.isipe.net)

What the students wanted can be summarized as follows (→ Introduction of Real World Economics edited by E. Fullbrook):

1. Economics should become reality based; i.e. not based on unrealistic abstract models and misuse of mathematics (Newton or physics envy) based on flawed assumptions
2. Economics should be problem led, not method led; i.e. not trying to fit the reality to models, not providing only a partial and fragmented view of the object of inquiry
3. Economics should (like physics) be **pluralistic**, not monistic; i.e. multiple schools of thoughts, multiple viewpoints for different aspects of life (social, ecological, political…)
4. Economics should be knowledge driven, not ideology driven

Closely related with the issue of premature mathematization (→ Small is Beautiful by E.F. Schumacher), neoclassical theory is largely limited to **quantitative analysis** which is narrowly focused on easily measurable entities like money, quantity of goods and the amount of CO2 emissions. But quantitative analysis alone is not sufficient for studying sustainability (Söderbaum P, 2019).

My personal experience confirms Söderbaum's claim: When I asked an academic at the University of Bern (Switzerland) some questions about the education of economics (in the context of pluralist education) his answer was: "Sorry, I don't think anybody can help you here, we do only quantitative analysis in our department of economics." Most interestingly, this academic was an environmental economist by title (→ my email to University of Bern). He probably believes, *environmental*

economics is only about developing quantitative models based on some environmental parameters like the amount of CO2 in the atmosphere.

Economist Katharine N. Farrell: "Georgescu-Roegen argues that their [founders of neoclassical economics like Marshall, Jevons and Walras] aspiration to secure economics a place at the table of the hard sciences [envy for the respectable status of Newton physics] led them to adopt an analytical approach of **arithmetic fetishism** (my words, not his) that leaves unattended the *qualitative aspects* of purposiveness and biodynamic transformation that lie at the heart of economic process: ignoring, thereby, aspects central to defining what constitutes the material requisites of wellbeing, and to identifying viable means on the basis of which these may be attained and effectively [and sustainably] used." (Farrell KN, 2019, → Producing ecological economy)

Hence, Georgescu-Roegen implies, arithmetic fetishism is closely connected with *ecological illiteracy*; ecological literacy would lead to criticism about the fundamental assumptions of neoclassical theory, and stimulate more qualitative analysis to understand the requirements of wellbeing.

Over-use (or misuse) of mathematics and narrow focus on quantitative analysis have another important function for neoclassical economists; by dedicating the whole attention to analytical issues, they can escape from **contested concepts** like power, institution and ideology (Söderbaum P, 2019) that would require *qualitative inquiry* with potentially conflicting opinions. In that sense, escaping from such many-sided and controversial concepts means escaping from the complex realities of life, and escaping from pluralist discussions, to the noncontroversial, abstract and sanitized models of neoclassical economics.

The use of mathematics in economics is often compared to the successful use of mathematics in **physics**. Donald Gilles, a historian of science and mathematics, argues that there is a fundamental difference: The use of mathematics in physics was often successful, proven by its explanatory and predictive power, unlike the use of mathematics in neoclassical economics (Gillies D, 2012)

Gillies: "The use of mathematics in neoclassical economics since 1945 has produced no precise explanations or successful predictions. This seems to me the main difference between the use of mathematics in physics and the use of mathematics in neoclassical economics." (Gillies D, 2012)

Mathematical theories and models in physics are always tested with real-world data. Gillies argues, this crucial process of positive science is generally neglected in neoclassical economics. He gives as an example the prominent book of **Paul Samuelson** [an economist with the Nobel Prize of Swedish central bank] titled *Foundations of Economic Analysis* which is considered a classic of mathematical economics in most elite universities:

"if mathematical economists are even to begin to emulate this success [of physics], the first step must be to use mathematics to calculate from their theories results which could be compared to observational data. The extraordinary thing is that Samuelson in his classic book [Foundations of Economic Analysis] does not even take this first step. The book consists, in the 1963 edition, of 439 [356] pages, and almost all of them filled with mathematical formulas, but not even one result is derived which could be compared with observational data. Indeed, there is no mention of **observational data** in the entire book." (Gillies D, 2012)

The other fundamental difference between science and physics is about commonly accepted versus intensely contested paradigms:

Gillies: "Virtually all contemporary physicists accept relativity theory and quantum mechanics. In Kuhnian terms they share a paradigm. The situation is very different in economics. The economics community is divided into different schools. The members of each of these schools may indeed share a paradigm, but the paradigm of one school can be very different from that of another. Moreover, the members of one school are often extremely critical of the views of members of another school." (Gillies D, 2012)

Most neoclassical economists have a very low opinion of critical (heterodox) economists, and vice versa. Gilles thinks (like Weintraub) that it is very difficult for heterodox economists to obtain an academic post posts in a university. Even if they do obtain such a post, they may be treated badly by their neoclassical colleagues (i.e. mobbing, disdain, belittling…). (Gillies D, 2012)

There is yet another difference between **learning physics and economics**. In physics, students learn very early the concept of a controlled experiment, which is a heavily simplified version of the complex real life. For example, mathematical formulas (speed, acceleration, mass, gravity, time etc.) of Newtonian physics that are valid only in a frictionless space… Every student realizes based on her real-life observations that a stone and a feather don't fall to the ground within same seconds if they are released from the same height; this is only the case in a theoretical frictionless environment. In economics however, students (most of whom live in the artificially mechanistic environment of a city) often don't have the possibility to test the abstract theories of economics (like efficient competitive markets) in their daily life. So, they must simply trust the neoclassical economists, and think that whatever models the neoclassical economics have developed and published in popular university textbooks (and so much respected as a real hard science honoured with Nobel Prizes etc.) must be true.

In his article titled On the Problem of Formalism in Economics, Geoffrey M. Hodgson, a professor in management, refers to a quotation by Mark Blaug (1997, p. 3): "Modern economics is sick. Economics has increasingly become an [abstract] intellectual game played for its own sake and not for its practical consequences for understanding the economic world. Economists have converted the subject into a sort of social mathematics in which analytical rigour is everything and practical relevance is nothing."

Hodgson explains, how the problem of premature mathematization became even more serious after 1980s (i.e. global spread of neoliberal economics): "Although the victory of **formalism** can be dated to the 1950s (Blaug 1999, 2003), by the 1980s the problem had become much more serious. Because mathematics has swamped the curricula in leading universities and graduate schools, student economists are neither encouraged nor equipped to analyse real world economies and institutions." (Hodgson GM, 2004)

Peter Söderbaum (ecological economist): "It has been argued that economics is an established discipline comparable to physics and chemistry and with similar ideas of good science and scientific progress. Economists can refer to a *distinct paradigm*, that is a clear theoretical perspective. The tendency is to stick to this perspective, and today there is a **monopoly position** for neoclassical economics at almost all university departments of economics." (Söderbaum P, 2004. → The Nobel Prize in Economics; barrier for new thinking)

In his article titled The Rand Portcullis and Post-Autistic Economics (subtitle Pentagon), Fullbrook explains how strictly neoclassical/neoliberal **economics departments** of eight prestigious US universities came to dominate the research and education of economics globally (Universities of California, Harvard, Stanford, Yale, Chicago, Columbia, MIT and Princeton). Most prestigious

mainstream journals are also dominated by the graduates of these universities. For Fullbrook, it is unsurprising that these departments are seen as distinguished: “The best departments are those who publish in their own journals, which are the best since they publish the best departments.”

Gunnar Myrdal, one of the scholars who received the Bank of Sweden’s Award in Economics, repeatedly argued that values and ideologies are always a part of the research in economics and in other social sciences. This is why, sticking to one and only one (neoclassical) paradigm transforms economy department of universities into political **propaganda centres** (Söderbaum P, 2004).

Richard B. Norgaard, an ecological economist, argues that mainstream economics has become a modern secular religion that he calls Economism: “We live in the era of [neoliberal] *Economism*. Human consciousness [and social common sense] is deeply etched by **economistic beliefs** in individualism, materialism, property, markets, economic growth, and freedom as consumer choice.” (Norgaard RB, 2019, → Economism and the Econocene: a coevolutionary interpretation)

For Norgaard, modern **Economism** is shaped by neoliberal beliefs: “The economy and the problems we have today reflect our past understandings that have been dominated by *neoliberal beliefs* about markets as self-regulating, about the superiority of markets to government, and about how economic growth supposedly advances wellbeing and even brings about environmental protection too.” (Norgaard RB, 2019)

Like Norgaard, economist Alan Kirman thinks, the institution of mainstream economics has very much the herd mentality of a tribe or church (→ video: Why We Need a Multidisciplinary Economics, at 8:50)

For economists like Söderbaum, **pluralistic economic analysis** is about democracy of ideologies. He equates the domination of a single paradigm (or herd mentality) of neoclassical economics to a kind of local dictatorship (or monopoly) within the departments of economics. (Söderbaum P, 2019)

Economist-Philosopher Edward Fullbrook (→ profile) criticises the role of mainstream lectures like Economics 101 with a strong language:

Fullbrook: “Today’s economics, especially **Economics 101**, is a major source of humankind’s denial of the possibility of the calamity of all calamities which our economy is engineering. Annually millions of students around the world are forced to study textbooks that indoctrinate them in to thinking that there is no significant causal connection running from our economy to the ecosphere.” (Fullbrook E, 2019, → Economics 101: Dog barking, overgrazing and ecological collapse)

Fullbrook explains, how neoclassical ideology dominated education and research, as follows:

Fullbrook: “From the 1960s onward, neoclassical economists have increasingly managed to block the employment of non-neoclassical economists in university economics departments and to deny them opportunities to publish in professional journals. They also have **narrowed** the economics curriculum that universities offer students. At the same time, they have increasingly **formalized** their theory, making it progressively irrelevant to understanding economic reality. And now (2002) they are even banishing economic history and the history of economic thought from the curriculum, these being places where the student might be exposed to non-neoclassical ideas.” (Fullbrook E, 2004)

Since 1970 at the latest, western science has discovered that our economic system was causing fundamental and irreversible changes to the ecosphere. The question is, what has economics done about it? Many critical economists like Fullbrook think “virtually nothing!”. (Fullbrook E, 2019)

Fullbrook writes furthermore, that mainstream economics has rather taken a direction of **convenient compatibility**, that is, a direction which converges with the corporations to expand and profit. (Morgen J, Fullbrook E, 2019, → Introduction: Economics and civilization in ecological crisis)

In the terminology of economics, the ecosystem is an **externality**, a kind of secondary parenthesis issue, that doesn't generally enter as a factor into the economic analysis (McManners P, 2019, → Victim of success: civilisation is at risk).

For the founders of neoclassical economics (toward the end of 19th century), the global economy was too small to have a global impact on the environment. Even then, negative impacts like polluted air or rivers in and around London or Manchester were obvious of course, but they seemed to the founders small and local enough to ignore them in their economic analysis. "So, economists conceptually **dumped** an economy's negative effects into a broad category they called *externalities* [as a secondary issue generally considered as exceptions], and today in Economics 101 that is where they remain under the name *negative externalities*." (Fullbrook E, 2019)

Norgaard argues, the concept of externality is closely related with the privatisation of land. The idea of private property coevolved with the Cartesian (or Newtonian) notion of **atomism** in science, which claimed, nature can be separated into parts without losing anything from the functionality of the whole; just like a machine or factory. As commons were being transformed into private property en masse (through enclosure and privatization), social and environmental connections related to the commons were conveniently ignored and made *external* to the economic thinking right from the start. The science of ecology that see the complex interconnectedness of nature would not evolve for another century (Norgaard RB, 2019). In that sense, *ecological ignorance* was built into classical economic thinking.

John Maynard Keynes (1883-1946) said: "The ideas of economists… both when they are right and when they are wrong, are more powerful than is commonly understood." The power of economic ideology makes an indoctrination, that tends to ignore or underestimate the extend of negative externalities, extremely dangerous for the future of the world.

Fullbrook: "We now know thanks to natural scientists [or lay people with common sense], that the longer this **mass indoctrination** into this fantasy world continues, the more likely that the ultimate disaster will happen. It is not only with bombs and gas that crimes against humanity can be committed [example: social and environmental disasters caused by industrial agriculture with chemical fertilizers and pesticides, which was promoted as Green Revolution, progress, development, modernisation and economic growth]. Everyone connected with economics, perhaps most of all its students, need to ask themselves what they can do." (Fullbrook E, 2019)

Michael Hudson, another unorthodox economist says: "All historical, sociological and empirical aspects of real life are systematically expunged from the curriculum of economics education, in order to make the mainstream theory unquestionable." (→ video: Michael Hudson: The History of Neoliberal Economics)

When asked by the interviewer "why do mainstream (neoclassical) economists ignore the role of banks and private debt in today's economic system? Are they simply not aware of the flaws in their models?" M. Hudson answers quite boldly: "They are what's called **useful idiots**!" (→ video: Michael Hudson explains Junk economics, at 23:55).

For whom are the neoliberal economists supposed to be useful? First of all, for vested business interests. But they are probably useful to themselves too, because, given the domination of

mainstream, life appears to be much more difficult for unorthodox economists in academy or government.

Another unorthodox economist Steve Keen, the author of Debunking Economics, says: "… economics makes you believe that the ideal system is desegregated markets, and your role is to get rid of all the elements of the **real world** that are different to the text-book." (→ video: How Economics Became a Cult, at 2:30)

This is an interesting insight that reminds me the monocultural mindset of industrial agriculture: Get rid of all elements of the real world (like biodiversity) that stand in the way by making everything much more complex and unpredictable compared to the simple mechanistic and reductionist model of agriculture (→ NPK mentality that reduces soil to a non-living chemical substrate).

Zoologist and environmental activist David Suzuki, formulates the same argument of Keen in a slightly different way: “We always ask nature to fit our flawed economic systems, and it just won't work." (→ video: An elder's vision for our sustainable future, at 46:00)

William E. Rees is one of the many critical economists, who thinks, mainstream has ceased to work in **scientific mode** long ago: “While natural scientists (like physicists, chemists or biologists) experiment and subsequently adapt their models better to represent reality, economists, particularly those enamoured with the idea of a self-regulating (free) market, would have the real economy adapt to fit their models.” (→ End game: the economy as eco-catastrophe and what needs to change, Rees WE, 2019)

Philosopher-economist Tony Lawson explains this process of **inverse fitting** (i.e. fitting real life to models) as mentioned by Suzuki very eloquently as follows:

“Rather than starting with a question about an aspect of social reality and determining an appropriate method, modern economists usually start with a particular type of method and presume, mistakenly, that it must be appropriate to all social contexts. The result is that, in their conceptions, modern economists end up distorting social phenomena just to render them open to treatment by their chosen approach.” (Lawson T, 2004)

Lawson: “In any other discipline, they start with a problem and the context, they look at the nature of the problem being addressed, and they design methods to fit the task, the world, the context they’re dealing with. Economists, for the last 60 years, have started from the assumption: This is the method, give me the problem.” (→ Professor Tony Lawson on Economics & Social Ontology)

How did mainstream economists come to believe “they have all the tools required to analyse the real-world economy”? One big step for this self-deception was probably reducing the whole economy to business realm and *market exchange* (i.e. narrowband economics).

One common way of distorting social phenomena is making unrealistic and untested assumptions like the “utility-maximizing rational consumer” as a model for human behaviour. Another typical way is simply ignoring the social and ecological complexities of life by focusing solely on easily measurable entities like money and quantity.

Trying to fit reality to models, rather than fitting models to reality… One may ask, what kind of science is that?

Unorthodox economists are not the only people who think mainstream economics is a **pseudo-science**. When asked in a TV panel about the role of the “dark science of economics” in climate versus growth discussion, D. Suzuki says: “First of all, economics is not a science; it is a set of beliefs

posing as a science." (→ video: David Suzuki, Naomi Oreskes and Tim Flannery - Hope for the Planet, at 35:17)

How did the mainstream theory and education of economics come to this dismal state? E. Fullbrook explains three primary factors (among many minor factors) as follows (Fullbrook E, 2002)

1. **Mytho-matics** (in Steve Keen's words): Neoclassical economists have as a group deluded themselves into believing that all you need for an exact science is mathematics.
2. As even J. Stiglitz observed, economics has suffered a triumph of neoclassical neoliberal ideology over science.
3. Today's social, ecological and economic conditions are very different than the conditions in the 19th century, for which neoclassical economics was invented to describe. For example, increased and sharpened consumerism, corporate globalization (World Bank, IMF, WTO), environmental disasters, increasing inequality, climate change, increasing monopoly power of multinational corporations etc. are all relatively new phenomena. Because neoclassical economics has stuck with its original assumptions and worldview, it can explain only a small proportion of the modern economic reality.

How did mainstream (neoclassical/neoliberal) economics come to dominate the policy and education despite all its fallacies and deficiencies?

There seems to be five **primary mechanisms** that explain the domination of neoclassical/neoliberal ideology:

1. Financial and ideological support of vested political and business interests (including neoliberal think-tanks, destructive industries like weaponry, fossil fuels, agribusiness, agrochemicals, biotechnology etc.)
2. Domination in university departments and academic journals since 1960s
3. Effective indoctrination during the undergraduate education in most modern universities as a way of self-perpetuation
4. Urban lifestyle which is disconnected from nature and agriculture, plus industrial education which accomplishes the process of pre-indoctrination (business worldview, belief in the idea of western progress, belief in economic growth, technological fundamentalism)
5. Fake Nobel Prize and mass media (controlled by business interests) for further indoctrination and scientific respectability

Apropos Nobel: Is there really a **Nobel Prize for Economics**? No, there is only a prize of Swiss Central Bank (Sveriges Riksbank) in the cloak of Nobel Prize (→ The Economics Nobel Isn't Really A Nobel). Peter Nobel, one of the descendants of Alfred Nobel (founder of Nobel prize) said: "Nobel Economics Prize is a PR coup by economists to improve their reputation" (→ Nobel descendant slams Economics prize).

Even Friedrich Hayek, one of the Nobel laureates in economics (and one of the leasers of neoliberal movement), said: "Nobel Prize confers on an individual an authority which in economics no man ought to possess." In his paper titled Beautiful Mind, Ugly Deception, Yves Gingras explains how the illusion of Nobel Prize for Economics was created as a form of social alchemy.

Many critical economists like Jack Reardon and Bernard Guerrien write about a kind of **adverse selection** in the research and education of mainstream economics: "the recruitment and selection processes for economics teachers and researchers continue to privilege those who demonstrate (particularly in their publications) their knowledge of [abstract] mathematics, thereby perpetuating the situation or even making it worse." (Guerrien B, 2004, → A Science Too Human?)

Sociologist Kyle Siler writes, neoclassical economics is so obsessed with abstract analytical models that proficiency in mathematics, however relevant or not with real life situations, has become a matter of social prestige and professional hierarchy in many departments of economics (Siler K, 2003, → The Social and Intellectual Organization and Construction of Economics).

Silja Graupe, a German professor of economics, explains the problems of mainstream economics (and solutions to them) by analysing the question of **epistemology**:

Greta Thunberg's words ("how dare you?") were repeated at the WWF conference for Rethinking Economics (→ www.aufzuneuenufern.org) by Graupe (→ video: Keynote von Prof. Dr. Silja Graupe).

But before coming to the message of Thunberg, Graupe tells how she had heard the same phrase "how dare you" about ten years ago in a totally different, one may say in a just opposite context. One of her academic colleagues submitted a critical (unorthodox) paper about the financial crisis in 2008 to a prestigious journal of economics in USA. Within 25 minutes she received following response from the editorial office of this journal: "How dare you!"

Gaupe thinks, three main pillars of sound economic thinking, namely "**application** (policy development and implementation, practical work; how do we reach our main goals), **morality** (what are main goals of economic policies) and **science** (theory and education)", came apart in the mainstream education, lost their connections and coherence due to completely misleading foundations (i.e. fundamental assumptions) of mainstream economics. She talks about concepts like mental infrastructure, mental pathways and epistemicide.

Epistemicide is about extermination of certain (generally unfavourable, inconvenient, disturbing) knowledge systems (i.e. knowledge sources, ways for obtaining knowledge, or different fields or bodies of knowledge).

In the case of mainstream economics, epistemicide (as I understand) boils down to ignoring, underestimating or downplaying inconvenient bodies or sources of knowledge like ecology, which makes the social costs of environmental destruction (i.e. environmental externalities) too obvious for students and lay people. Ecology as a body of knowledge is inconvenient for a mainstream economist (or student) because it causes conflicts with the sanitized worldview of mainstream economics (functionally-benevolent business realm) and the idea of "efficiently allocating competitive markets".

As Neva Goodwin writes: "This (the possibility of market failures) makes mainstream economists squeamish about admitting to externalities, since the optimality of market outcomes is one of their main boasts, and they don't have an alternative theory to pull out of the hat." (Goodwin N, 2019, → Addressing meta-externalities)

Graupe claims, once the mental infrastructure is established in the young brain of a student, along with deeply engraved mental pathways for the general analysis, it is extremely difficult for the student to overcome all these ingrained constraints to take different pathways for thinking and learning.

In line with Graupe, many unorthodox economists like Steve Keen (author of Debunking Economics) talks about **indoctrination** in the education of mainstream economics:

"Finally, in honours, master's or PhD courses, they study the full exposition given below, and finally learn that the aggregation of individual demand is valid only under patently absurd conditions.

However, by this time the indoctrination into the *neoclassical mindset* is so complete that most of them cannot see the absurdity." (Keen S, 2011, page 42)

Graupe underlines, what we learn and how we learn depend on our motivation (**purpose**); what do we want to achieve with the information we have obtained? This is exactly why the moral dimension of economics is so important. Why do we learn economics at all? In order to develop and implement policies for the general wellbeing (sustenance, security, equity, happiness, meaningful life, self-realization etc.), or for economic growth (as an illusory proxy for wellbeing), or just science for the sake of science, that is, pure (sanitized) science isolated from all moral and practical aspects of life?

The training of the indoctrination (i.e. building rigid mental infrastructures) is a process that happens in most cases subconsciously for both the teacher and the student. Graupe says, we must somehow make these normally invisible **mental infrastructures** visible in order to change them if necessary. She thinks, this process of enlightenment, that is, the escape from narrow and rigid habits of thought (in V. Shiva's words "monoculture of the mind") requires fostering in education:

1. Critical common sense; the ability to question one's own convictions if they are in conflict with reality, rather than ignoring or downplaying the warnings of reality to conserve established convictions
2. Moral competence; ability to make sound moral (ethical) judgements
3. Creative and dialectic imagination; developing ideas in dialog with other people, and in dialog with theory and practice to make sound judgements about practical applications

Some economists like Söderbaum or Fullbrook use another term for indoctrination: **Cognitive inertia.** The solution for cognitive inertia is for them again pluralist discussion: "The close to monopoly position of neoclassical theory and method at university departments of economics and elsewhere needs, as a first step, to be replaced by pluralism. The cognitive inertia of neoclassical economists, emphasizing one thinking pattern at the expense of all other possibilities can be referred to as *narrative fixation* (ideological fixation)."

Coming back to GDP, John Bellamy Foster writes: "The notion (illusion) of growth dominated politics only after the second world war. There was no talk of *economic growth* before." (→ video: What every Environmentalist Needs to Know about Capitalism)

In terms of the critical dimensions mentioned above (practice, morality, theory) and the history of economic though, I think, we can roughly talk about **four periods since Adam Smith**:

1. Classical period: From Adam Smith (1723-1790) to 1870, all these dimensions were incorporated into the politics of economy, even though ecological aspects were often ignored due to lack of daily experience and knowledge in this field. As an important milestone for understanding ecology, Origins of Species (evolution by natural selection) by Charles Darwin was published in 1852.
2. Neoclassical period before GDP: 1870 to 1950, economic theory was sanitized from practical and moral aspects of the politics of economy through intensive misuse of mathematics (physics and Newton envy); a kind of esoteric science for the sake of science in the name of objective analysis. The situation became even worse after the death of Keynes (1883-1946); especially in the second half of his career, Keynes was strongly against premature mathematization in economic theory.
3. Neoclassical period after GDP: 1950-2008, erroneously used as a proxy for wealth, progress and wellbeing, GDP growth has become the ultimate purpose of economic policies.

4. Period of confusion (searching ways for a better economic education): 2008-today. Though mainstream majority (economic orthodoxy) is quite oblivious to critique and resistant to change, relatively perceptive economists and students of economics, and even many lay people (especially eco-socialists and environmentalists) became increasingly aware of the fallacies of mainstream economics, and dangers of economic policies based on economic growth (i.e. dangers of business as usual).

Having semantically equated economic growth (GDP growth) to wellbeing, most mainstream economists dedicate their whole attention directly to (sustainable) economic growth, thereby bypassing the ultimate goal of wellbeing and **confusing means with ends**, with disastrous consequences for many states and countries of the world. Many socially and ecologically destructive projects (like dirty industries, industrial agriculture, dirty energy and mining, huge water dams) are promoted, imposed (often by WB and WTO) and justified in the name of economic growth.

Economist Neva Goodwin writes: "Among many problems with current uses of GDP, they are used to support policies that *emphasize growth in throughput over increase in wellbeing*. They ignore the contributions of unpaid workers (especially women, especially but not only in household work) as well as the cost of environmental damage –unless that damage requires *compensatory activity*, in which case it is listed as an addition to GDP." (Goodwin N, 2019)

A **narrow pursuit of economic efficiency**, like the GDP, is often employed as the highest goal of economic policies. McManners writes: "It is exceedingly hard to convince mainstream economists that the ecosystem should be protected and conserved using higher order principles (i.e. higher goals) to frame the economic analysis. Environmentalists can be accused of being unworldly dreamers, when in fact it is the economists who continue working on the assumption that the ecosystem will remain intact by default, who are in cloud-cuckoo land." (McManners P, 2009, → Victim of success: civilisation is at risk)

Neoclassical economics is inclined to measure everything with money. As discussed above, the concept of GDP reduces the whole production of an economy (with monetary and non-monetary components) to monetary production only. Such kind of **monetary reductionism** is also employed in the Cost-Benefit-Analysis (CBA) (Söderbaum P, 2019).

Söderbaum: "In neoclassical **Cost-Benefit Analysis** (CBA) actual market prices and a kind of hypothetical market prices are used to transform non-monetary impacts of various kinds to the monetary dimension. Even different non-monetary dimensions are traded against each other in this way. Those indoctrinated in the neoclassical paradigm tend to see the mentioned simplification of analysis as smart and elegant." (Söderbaum P, 2019).

A more holistic and multi-dimensional approach, with monetary flows and positions as well as non-monetary flows and positions, are required, instead of attaching a monetary value to every kind of economic, social and environmental impact (Söderbaum P, 2019).

Attaching a **monetary value** to every kind of impact requires a blind faith in assertions like:

- Money can buy, substitute or repair everything, including the loss of biodiversity
- With sufficient money (investment), one can develop *advanced technologies* that can solve every kind of social and ecological problems, including depleted resources and pollution (technological fundamentalism)

- There are no irreversible losses, that is, no irreversible processes, unrepairable or irreplaceable resources in our economic system (implies a lossless and frictionless perfect circular flow as often shown in GDP flow diagrams)

Economist Katherine N. Farrell also criticises this kind of monetary *real cost estimations*:

"The persistence of such work [done by environmental and ecological economists] illustrates the momentum of **arithmetic fetishism**, in which processes that do not easily lend themselves to quantification are arithmetized for the purpose of forcing them into the existing, quantitative analytical rubric [i.e. again, fitting reality into abstract models]. It is, I would posit, largely a waste of time and resources, as the resulting data are not only meaningless but also distracting." (Farrell KN, 2019)

Farrell argues further, that we need to manage the transition from a mechanically based operating system to a biologically based one. This requires first of all strong interdisciplinarity and a posture of *humility* in front of the life-giving and self-organising capacity of the natural world "which modern **industrial science** has yet, for all its achievements, to replicate." (Farrell KN, 2019)

Without the necessary humility and respect for nature, science would continue to work in the domination mode in the name of progress and development, with the rhetoric of "our war against nature" (Vandana Shiva).

Many scientists, economists, and lay people with a healthy common sense think, we don't need growth, efficiency and expansion; we need first of all social cohesion and ecological stability for the ultimate goal of sustainable wellbeing.

McManners: "Abandoning the growth objective leaves economists struggling to know what to do. We need nothing less than **reframing economics** for the 21st century." Sustainable wellbeing, hence social and ecological goals should have priority over narrow economic goals like efficiency, or output maximization. (McManners P, 2009)

For McManners, reframing of economics should fulfil two purposes: (1) Bring economics back under the umbrella of higher-level objectives and aspirations. (2) Set up economics as the enabler of high-level policy. That is, economics should be a policy enabler, not a policy driver with misleading high-goals like GDP growth or efficiency.

McManner thinks, the conventional sequence of policy development must be reversed: "Applying the old 20th century economics involves crafting an economic and business case. Once completed, the case is subsequently subjected to social and environmental impact assessments. This sequential approach reinforces the dominance of economics and ensures that long-term overexploitation of resources and environmental damage is almost inevitable. Positioning the social and environmental analysis at the front of the process, sends the economic analysis down a different track." (McManners P, 2009)

Economic success today (in the narrow unsustainable sense) should not be obtained at the expense of future generations. Not only climate scientists but even economists like McManners warns that a potential collapse (i.e. series of serious catastrophes) is not a long-term issue anymore; it may hit humanity within two or three decades, within the lifetime of our children. We need policies that respect (1) planetary boundaries, (2) the rights of future generations, and (3) higher ethical goals like global equity and basic human rights like food and health.

Katharine N. Farrell is one of the many heterodox economists who think **strong interdisciplinarity** is required to develop policies to reach higher goals within the planetary and social boundaries:

Farrell: "In contrast to subsuming knowledge from other disciplines to serve the ends and means of conventional modern economic analysis [like economic growth], as is done, for example, in the fields of neuro-and behavioural economics [also in environmental economics], this implies situating economics [only] as a contributor [i.e. as policy enabler, not policy driver] toward the collaborative project of developing multi-dimensional, complex representations of the social-ecological relationships and processes that both underlie and are impacted by late-industrial economic activity." (Farrell KN, 2019. → Producing ecological economy)

As Kate Raworth writes in Doughnut Economics, if the **ultimate goal** of all economic policies is not openly and explicitly discussed in economics (by pretending to be an objective, mathematical hard science like physics), it will be hijacked by vested business interests, and ultimate high goals like "sustainable wellbeing for all" will be replaced by narrow business goals like economic growth. With the support of mass media and education, this process of mental distortion can reach such levels that many people may come to believe that economic growth (and protecting their consumerist life-style) is more important that the health of the planet (Oreskes N, Conway E, 2014).

Lack of historical consciousness (i.e. not being aware of the revolutions and long-term changes like biological and cultural evolution) is another deficiency of mainstream economics. Many academics and critical economists think, mainstream economists and students are not literate enough because they don't study subjects matters like history of economy, history of economic thought, history of civilizations (anthropology and cultural evolution) and history of nature (ecology and biological evolution) properly.

The consequences of this **historical illiteracy** combined with the narrow focus of mainstream economics that reduces economy to the business realm (firms, households, consumers, market, money, goods & services, state) can be summarized as follows (Foster JB, Clark B, York R, 2010, → The Ecological Rift):

1. Myopic view to economy without past and future; fosters short-term thinking like many politicians and profit-oriented corporations
2. Myopic view to economy in terms of geography, nature and society; inability to see complex socio-ecological relationships and wide-reaching consequences of economic activities
3. Blind belief in the present economic system (incl. free market, progress and growth delusions), as if it is a law of nature, as if there was no other/better system in the past, and there can be no other/better system in the future, even if the present system is not ideal.
4. No history of economic thought means, rival ideas and theories that conflict with the mainstream paradigm (i.e. neoclassical/neoliberal economics) are ignored.

"A narrow spectrum of time in which social [and ecological] conditions have seemed to be relatively stable is frequently translated into a set of permanent conditions" and consequently these conditions disappear from the economic analysis since they are rationalized as [secondary] **background conditions**. "In conventional economic analysis, fundamental social [and ecological] relations are relegated to the category of background conditions, which are assumed to remain constant over time." (Foster JB, Clark B, York R, 2010)

The dehistoricization of society and the dehistoricization of nature go hand in hand. Today, social sciences and humanities (i.e. economics, political science, sociology, anthropology, philosophy and

cultural sciences) are marked by their separation from nature (ecological Apartheid), and particularly from history of nature (evolution).

In **conventional history** for example, all significant aspects of history like kingdoms, states, wars, lifestyle, culture etc. are explained without any reference to the environmental conditions of the era, as if humans shaped all important aspects of the world around them, and became totally independent of their environmental conditions through their cultural and technological ingenuity. Or as if, the environmental conditions didn't change much during hundreds and thousands of years.

In any case, environmental conditions like climate, soil, biodiversity etc. are reduced to secondary background conditions in conventional history. The dominant (mainstream) anthropocentric ideology is, human culture dominates and shapes the nature, not vice versa. The erroneous assumption is, cultural evolution does not depend on environmental conditions (i.e. there is no co-evolution of culture and nature; human culture shapes all the significant and relevant aspects of nature).

Note that this myopic view to time, geography, society and nature is closely correlated with dogmatic convictions like growthism (i.e. belief in limitless growth), continuous linear progress (in Western history) and technological fundamentalism (i.e. technological progress can solve every social and ecological problem).

For example, if a student is not aware of the wide-reaching consequences and side-effects (i.e. externalities) of allegedly "modern and **advanced technologies**" like GM seeds, artificial chemical fertilizers and pesticides, she will tend to believe that technological progress can solve every problem in the world. A student who studies history will understand that many technologies that were initially promoted as the "ultimate silver bullet solution, symbols of progress etc." (like DDT based pesticides or chemical fertilizers) did nothing than shifting and expanding ever-growing social and ecological destruction into the future, and into other dimensions of life (K. Marx, J. B. Foster).

We know today that many **highly-profitable technologies** are extremely destructive, and they are only short-term solutions developed to fight and suppress symptoms, rather than to cure the underlying real disease as a permanent (sustainable) solution (Foster JB, Clark B, York R, 2010). The tragedy of DDT is again a good, demonstrative example (→ Silent Spring by Rachel Carson). In many cases, like sustainable ecological agriculture that regenerate soils, sustainable social and ecological solutions are not aligned with the interests of many corporations, because there is no money in non-monetary social and ecological solutions (→ defensive/repair costs due to socio-ecological destruction, Lauderdale Paradox).

It must be quite understandable that neoliberal ideology doesn't like historical consciousness, because even the most simple and fundamental assumptions like **free exchange** (a fundamental requirement of free market) can't stand much to the critical analysis of a historical mind.

For example, consider a consumer buying voluntarily a bottle of drinking water from the market. If he is just focused on the present time and conditions, everything about this purchase is free. He is buying the bottle voluntarily, and he has the choice among several brands of bottles (i.e. competitive market); a single brand does not monopolize the market of bottled drinking water.

The danger is, what if asks, why is he obliged to buy drinking water (with money) at all? How was it 20 years ago, 50 years ago, or 100 years ago? Did people always pay money for drinking water? If not, how did it happen that we all have to buy drinking water today?

By asking such dangerous questions, he will soon find out that drinking water has become a scarcity, hence very profitable business (→ ecosystem mutilation and patching business, Lauderdale Paradox, defensive/repair expenditures), due to the social and ecological destructions in the past (meta externalities); destruction of nature, pollution, crowded and dirty cities as the natural consequence of the destruction of local village economies, and so on.

Considering the history of such events, he will begin to ask if his purchase was really a free exchange, or was it in reality a **compulsory exchange**? After all, he must drink water to live; he has no choice like "not buying water" or buying a substitute for water.

He may even think further, and ask following, even more dangerous question: What is the real competitor of a company that sells bottled water? Other companies, or nature, or social organizations, that provide drinking water for free? If nature (as the primary producer) and social solidarity are the primary competitors of a company in the context of drinking water, in what other contexts do companies see socio-ecological cohesion and harmony as their primary obstacle to easy profits?

As this example illustrates, ecology + history is a very dangerous combination for the neoliberal ideology. It is not without a reason that neoliberal business interests (i.e. economic elites) and neo-conservatives conspire to call environmentalists as the new red (→ Green Is the New Red: The Metamorphosis of Communism).

When Satish Kumar, an Indian-British philosopher and founder of Schumacher College visited the London School of Economics (LSE), he asked justifiably "Why don't you have a department of **ecology**? Don't you know that both words, namely ecology and economy are derived from the same root oikos which means household?" (→ video: Education with Hands, Hearts and Heads)

Despite all critique since more than 50 years (for example, Small is Beautiful by E.F. Schumacher), mainstream economics failed to integrate ecology into its scope of analysis by sticking to its narrow business realm (human economy of industrial paradigm) and mechanistic-reductionist worldview. Not only ecology; mainstream economics also failed to integrate important discoveries of thermodynamics, complexity and chaos.

The **second law of thermodynamics** tells us that many ecologically relevant flows through the economy are unidirectional transformations of energy and matter. That is, they are not circular or reversible flows as depicted in the circular money-and-goods diagrams of mainstream economics. Many real-life economic processes like loss of biodiversity, pollution, depletion of oil reserves etc. are not reversable in the short-term by human action or technology. This insight has very important implications for making judgements about sustainability. A circular flow diagram seems to function for ever, but the reality is very different (Rees WE, 2019, → End game: the economy as eco-catastrophe and what needs to change).

"As Georgescu-Roegen tried unsuccessfully to impress on fellow economists, an expanding economic process is ultimately self-destructive; it feeds on useful energy/matter *produced by nature*, and returns it to the ecosphere as useless waste (which increases the entropy of the planet). A should-be-obvious corollary of second law is that all economic *production* is mostly consumption." (Rees WE, 2019)

Why can't students see more comprehensive flow diagrams in their standard textbooks, with entities like nature, society, (often toxic) waste matter, mineral and energy depletion, entropy?

"Because of second law inefficiencies, the bulk of the energy/matter that enters the production process is emitted almost immediately as (often toxic) land air or water pollution; only a small fraction is embodied in marketable goods and services (and even this eventually joins the waste stream). Again, without reference to this *one-way entropic throughput*, it is virtually impossible to relate the economy to the environment, yet the concept is virtually absent from economics today (Herman Daly)." (Rees WE, 2019)

Complexity theory tells us that the interplay of the relatively simple laws of physics, chemistry and biology can produce extremely complex and nonlinear, and therefore inherently unpredictable system behaviour. Even without the complexity theory, our common sense tells us that nature is very complex and full of surprises. (Rees WE, 2019)

Complexity theory can two important implications for economics:

First, we can't predict the behaviour of natural ecosystems by simply analysing the behaviour of its parts (mechanistic and reductionist approach), because complex systems like ecosystems or societies have emergent properties and emergent behaviour. For example, one can't predict the behaviour of a school of fish by just analysing the behaviour of individual fish.

By the example of an eye cortex, Prof. Robert Sapolsky explains where westernized reductionism begins to fail: Complex (and nonlinear) biological systems (→ video: 21. Chaos and Reductionism, at 19:40)

Second, persistently accumulating small influences (like toxic waste) to a complex natural system may suddenly cause dramatic changes (i.e. catastrophe) in the system, and may tip the whole balance to extreme conditions in which human life is not feasible anymore.

"**Catastrophe** occurs when a key system variable, driven by some persistent pressure, is displaced far from its usual attractor (convergence/balance point). … Most significantly, the new domain may be hostile to human interests and there is no guarantee that the system will ever return to its former state." (Rees WE, 2019)

Typically, a relatively simple **lake ecosystem** will endure much assault and waste without showing obvious symptoms of degradation; but only up to a certain level of endurance. Once some key species that are crucial for the food webs begin to die, the whole ecosystem will collapse in a relatively short time. After the collapse, one will be confronted with a much poorer, much less productive, and much more instable ecosystem. One can observe similar phenomena in an aquarium. Hence, 100-years of endurance is no guarantee for 101-years of endurance for a natural ecosystem.

If neoclassical economics has so many flaws and illusions, what shall we do with it? Throw it to the dust bin of history?

Economists like Söderbaum think that would be a mistake, because we should not be looking for an ultimate correct theory, an ultimate conceptual framework that would replace the neoclassical one, in the sense of a formal paradigm shift (Kuhn T, 1970). What we need is **pluralist, multi-dimensional and multi-disciplinary (holistic) inquiry** with different ideologies, different priorities, different viewpoints and different schools of thought, including the neoclassical one. Besides, one perspective may help to improve the understanding of another one.

In that case, one is tempted to ask questions like "in what kind of contexts would neoclassical economics be valid, relevant and useful? Is there really such a case with ideal competitive markets

and utility-maximizing rational consumers in real life?", or "will learning neoclassical economics really help understanding other approaches and schools of thought, or will it rather be an obstacle due to rigid indoctrination?"

My opinion is, learning neoclassical economics will probably not be a rigid indoctrination if the student already has a **solid background** in areas like philosophy, history of nature (evolution), ecology, sociology, anthropology (human history and cultural evolution) or history of economic thought. But if the student doesn't have the necessary background to make various cross-checks and ask critical questions about the fundamental assumptions of neoclassical economics, the danger of indoctrination may become significant.

This is probably why, many economics departments are so reluctant to add such interdisciplinary broadband lectures to their curricula; it may lead to critical thinking, and hence, questioning the dominant paradigm taught in the department. This is like teaching the modern synthesis of Darwin's evolution theory in a school where intelligent design (i.e. creationism in disguise) is the dominant paradigm.

Economist Alan Kirman: "We should be taking into account anthropology, sociology, biology... in economics" (→ video: Why We Need a Multidisciplinary Economics, at 4:00)

Economic historian Robert Skidelsky explains why learning the **history and philosophy of economy** is essential to critically question the methods, purpose and direction of economics (→ video: What Is Economics About? How & How NOT to Do Economics).

Sidelsky claims, there are two primary reasons of mainstream economists' resistance to change (i.e. cognitive fixation to even contested/flawed methods and models): (a) internal reasons; ideological fixation to mainstream paradigm in science as Thomas Kuhn explained in his book "The Structure of Scientific Revolutions", and (b) influence of political power (ruling class); how people in power would like economics to be done. Skidelsky also explains, how the discipline of economics (with neoclassical influence) traded "breath of understanding" for "sharpness" (i.e. perceived objectivity and certainty) in a narrow field, by replacing narration (qualitative analysis) by mathematics.

An important discussion in the history of economic thought was about the concepts of **use value** (wealth) and **exchange value** (market value, price).

For the classical economic thinkers like Smith, Ricardo, Mill and Marx, it was very important to understand the source of real material wealth (i.e. use value of materials). That's why, they were very careful about differentiating use value from exchange value. They were quite aware of the fact that an abundant material resource like water, soil or air, that we find in nature for free, may have great *use value* even if it had no exchange value (i.e. market value) at all.

The distinction between **use value and exchange value** was but dropped with the advent of neoclassical economics. Neoclassical economists cared only about exchange value (price in the market). That is, they equated wealth to money (consciously or not), just like they equated wellbeing to economic growth (consciously or not). This kind of monetary reductionism had the consequence that, all the things that we find in nature for free were considered as free (valueless) gift, because value (as well as wealth) meant only exchange value for neoclassical economists. (Foster JB, Clark B, York R, 2010)

Designating the resources of nature as **valueless gifts** further reduced the perceived value (and importance) of nature in the eyes of mainstream economists. In stark contrast, William Petty (1623-1687), a philosopher, scientist and economist, who could distinguish use value from exchange value

said: “labour is the father of material wealth, the earth is its mother.” (Foster, Clark, York, 2010, page 63)

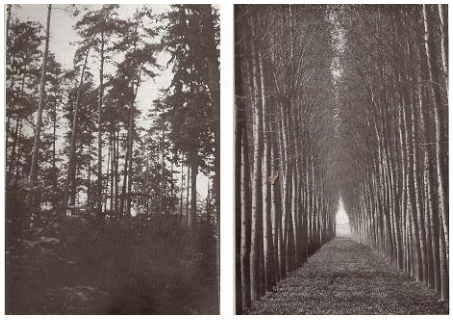
Seeing like a state: Mechanistic and reductionist worldview of the tax collector

The history and evolution of sedentary state societies in Mesopotamia, China, Egypt and Americas show us that these early states (like modern states) were not interested in uncontrollable, illegible and non-taxable production of the society or nature.

On the contrary; all these states were obsessed with centrally controllable and **taxable production** like grain-based agriculture. Grains like wheat, barley or rice could easily be controlled, monopolized, measured, stored, taxed (in kind) and distributed. Disobedient (i.e. not fully domesticated) or unlawful pheasants could easily be punished by confiscating their harvest (Scott J, Pollan M, Manning R).

Historical roots of the mechanistic and reductionist worldview should probably be sought in this state mentality. Note that there are lots of similarities between the power seeking state and corporate mentality. For example, modern corporations are generally hostile to self-sufficient sustenance economies like traditional hunter-gatherers, traditional village economies and poly-cultural farming communities that are not dependent on the products, services and technologies controlled by corporations. What can a corporation (or the elites of a state) extract from a community if it is self-sufficient and sustainable?

“**Scientific forestry** in the Saxony and Prussia of the 19th century” as explained in the book *Seeing Like A State* by James C. Scott is one of the best examples of mechanistic reductionism I’ve ever seen.



Illegible Natural vs. Legible "Scientific" Forests
(pages 16-17 of James Scott's *Seeing Like a State*)

James C. Scott explains how the mixed (poly-cultural and poly-functional) forests of Europe were reduced to mere timber factories by the state of the era (19th century):

“The early modern European state, even before the development of scientific forestry, viewed its forests primarily through the fiscal lens of revenue needs. Exaggerating only slightly, one might say that the crown’s interest in forests was resolved through its fiscal lens into a single number: the revenue yield of the timber that might be extracted” (Scott J, 1998).

Note that the correct term today for such kind of monocultural forestry should be *industrial forestry*. And the kind of science which ignores the social and ecological realities (and complexities) of life could be called *industrial science*.

“Towards the end of the eighteenth century, this only-the-timber-yield-matters thinking led to attempts in Prussia and Saxony to turn chaotic, mixed old-growth forests into predictable, same-age stands, each consisting of a single type of tree (Norway spruce)” (Douthwaite R, 1993).

“From the landowner’s (or state’s) perspective, this radical simplification of the forest to a single commodity was a resounding success. It was, however, a disaster for the peasants who were now deprived of all the grazing, food, raw materials, and medicines that the earlier forest ecology had afforded.

But the landowners' initial success was not sustainable because the complex inter-relationships among thousands of different species, that keep a forest ecosystem alive, were destroyed. As a consequence, already the second generation of spruce grew 20-30% slower than the first.

Moreover, the single-age, single-species stands proved highly vulnerable to damage by pests and to being toppled in storms. The term Waldsterben (forest death) entered the German language for the first time." (Scott J, 1998).

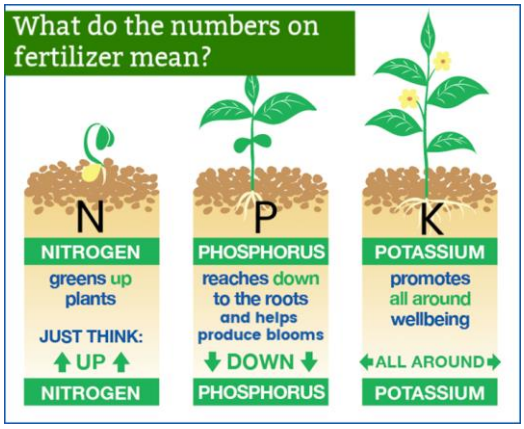
Note that **ecological illiteracy** is an important feature of this mechanistic and reductionist (industrial) worldview that reduces a complex forest ecosystem to a mere timber factory. The awareness of complex relationships between different species, and a general knowledge about living ecosystems (food webs, biochemical cycles of nature, animal and plant behaviour, evolution and co-evolution etc.) make such over-simplifications very difficult.

There is probably a two-way relationship between the industrial (mechanistic) and ecological (holistic) worldviews; industrial worldview, with its narrow focus on human-made things like buildings, cars, factories, military (monocultural) order and so on, diverts the attention from the nature (→ Kimmerer R), and therefore fosters ecological ignorance. Ecological ignorance is on the other hand a prerequisite for mechanistic simplifications. That is, ecological ignorance makes a sincere belief in abstract mechanistic (industrial) models possible, and industrial worldview fosters ecological ignorance.

NPK-Mentality in industrial agriculture: How living soil was reduced to a non-living substrate for chemical fertilizers

The NPK-mentality in **industrial agriculture** is another model example for the mechanistic reductionism in modern (industrial) science and industry, as explained in *The Omnivore's Dilemma* by Michael Pollan (→ video: Omnivore's Dilemma)

NPK-mentality is about reducing the whole soil ecosystem, with thousands of living creatures living in the soil (bacteria, fungi, worms, insects etc.), to a mere non-living, inert and indestructible substrate.



NPK-mentality is also about reducing a complex farming ecosystem to a mechanistic plant or animal factory that could be modelled as a stateless and memoryless input-output function; water + fertilizer + pesticides + labour in, plants out…

After explaining the importance of humus-rich soil (as a living ecosystem that recycles, stores, transports and transforms many organic nutrients along with minerals and water) which does much more for plants than providing those three basic nutrients, Pollan writes:

"To reduce such a vast biological complexity to NPK represented the scientific method at its **reductionist** worst. Complex qualities are reduced to simple quantities; biology gives way to chemistry. As Howard was not the first to point out, that method can only deal with one or two variables at a time. The problem is that once science has reduced a complex phenomenon to couple of variables, however important they may be, the natural tendency is to overlook everything else, to assume that what you can measure is all there is, or at least all that really matters. When we mistake what we can know for all there is to know, a healthy appreciation of one's ignorance in the face of a

mystery like soil fertility gives way to the hubris that we can treat **nature as a machine**." (Pollan M, 2006, page 147)

Sir Albert Howard (1873-1947), referred by Pollan, was a pioneer in organic agriculture. He was one of the distinguished agronomists who had sufficient perception, overview and practical field experience to realize the weaknesses of highly specialized, fragmented and reductionist modern science:

"The basis of research was obviously to be investigation directed to the whole existence of the selected crop, namely, the plant itself in relation to the soil in which it grows, to the conditions of village agriculture under which it is cultivated, and with reference to the economic use of the product. In other words, *research was to be integral, never fragmented*." (Howard A, 1947)

He explained in his ground-breaking books like *The Agricultural Testament* (1940) and *The Soil and Health* (1947) that soil health is crucial for all animals and plants that live over the soil, and health is only possible with a rich biological diversity which makes healthy ecosystems so complex and complete (i.e. self-sufficient) with many internal cycles and emergent properties.

By explaining the reductionist NPK-mentality in agriculture, Pollan also explains **technological fundamentalism** (i.e. misguided technological optimism) in the context of plant fertilizers:

Though German chemist Justus von Liebig, the discoverer of the NPK fertilizer, was probably aware of the complex metabolism of soil, most of his followers believed mistakenly that NPK fertilizer was a complete and ultimate solution for plant growth. Consequently, they thought, the entire mystery of soil fertility had been solved. Therefore, it wasn't necessary anymore to understand or nurture the complex ecosystem of the soil, because in their eyes, agriculture could be reduced to a mere **plant factory**; just feed the factory with an input of NPK fertilizer (the ultimate technological solution), and collect the output (harvest) of plant crops. (Pollan M, 2006, page 147)

Pollan: "Since treating the soil as a machine (or factory) seemed to work well enough, at least in the short term, there no longer seemed any worry about such quaint things as earthworms and humus."

Howard: "… an infertile soil, that is, one lacking sufficient microbial, fungous, and other life, will pass on some form of deficiency to the plant, and such plant, in turn, will pass on some form of deficiency to animal and man."

This case also illustrates the close causal relationship between **technological fundamentalism** and ecological ignorance; ecological ignorance (often combined with the lack of historical consciousness and short-termism) feeds technological fundamentalism, and vice versa; technological fundamentalism fosters ecological indifference and ignorance.

Most classical and neoclassical economists considered **land**, and therefore soil, as an indestructible capital with a fixed use value (i.e. indestructible, inert, rock-solid dead matter). But unorthodox economic thinkers like Karl Marx and William Petty, already in the 19th century, had a hunch that soil was much more than dead-matter whose fertility must be actively fostered and maintained for future generations (Foster, Clark, York, 2010, page 78):

Marx: "(the systematic expansion of capitalism) disturbs the metabolic interaction between man and earth, prevents the return to the soil of its constituent elements consumed by men in the form of food and clothing; hence it hinders the operation of the eternal natural condition for lasting fertility of the soil."

In his article named Economism and the Econocene: a coevolutionary interpretation economist Richard Norgaard has a paragraph about the evolution of the Western conception of soil (page 18):

"… historically we understood **soils** mostly as physical and then later as chemical systems. While we now understand soils more as biological systems, or biogeochemical systems, our understanding of the agricultural soils that exist today is more complete, and thus better, when we incorporate how we had historically transformed these biogeochemistry systems through plowing and the application of fertilizers based on our earlier, dominantly physical and chemical, understanding of soils." (Norgaard R, 2018)

Norgaard writes, "we" have today a more holistic and complete picture of soils compared to the common understanding of the 19th century. But who are we? Do the students of economics really learn that soil is complex living ecosystem, or do they still learn (consciously or subconsciously) that land is an indestructible, inert and non-living capital?

For a very basic check, I searched after words like "soil, ecosystem, ecology, ecological, humus, topsoil, land" in one of the most popular introductory textbooks: *Principles of Economics*, Gregory Mankiw, 7th Edition

Results:
soil: "In the poorest parts of the world, he argues, nutrient-starved tropical soil makes agriculture a challenge…" (What Makes a Nation Rich? Daron Acemoglu vs Jared Diamond)

soil: "There is no difference in geography between the two halves of Nogales. the weather is the same. The winds are the same, as are the soils."

soil: "You monitor weather and soil conditions, check your fields for pests and disease, and study the latest advances in farm technology."

ecosystem: none, ecology: none, ecological: none, humus: none, topsoil: none

land: many, including sentences and phrases like:

"The Other Factors of Production: Land and Capital"

"Once society has allocated people (as well as land, buildings, and machines) to various jobs, it must also allocate the goods and services…"

"Firms produce goods and services using inputs, such as labour, land, and capital (buildings and machines)"

So, concepts like ecosystems, ecology, soil as living ecosystem, or maintaining the fertility of land or soil are apparently too insignificant issues for Mr Mankiw to be included in an 880-page introductory textbook for economics. For him, economy is about markets, firms, state, land (implicitly as non-living, inert, indestructible input factor), buildings, machines and other human-made widgets and gadgets (technology); not about the ecological and social aspects of life (externalities).

I wonder, what ratio of economy students would be able to explain the nature, role and importance of humus (topsoil) for a healthy and sustainable agriculture. This is a very basic question about the primary production of a society for a most basic need: Food

In one of her speeches, following question was directed to V. Shiva: "How do we teach the next generation to overcome the (physical and mental) separation from nature?" (→ video: Making

Peace with the Earth and Ending Our Separation from It, at 45:56 in video). She summarizes the solution as follows:

1. Learning from nature, observing the richness and biodiversity of life
2. Learning from people who actually do the stuff (real farmers, practical work)
3. Learning from the community, cultivating community

Fragmented and corrupted science & education

Modern (industrial) science and education have three fundamental problems:

1. Human-centred, mechanistic and reductionist worldview (→ industrial paradigm) which is the cause and consequence of over-specialization
2. Over-specialization: Narrow and fragmented scope of scientific knowledge with rigid disciplinary boundaries; a situation that reflects the high level of specialization and labour-division on the modern industrial economy.
3. Corruption; the corrupting influence of vested business interests and political power

Over-specialization in a narrow field often comes at the expense of holistic and integrated overview (i.e. the ability to see the complete picture). Over-specialization in education and at work can also make people numb, weary and unhappy (A. Smith, E.F. Schumacher). For critical thinkers like Vandana Shiva, the problem of over-specialization is closely related with *monoculture of the mind*:

"The **monoculture of the mind** treats [every kind of] diversity as disease and creates coercive structures to remodel this biologically and culturally diverse world of ours on the concepts of one privileged class, one race and one gender of a single species." (→ Tackling Monoculture of the Mind by Vandana Shiva)

Naomi Oreskes, one of the authors of *Merchants of Doubt*, explains, how over-specialization can inhibit the understanding of complex and multi-dimensional subjects like **climate change**:

Oreskes: "Modern science has been constructed in a very balkanized, fragmented way with rigid disciplinary boundaries. You can study (a branch of) chemistry and not know how old the earth is. You can study genetics and not know much about evolution. You could be a physicist and know nothing about the interconnections of life [like most economists]. To address the problem of climate change we have to look at the interconnections." (→ video: David Suzuki, Naomi Oreskes and Tim Flannery - For Thought: Hope for the Planet, at 3:45)

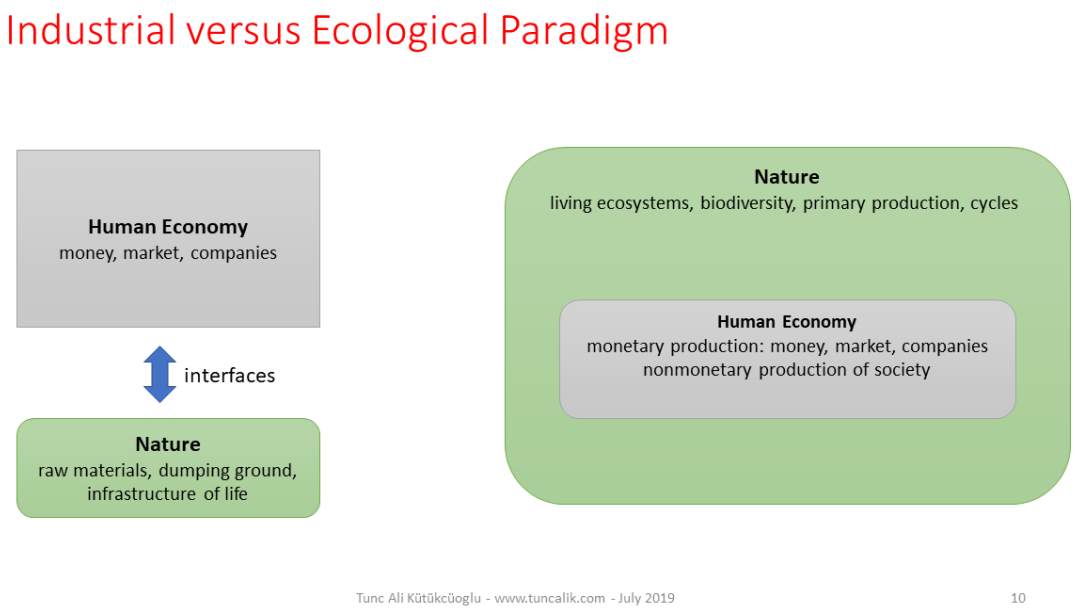
Understanding the causes and impacts of climate change requires an integral overview to many disciplines, but most scientists, who are used to think within their disciplinary boundaries are overwhelmed by the task. It might be better to develop the ability to see the interconnections at the expense of reduced expertise in a particular discipline. That is, more holistic inquiry at the expense of reduced specialization (i.e. the resurgence of holistic science) (N. Oreskes, V. Shiva)

Specialization, in combination with division of labour, is often praised by mainstream economists in the name of industrial efficiency. There are but social, psychological and ecological **limits to specialization**.

In his article titled Economism and the Econocene, economist Richard B. Norgaard tells the history of social transformation from nationalism to economism as follows:

As scientists like Svante Arrhenius were trying to understand the environmental impacts of human economy due to greenhouse gases, "the vast majority of theoretical scientists were busily digging

deeper, narrower strands of knowledge, that occasionally other more applied but still specialized scientists and engineers were turning into technologies that were profitably introduced into human and natural environments, with little if any concern for their larger consequences. How could they be concerned given their **fragmented training** and lives in specialized organizations of specialists who also were oblivious of larger systems?" (Norgaard RB, 2019)



Whatever the stated and intended purpose, the real function of modern **industrial education** is producing for lucrative corporate and government posts tamed specialists who don't ask inconvenient questions about big picture, purpose and meaning (Lasch C. 1995, Warburton N. 2012). That Nobel praised scientists work for exploitative companies like Syngenta and DuPont demonstrates, how effective industrial education is for its own purposes (→ AufKostenAnderer.org).

Social cohesion, political dialogue and democracy suffers when people are educated only about their jobs, and remain largely ignorant of the general philosophical, political and practical issues of life (Lasch 1995, → The Revolt of the Elites).

In the agriculture for example, one may be tempted to specialize on a single crop like maize in the name of efficiency. Monocultures are but, in most cases, ecologically unsustainable because they cause soil degradation within a few years. This example can be generalized: Too much specialization and too much efficiency (i.e. efficiency in the narrow sense) can overwhelm the ecological carrying capacity of the ecosystem.

In our modern urban life, over-specialization and **industrial paradigm** often conspire to make nature (hence ecology) virtually invisible. As Economist W. Rees writes, mechanistic and reductionist worldview is not a peculiar feature of economists; it has become the *social common sense* through urban lifestyle and industrial education:

"Our dominant econo-cultural narrative of *perpetual growth and ever-progressing technology* sees the **natural environment** as little more than a static aesthetic backdrop to human affairs. It relies on analytic models based on reductionist assumptions about resources, people, firms, and technology that bear little relationship to their counterparts in the real world; in effect, society views the economy as a separate system functioning independently of the ecosphere. Relieved of limiting

frictions, mainstream economists and politicians equate *sustainable development* with sustained economic growth abetted by technological progress." (Rees WE, 2019)

There are other factors like **corruption** (by money and power) that foster and profit from socio-ecological illiteracy. Because vested business interests perceive environmental sensitivities and regulations as nasty obstacles to easy profits, they tend to subsidize public ignorance about environmental issues including climate change, by every means possible.

Economist Neva Goodwin: "Dominant economic system has permitted and sometimes encouraged economic actors (especially powerful corporations and governments) to ignore the harms they impose on people and other parts of nature having little political/economic power. These harms are not trivial; they have included the murder of indigenous people for the value of their lands or of the minerals under their lands; toxic wastes dumped in oceans and in the neighbourhoods of poorer people; schemes to cover-up the harms of profitable products like tobacco and fossil fuels; and, over many decades, **effective prevention of public education** about the dangers of climate change, and of ways to avert it –until it is too late to prevent a future of ever more catastrophe." (Goodwin N, 2019, → Addressing meta-externalities)

Corruption always comes with secrecy: Big donations to organizations that deny global warming are usually funnelled through third-party pass-through organizations that conceal the original funder (→ "Dark Money" Funds Climate Change Denial Effort)

Books like *Merchants of Doubt* (N. Oreskes & E. Conway) and *Whitewash* (C. Gillam) explain in detail how certain scientists were somehow convinced or bribed into producing and publishing "favourable" research reports for pressing issues like fossil fuels, climate change, pesticides and GM seeds (→ video: Merchants of Doubt).

Scientist and social critic J. D. Bernal claims (in his book titled Science in History), **all social sciences** (including economics) suffer from the corrupting influence of the established order of power (Foster JB, Clark B, York R, 2010, The Ecological Rift, page 21).

Bernal explains this kind of corruption as follows: In normal times, mainstream social science has been more about maintaining and managing the given social order rather than encouraging revolutionary changes, despite all important discoveries in natural sciences including ecology. Social science can even invent imagined realities based on seductive ideologies if necessary (though in most cases not deliberately), to protect and strengthen the present order, unless serious crises require radical changes.

The corruption mentioned here is not necessarily about petty academic crimes like falsification of data, plagiarism or bribery; it is primarily about "capitulation to the status quo, and evasion of all alternative perspectives", even at the cost of abandoning objective, honest and rational analysis.

A social order of **adverse selection and self-censorship** reinforces the cognitive inertia of the established mainstream assumptions and theories:

"Getting ahead in the academy (as well as in the media, the government, and other places in which social scientists are to be found) all too often involves self-censorship, a narrow focus on the relatively inconsequential, and leaving the big stuff (in terms of social change) off the table. Hence, social science becomes an accumulation of harmless platitudes with disconnected [and harmless] empirical additions." (Foster JB, Clark B, York R, 2010)

Thus, Bernal claims, many problems of economics that we can observe today like serving to the interests of power, inventing imagined realities (i.e. rigid ideologies), adverse selection and self-censorship are quite common to all social sciences.

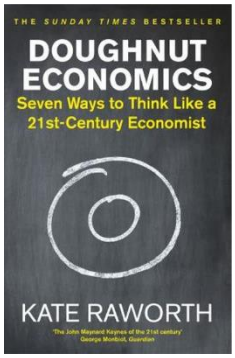
The Growth Delusion: Ignoring non-monetary wealth and production (of nature and society); ignoring social and ecological destruction for the sake of monetary profits

"Growth for the sake of growth is the ideology of the **cancer** cell." Edward Abbey (1927-1989)

"Unless we take steps to rid human societies of this economic pathology, malignant economic growth, like **cancer**, will destroy itself and its host as it exhausts the remaining supplies of accessible petroleum, the consequences of global warming become more severe and disruptive, and our own struggles for survival become more desperate and destructive." David C. Korten in the foreword of The Growth Illusion by Richard Douthwaite (1999).

So many books and academic papers are written about the misleading fallacies of GDP (Gross Domestic Product) and GDP growth (economic growth) since 1970. Some examples to these books are:

- Small is Beautiful, E. F. Schumacher
- The End of Growth: Adapting to Our New Economic Reality, Richard Heinberg
- The Growth Illusion, Richard Douthwaite
- The Limits to Growth, Donella H. Meadows et al.
- The World After GDP: Politics, Business and Society in the Post Growth Era, Lorenzo Fioramonti
- The Growth Delusion: Wealth, Poverty, and the Well-Being of Nations, David Pilling



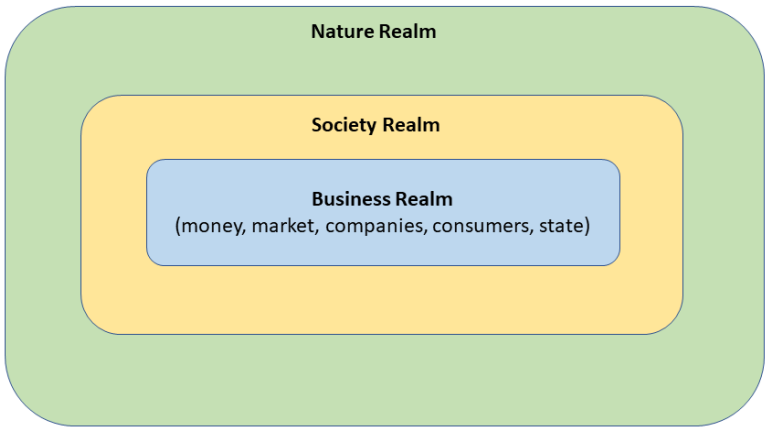
Doughnut Economics by Kate Raworth is another book which criticise the concepts of GDP and GDP growth. In this book, Raworth explains the mechanistic and reductionist foundations of the concept of GDP.

In one of her speeches (→ Why it's time for Doughnut Economics | Kate Raworth | TEDxAthens) K. Raworth explains, why the **flow diagram** of macroeconomics (circular flow of money and goods/services) is so influential, and at the same time, why it is fundamentally flawed: (1) Human economy is not a self-reliant, independent, closed system; it is deeply embedded in the environment (solar energy, biochemical cycles of nature, pollution, raw materials, biodiversity etc.). It doesn't work without the primary producer which is nature. (2) unpaid work (unpaid work at home, raising children, unpaid work in sustenance economies etc.), (3) social cooperation and solidarity (f.e. wikipedia as free encyclopaedia, free education, free recreation and entertainment, collaborative commons), (4) power relationships and inequal distribution of wealth (a single GDP number obscures the extremely inequal distribution of wealth, and thus, increasing poverty despite growing GDP numbers)

Raworth also explains, how a mainstream economist would react to those critiques: For environment you can study externalities in major classes if you like. For unpaid work… well, that sounds too feminist, doesn't it? For power relationships you should rather study politics (i.e. shifting important questions to other disciplines). These critiques are all sound and interesting, but you are distracting us from our real scope that is primarily about mathematical models (utility, supply/demand, equilibrium, price etc.) which makes our field scientific and objective.

That mainstream economics ignores or downplays the importance of social cooperation is probably related with the ideology of **individualism** built in the theory of neoclassical or neoliberal economics.

This ideology of individualism (against all kinds of state regulations) is even stronger in neoliberal economics compared to its earlier twin soul neoclassical economics.



In my opinion, all these fallacies and deficiencies are natural consequences of the mindset that (1) reduces the whole economy to the **business realm** by simply ignoring the social and ecological realities of life, and (2) that tries to obtain scientific respectability and justification through misuse of mathematics (Newton envy, or "premature mathematization" as E.F. Schumacher wrote in Small is Beautiful). Veblen said, political economy had started as a decent branch of political philosophy with classical economic thinkers like Smith, Ricardo, Mill and Marx, but unfortunately it degenerated then into a crude business ideology.

The side-effect of premature mathematization is narrow focus on only easily measurable things like money, price and quantity, with the consequence that, nonmonetary or qualitative issues that are so important for wellbeing of the society are conveniently ignored for the sake of sanitized analytical modelling.

In his paper titled "What's wrong with GDP and growth?" (Gadrey J, 2004, → google reader) economist Jean Gadrey summarizes the **flaws of the concept of GDP** growth as follows:

1. Everything that has monetary value, and can be sold will bump up GDP and growth, whether it adds to the individual or collective wellbeing, or not.
2. Many activities and resources that add to wellbeing are not counted (in GDP) simply because they are not market activities or resources, or because they don't have a direct production cost expressed in money terms.
3. GDP is obsessed with (monetary) outputs, but it takes no account of (nonmonetary and qualitative) outcomes (of economic policies) that are very important for wellbeing. Nor does it take account of issues like the distribution of wealth, inequalities, poverty, economic security etc. even though all these issues are unanimously regarded as aspects of a society's wellbeing.

And yet, Gadrey claims, many (mainstream) economists and politicians continue to use the concept of economic growth as a proxy for wellbeing and progress. Some economists and politicians began to talk about *sustainable growth* which is for economists like J. Bellamy Foster just another upgraded fallacy based on business myths like **Green Capitalism**; i.e. green technologies will save the world; no need to change our established (mainstream) economic paradigms and wasteful lifestyle that are based on growth, profits and consumerism (Foster JB, Clark B, York R, 2010).

Olivier Vaury explains the fundamental flaw of GDP as follows: "GDP includes many goods and services that do not increase a country's economic wealth, and, furthermore, excludes many goods and services that do. Hence, the use of GDP as an indicator of economic progress is flawed, and results in biases in international comparisons." (Vaury O, 2003, → Is GDP a good measure of economic progress?)

In his book named The **Illusion of Growth** (how economic growth has enriched the few, impoverished many and endangered the planet), R. Douthwaite writes (Douthwaite R, 1999):

a) GNP (or GDP) ignores non-monetary production of nature
b) GNP (or GDP) ignores non-monetary production of society

Douthwaite writes: "Growth only measures changes in gross national product (GNP) — the total sale value of all the traded goods and services produced in a country during a year — and this is a very odd animal indeed. For example, since GNP only includes the value of things that are bought and sold, the vast array of activities outside the monetarized part of the economy is ignored entirely." (Douthwaite R, 1999)

Definition of the quality of life	per cent
Family and home life	23
General contentment	19
Money and prices	18
Living standards, consumption	17
Social values	16
Personal beliefs, religion	11
Social relationships	10
Housing	10
Health	10
Work	9
Freedom of all kinds	7
Leisure, holidays, travel	6
Natural environment	4
Education and culture	4

Source: The Illusion of Growth, R. Douthwaite

A life-quality (wellbeing) research in UK during the period 1970-1975 showed that 71% of the factors that people perceived as important for their life-quality were about things like family and home life, social life and health that have little or nothing to do with cash. Consumption was only one of the many factors in the resultant list. (Douthwaite R, 1999)

With his remark "economic growth has enriched the few, impoverished many" Douthwaite emphasizes the imperialistic, exploitative and extractive nature of economic growth. In other words, Douthwaite says that the enrichment (i.e. economic growth) of the privileged minority comes at the high cost of others' impoverishment, as explained in detail in books like *Auf Kosten Anderer* (in English: at the cost of others, → www.AufKostenAnderer.org).

Apropos economic imperialism, V. Shiva wrote: "The insatiable appetite of growth, and the ideology of development based on it, are the prime factors underlying the ecological crises and the destruction of natural resources." (Shiva V, 2005, page 47)

In one her speeches, V. Shiva explains eloquently, why economic growth means poverty for the majority, not only in India but all over the world (→ video: Festival of Dangerous Ideas 2013: Growth = Poverty). In another speech, she talks about the lunacy of economic growth (YouTube video).

Shiva says "growth today is mining our future", that is, making the powerful minority (global investors and corporations) even richer and more powerful at the cost of future generations. Shiva claims that the conception of economic growth reflects the mechanistic and reductionist worldview of corporate interests, which separates ecology from the conception of economic wellbeing (**ecological apartheid**).

As I had mentioned in my previous progress report, economic (and military) **imperialism**, a dismal reality of life, is generally ignored in most standard textbooks for undergraduate students of economics. For example, words like "imperialism, exploitation, (Immanuel) Walerstein, extractivism,

(John A.) Hobson" don't exist at all in Mankiw's Principles of Economics (7th edition), one of the most popular textbooks for teaching economics.

As many economists and politicians continue to use the rhetoric of economic growth as if it were the ultimate purpose of all economic policies, younger generations began to realize the deep conflicts between economic growth (i.e. business as usual) and survival of humanity:

Greta Thunberg: "People are suffering. People are dying. Entire ecosystems are collapsing. We are in the beginning of a mass extinction. And all you can talk about is money and *fairy tales of eternal economic growth*. How dare you!" (→ her related tweet)

Peter Söderbaum (ecological economist): "Adhering to neoclassical theory with its focus on economic growth in GDP-terms is perceived by an increasing number of people as unsustainable." (Söderbaum P, 2002)

Another factor that probably played an important role in the misconception of GDP as a measure of wealth or wellbeing is the empty world (**limitless world**) paradigm, as often mentioned by authors like Naomi Klein and Vandana Shiva. How did the earlier classical economic thinkers come to believe in a limitless world?

First of all, classical economists can be (at least partially) excused for not being aware of the physical and biological planetary constraints, because the world was relatively pristine and empty at that time, with a very low level of consumption compared to today's level. For example, the estimated world population was about 1 billion in 1804, whereas it is almost 8 billion as of today (7.7 billion in February 2020). People began to talk about global-scale environmental problems only later, in the 20th century; especially after 1960, due to the influence of intellectual pioneers like Rachel Carson who wrote Silent Spring.

But still, already in the 18th century, there were over-polluted cities in the world like London. It should not be too hard to imagine that this pollution and destruction could easily become a global phenomenon with the expansion of destructive and polluting industry.

In his article named Origins and Delusions of Green Growth (published in ISR: International Socialist Review) Gareth Dale investigates the origins of the belief in a limitless world:

"… Ricardian notion was that the logic of diminishing returns, which had cast a cloud over the growth predictions of the classical economists, could be postponed to the *almost indefinite future* by technical progress and spatial fixes such as foreign trade and the exploitation of the almost limitless resources of the extra-European world. The same century witnessed that limitless world become integrated into the Western world-system, and with this a new geography (i.e. America) of power came into being, a relational geography in which the power and status of the advanced powers depended decreasingly upon territorial sway and increasingly upon economic success—soon to be conceived of as growth."

In her latest book "On Fire" Naomi Klein questions the **central fiction** of the mainstream economic model, that caused ecological crises like climate change: "… that nature is limitless, that we will always be able to find more of what we need, and that if something runs out, it can be seamlessly replaced by another recourse that we can endlessly extract. And it is not just the atmosphere that we have exploited beyond its capacity to recover [i.e. ecological carrying capacity]; we are doing the same to the oceans, to freshwater, to topsoil and to biodiversity. The expansionist, extractive mindset that has so long governed our relationship to nature is what the climate crisis calls into question so fundamentally." (Klein N, 2019)

Apparently, factors like empty world paradigm, closed-system illusion of economic flow diagrams, blind belief in endless progress, limiting economy to the business realm, technological fundamentalism, confusing geographical expansion and exploitation with economic growth and ecological ignorance; all conspired together to establish a rigid belief in limitless economic growth.

V. Shiva defines **technological fundamentalism** as follows: "The unshakeable belief in the idea that there is a technological fix for every social and environmental problem." (→ Earth Democracy and the Rights of Mother Earth)

In his article titled "Growthism: its ecological, economic and ethical limits" (→ Economics and the Ecosystem) Herman Daly explains, how economic growth becomes **uneconomic growth** (i.e. damages society more than its benefits) after certain social and economic limits are reached:

"What we conventionally call economic growth in the sense of the growth of the economy has ironically become uneconomic growth in the literal sense of growth that it increases costs more than it increases benefits. … Well before becoming physically impossible, the growth of the economic subsystem (i.e. business realm) becomes uneconomic in the sense that it costs more in terms of sacrificed ecosystem services than it is worth in terms of extra production. … The public is bamboozled by technical obfuscation, and by the false promise of growthism that one day we will all be rich." (Daly H, 2019)

Why do economic elites (i.e. the rich rentier class) like the idea of economic growth so much? Naomi Klein explains it as follows: "… one of the major benefits of a growth-based economy for elites is that it allows them to constantly defer demands for economic justice, claiming that if we keep growing the pie [a popular metaphor like the trickle down theory], eventually there will be enough for everyone. This was always a lie, as the current inequality crisis reveals, but in a world hitting multiple ecological limits, it is a nonstarter." (Klein N, 2019, page 88)

Another misleading fallacy that is built in the concept of GDP is **defensive expenditures** (Gadrey J, 2004, page 265) which is also called repair expenditures (→ patching in ecosystem mutilation and patching business). In most cases, additional repair costs to the society due to social and ecological destruction (negative externalities) that certainly reduce sustainable wellbeing, are added to GDP as positive growth items.

Jean Gadrey writes: "Expenditure (and the corresponding output) incurred in repairing the damage caused by human actions should not be counted as a positive contribution to real wealth. If such damage (pollution, crime, road accidents, etc.) reduced wellbeing and makes it necessary to produce goods and services (whose value is X) in order to repair or defend, there can be no question of X being counted as a positive item in any measurement of real wealth." (Peil J, Staveren I, 2011, page 128).

Closely related with the phenomenon of defensive expenditures is the **Lauderdale Paradox**, that claims that the increase (i.e. growth) in private wealth of the powerful minority (i.e. economic elites) is obtained at the expense of the decrease in public wealth:

"A long view of the history of capitalism reveals that growth has always depended on enclosure. This is done not order to acquire free value from the commons but also, I argue, in order to create an *artificial scarcity* that generates pressures for competitive productivity."

A typical example for creating profitable scarcities through destruction (i.e. meta-externalities) is ecological destruction or pollution of local water sources, privatization of remaining water sources

and selling drinking or irrigation water by giant multinational water monopolies (→ ecosystem mutilation and patching business).

That's why economics is not only about the production and distribution of scarce goods and services because abundant resources like clean food, water or air may become scarce within time due to exploitative business activities.

"Today Lauderdale Paradox is even more significant than it was when originally formulated in the early nineteenth century. Water scarcities, air pollution, world hunger, growing fuel shortages, and the warming of earth are now dominant global realities. Moreover, attempts within the system to expand private riches by exploiting these scarcities, such as the worldwide drive to privatize water, are ever-present." (Foster JB, Clark B, York R, 2010, page 67)

Creating **artificial scarcities** (for example, increasing need and demand for chemical fertilizers and pesticides) in agriculture by pushing many countries to the direction of industrial agriculture (based on socially, economically and ecologically unsustainable monocultures of cash crops) is another example of the Lauderdale Paradox in practice (V. Shiva, M. Pollan). Industrial agriculture was often promoted as *Green Revolution*, economic growth, technological progress and modernization by vested business interests.

After analysing all the fallacies and weaknesses of GDP, let's see how the issues of GDP and economic growth are handled in a typical economics textbook for undergraduate students.

In **Principles of Economics by Gregory Mankiw** (7th Edition), on page 485:

"This chapter considers gross domestic product, which measures the total income of a nation. GDP is the most closely watched economic statistic because it is thought to be the best single measure of a society's economic well-being."

Notice the dogmatic and single-truth teaching style: "… because it is thought to be the best single measure of a society's economic well-being."

This is how G. Mankiw defines GDP: "Gross Domestic Product (GDP) is the market value of all final goods and services produced within a country in a given period of time. GDP measures two things at once: the total income of everyone in the economy and the total expenditure on the economy's output of goods and services. GDP can perform the trick of measuring both total income and total expenditure because these two things are really the same. For an *economy as a whole*, income must equal expenditure."

So, here we learn that the economy as a whole is only about money (income and expenditures); there is no nonmonetary production of nature or society.

And let's see, what Mankiw thinks about wellbeing and quality of life:

"If you were to judge how a person is doing economically, you might first look at her income. A person with a high income can more easily afford life's necessities and luxuries. It is no surprise that people with higher incomes enjoy higher standards of living—better housing, better healthcare, fancier cars, more opulent vacations, and so on. The same logic applies to a nation's overall economy. When judging whether the economy is doing well or poorly, it is natural to look at the total income that everyone in the economy is earning. That is the task of GDP."

Here, we learn that the quality of life is only about things that we can buy with money; housing, healthcare, cars… Nonmonetary issues like the qualitative social and environmental factors play no

significant role at all (i.e. not worth to mention in a serious scientific university textbook). Or maybe, all these nonmonetary and qualitative factors of wellbeing can be considered as unchanging background factors, or in any case, totally independent of (i.e. not influenced by) monetary market or business activities.

This is the famous **circular flow diagram** on page 485 (→ Principle of Economics 7th Ed., G. Mankiw):

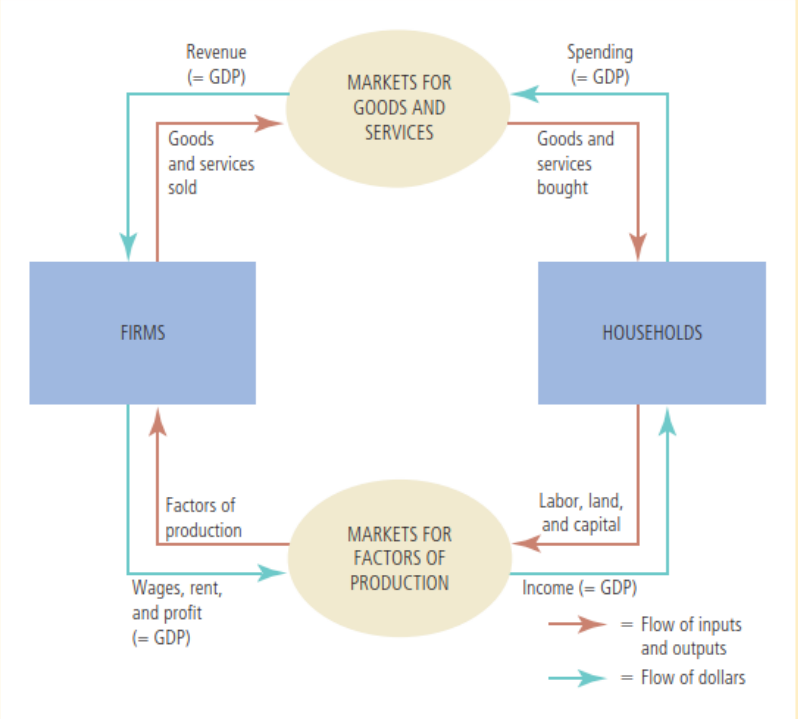


FIGURE 1

The Circular-Flow Diagram
Households buy goods and services from firms, and firms use their revenue from sales to pay wages to workers, rent to landowners, and profit to firm owners. GDP equals the total amount spent by households in the market for goods and services. It also equals the total wages, rent, and profit paid by firms in the markets for the factors of production.

Here, we learn that economy is all about firms, households, markets, goods and services (sold on the market) and money. Note that this is the **pure business realm** that exclude the complexities of society and nature. That is, we don't need to consider the complex social and ecological aspects of life which makes everything so much easier.

That circular nature of the flows of goods and services has a certain soothing effect that gives confidence; one gets the feeling that such an economic system has no sinks, no over-accumulation, no deficiencies, no pollution, hence no sustainability problems; it can work for ever. Thus, limitless growth and progress thanks to the again limitless advances in technology…

Let's check if Mankiw warns students about the weaknesses GDP in the following pages of the chapter named "Measuring a Nation's Income". Maybe he has also some warnings for the limited and idealized business realm reflected in the circular flow diagram.

Yes, luckily, he has some warnings:

GDP accounting uses market values; in that way it can add oranges to apples.

"GDP tries to be comprehensive. It includes all items produced in the economy and sold legally in markets. … GDP excludes most items produced and sold illicitly, such as illegal drugs."

Here, we learn that **illegal items** like harmful drugs are conscientiously excluded from GDP accounts. The student should ask "what about the legalized unethical and parasitic earnings like profiting from

social and ecological destructions (i.e. repair expenditures)?" Is black money (or dark money) only about illegal earnings?

"It also excludes most items that are produced and consumed at home and, therefore, never enter the marketplace. Vegetables you buy at the grocery store are part of GDP; vegetables you grow in your garden are not."

This is actually an important warning because here, Mankiw implies **nonmonetary production** of nature and society, which was conveniently excluded from the mechanistic flow diagram. However, he chooses here not to elaborate or generalise the issue with terms like "nonmonetary production". Literally and practically, the scope of the example remains limited to garden vegetables. A conceptual expansion of the inquiry into new fields like nature and society, that is, a broadband and interdisciplinary analysis, is totally missing. I wonder, what proportion of the students will be perceptive and imaginative enough to think deeper and broader about this particular example.

Having established the foundations of GDP, Mankiw goes on with mathematization as required by a real, respectable hard science like physics: Components of GDP (Y = C + I + G + NX)

After some mathematical elaboration (GDP deflator etc.) we come to the last part of the chapter: "Is GDP a Good Measure of economic Well-Being?"

Now this is important, I think, we can find some real warnings here. He mentions the critique of R. Kennedy in 1968, and writes:

"Much of what Robert Kennedy said is correct. Why, then, do we care about GDP? The answer is that a large GDP does in fact help us to lead good lives. GDP does not measure the health of our children, but nations with larger GDP can afford better healthcare for their children. GDP does not measure the quality of their education, but nations with larger GDP can afford better educational systems. GDP does not measure the beauty of our poetry, but nations with larger GDP can afford to teach more of their citizens to read and enjoy poetry."

Here, we learn that one can by health with money. This means, with sufficient money, we can repair all the social and environmental destruction, including the pollution of soils and water resources and the loss of biodiversity.

"Because GDP uses market prices to value goods and services, it excludes the value of almost all activity that takes place outside markets. In particular, GDP omits the value of goods and services produced at home. When a chef prepares a delicious meal and sells it at her restaurant, the value of that meal is part of GDP. But if the chef prepares the same meal for her family, the value she has added to the raw ingredients is left out of GDP. Similarly, child care provided in day-care centres is part of GDP, whereas child care by parents at home is not. Volunteer work also contributes to the well-being of those in society, but GDP does not reflect these contributions."

Because he is not explicit about the "world outside markets" (nature, society, complex social and ecological relationships that are essential for wellbeing) one gets the feeling, GDP covers almost everything excluding some minor details like cooking, child care and voluntary work that are mentioned here generously for the sake of scientific completeness.

Mankiw closes the chapter with a last remark in a most decent and scientific manner: "In the end, we can conclude that GDP is a good measure of economic wellbeing for most—but not all—purposes. It is important to keep in mind what GDP includes and what it leaves out."

Let's see which points are left out by Mankiw in the context of GDP and economic growth:

1. The problem of political and economic inequality (incl. power relationships); inequal income distribution, and the effect of this inequality on general wellbeing
2. Defensive (or repair) expenditures and Lauderdale Paradox; repair/defensive expenditures due to social and ecological destruction are generally added to GDP accounts
3. Nonmonetary capital and production of society and nature; nature as the primary producer
4. There are many qualitative factors of wellbeing that one cannot buy (or replace) with money. Many of these qualitative factors of wellbeing can but be destroyed in the endeavour of earning money (unpaid or unpunished externalities, parasitic earnings)
5. There are lots of academic books and papers written since 1970, that criticise growth and growthism. These resources are not mentioned, or referenced.
6. Other measures of wellbeing, for example comprehensive happiness indices

I think, the circular flow diagram of GDP is, pedagogically and epistemologically, one of the most refined and influential tools to **limit the mental scope** of an average student of economics to the business realm, ignoring almost all social and ecological realities of life, allowing only for some minor and insignificant details like garden vegetables, cooking, child care and voluntary work. This is a kind of *epistemicide* in the words of Prof. Graupe (Graupe S, 2019).

Ecological economist Herman Daly explains, what kind of impression is imprinted on the minds of young economics students with the circular flow diagram:

“The economy is represented as an isolated system; nothing enters from the outside, nothing exits to the outside. There are no natural resources entering from the ecosphere, no wastes exiting back to the ecosphere. Indeed, there is no ecosphere, no containing and constraining environment of any kind.” (Daly H, 2019, → Growthism: its ecological, economic and ethical limits)

Persistent belief in the Western idea of linear and continuous progress

Historian, moralist and social critic Cristopher Lasch (1932-1994) wrote in his book named "The True and Only Heaven: progress and its critics”:

Lasch: “How does it happen that serious people continue to **believe in progress**, in the face of massive evidence that might have been expected to refute the idea of progress once and for all?”

Lasch: “The assumption that our standard of living (in the broadest meaning of the term) will undergo a steady improvement colours our view of the past as well as our view of the future.” (Lasch C, 1991)

Modern conception of progress (since industrial revolution) is the promise of steady improvement with no foreseeable ending at all. (Lasch C, 1991)

Note that **standard of living**, though considered an objective and scientific measure in mainstream economics, is also a Western notion, which assumes, the only decent and good lifestyle (i.e. the real civilization) can be the Western lifestyle, which is in our modern times equated to the industrial urban lifestyle (sociologists like Marcus Wissen und Ulrich Brand call it imperial lifestyle) based on neoliberal values like individualism and consumerism. Note again, that individual freedom is often equated to *individual choice* in the context of market, as if all the material needs, that we need for a good life, could be purchased from the market.

V. Shiva claims, **consumerism** is one of the primary causes of the destruction of local cultures along with sustainable lifestyles and economies: “… economic consumerism hijacked culture, reducing it to a consumerist monoculture of McDonald and Coca-Cola on the one hand, and negative identities of hate (like religious extremism) on the other." (Shiva V, 2005, page 101)

Where does this belief in continuous progress come from? How did this unidirectional sense of history originate? Most ancient societies had a cyclical sense of history: Birth (foundation), development, maturity, degradation and death (collapse) like the life cycle of an organism or ecosystem.

The **mainstream history of humanity** that is taught in most modern schools is a linear history of progress: The earliest humans, namely hunter-gatherers, were primitive savages; they lived like animals without the protective morality and laws of a civilization. Accordingly, their lives were "solitary, poor, nasty, brutish, and short" (Thomes Hobbes, 1558-1679). Only with the foundation of first agricultural states in places like Mesopotamia, Egypt and China, humans could begin to live as civilized individuals with material prosperity and comfort, moral laws, religions and traditions. After enlightenment, foundation of modern (positivist) science, industrial revolution (i.e. fossil fuel revolution) and further technological progress, the human condition improved even better. There seems to be no physical limits to this improvement (i.e. material prosperity, standards of living etc.) due to continuous progress in science and technology, which can find a solution for every kind of social and ecological problem, and a substitute to every kind of natural resource including energy sources and minerals (i.e. *technological fundamentalism* due to unlimited trust in science and wishful thinking).

The primary reasons (**ideological pillars**) of the belief in progress can be summarized as follows:

- **Missing or distorted knowledge of human history** (i.e. evolutionary anthropology). For example, modern anthropology tells us that hunter-gatherers generally lived better and healthier that the majority of people living in agricultural states. (→ Worst Mistake in the History of the Human Race by Jared Diamond, Against the Grain by James C. Scott, Against the Grain by R. Manning).
- The **assumptions of classical liberalism** like (a) the sense of fair competition in the market and the feeling of responsibility for the family and nation will discipline the wild desires and instincts of individuals such as limitless greed for money and luxury, and (b) the pursuit of continuous economic development (luxuries of past becoming norms and needs of today etc.) will not corrupt the society, on the contrary; it will discipline the society, and serve as a sense of direction and purpose.
- **Too much trust in science and technology**, generalizing the superficial successes of the technological progress in the 18th and 19th centuries for the limitless future. Confusing the new possibilities offered by fossil fuels with human ingenuity (like confusing fossil fuel revolution with industrial and technological revolution) was another factor. Though science progressed significantly in fields like physics, astronomy and chemistry (i.e. science of non-living nature), it remained quite backward in understanding the dynamics and evolution of living complex ecosytems like forests, rivers and lakes with multiple species. The term "ecology" was coined in 1866 by the biologist Ernst Haeckel from the Greek word "oikos" meaning household (which is also the root of economy) but the movement of ecological and environment enlightenment began much later in 1960s, with pioneers like Rachel Carson (author of Silent Spring).
- **Ignoring the global influence of military and industrial imperialism**; looking to the world from the narrow perspective of West Europe and USA (i.e. Western perspective) which obscured the wide-reaching effects of Western military and economic imperialism, colonialism and exploitation from the perception of an average citizen of a Western country. Every economic development that added to the wealth of a Western nation was perceived as progress, even if this development had detrimental effects in other "2nd class nations" of the world. For example, the textile industry in UK which developed at the expense of prosperity (incl. textile and agriculture industries) in India. This imperialistic and narrow perspective was further

exacerbated by Western "white man racism" and ecological ignorance (i.e. not being aware of the global socio-ecological consequences of destructive economic activities).

- **Technological fundamentalism** (naïve technological optimism); with Vandana Shiva's words, "the unshakeable belief that technological progress can solve every social and ecological problem in the world." Promoting an unsustainable way of monocultural agriculture with chemical fertilizers and pesticides as Green Revolution is a typical example of technological fundamentalism.
- **Ignorance of social and ecological limits** to ever increasing production and consumption; the empty and limitless world paradigm (terra nullius) fed by disrespect for other nations and other races people (i.e. racism) and nature (i.e. anthropomorphism and mechanistic-reductionist worldview).
- **Equating progress to economic growth** through neoclassical/neoliberal ideology and monetary reductionism. In other words, measuring progress by economic growth (i.e. GDP), a practice, which became quite dominant among politicians and economists after the second world war. It was another factor which obscured the wide-reaching effects of economic exploitation (in terms of geography and time). V. Shiva explains in Earth Democracy how this kind of GDP and money reductionism works: "In the ideology of the market, people are defined as poor if they don't participate overwhelmingly in the market economy. People who satisfy their needs through self-provisioning mechanisms [i.e. non-monetary production] are perceived as poor and backward." Many countries like Peru and Punjab (a state of India) were welfare states in the past with a large and prosperous middle class. They are much poorer today, but this fact is obscured by GDP numbers that represent only monetary flow of goods and services.

Unlike ancient civilizations that had **a cyclical sense of history**, which considered "rise and fall of societies" as inevitable cycles of nature (or fate), Christian-Judaist tradition had a notion of unidirectional progress (i.e. civilized and uncivilized societies, a hierarchy of civilization etc.), but this notion of progress was more about moral improvement and social order rather that material wealth.

The leading intellectual of classical liberals, Adam Smith, diverted the meaning of progress to the direction of material wealth, though he was broad-minded enough to have some concerns about moral issues like mental health, happiness and equity. Though often claimed otherwise, he was well aware of the fact that "the invisible hand of the market" alone would not be sufficient alone to guarantee a nation's prosperity.

Lasch: "The original appeal of the 18th-century idea of progress, and its continuing plausibility derived from the assumption that **insatiable appetites** [for consumption, comfort and luxury], formerly condemned as a source of social instability and personal unhappiness, could drive the economic machine (just as man's insatiable curiosity drove the scientific process) and thus ensure a never-ending expansion of productive forces." (Lasch C, 1991, page 52)

Earlier societies believed that some greedy individuals can become disproportionately rich only at the expense of others. Classical liberals like Smith and Ricardo thought, economic development (i.e. increasing industrial efficiency through improved technologies and specialization) may become the source of richness, without effectively stealing wealth from other individuals of the society.

Political scientist and anthropologist James C. Scott describes the Western idea of progress as an "**ascent of man**" story based on a distorted view of human history: "Historical humankind has been mesmerized by the narrative of progress and civilization as codified by the first agrarian kingdoms. As new and powerful societies, they were determined to distinguish themselves as sharply as possible from the populations from which they sprang and that still beckoned and threatened at

their fringes. Agriculture, it held, replaced the savage, wild, primitive, lawless, and violent world of hunter-gatherers and nomads." (Scott JC, 2017, Against the Grain)

Scott: "From Thomas Hobbes to John Locke to … Friedrich Engels to Herbert Spencer to Oswald Spengler to social Darwinist accounts of social evolution in general, the sequence of progress from hunting and gathering to nomadism to agriculture (and from band to village to town to city) was settled doctrine. Such views nearly mimicked Julius Caesar's evolutionary scheme from households to kindreds to tribes to peoples to the state (a people living under laws) wherein Rome was the apex, with the Celts and then the Germans ranged behind. Though they vary in details, such accounts record the march of civilization conveyed by the most pedagogical routines and **imprinted** on the brains of schoolgirls and schoolboys throughout the world." (Scott JC, 2017, page 9)

Scott explains, why modern anthropology and archaeology destroy the faith in continuous progress, as follows: "It turns out that the greater part of what we might call the standard narrative [i.e. narrative of continuous progress] has had to be abandoned once confronted with accumulating archaeological evidence." (Scott JC, 2017, page 9)

In his book titled *Against the Grain*, Richard Manning gives an interesting example of an archaeological evidence which contradicts the mainstream belief that farmers must have lived much better than their contemporary hunter-gatherers: ""We know from the remains that the [Cahokia] farmers were smaller [compared to the contemporary hunter-gatherers], the result of general deprivation and abuse. The women, were especially smaller." (Manning R, 2004, page 35)

We know from the history of imperialism and colonialism that arguments like "bringing progress and civilization to backward nations" are often used to justify massive exploitation. Today, the modern version of such racist arguments has become "economic growth and development", and it is generally preferred to say simply and politely "developing country" rather than using rude designations like savage, primitive, heathen or backward.

In the context of climate change and **planetary boundaries**, Naomi Klein writes in her latest book "On Fire" that Western culture's most cherished ideas like the endless progress are no longer viable: "Those [nature's warnings like the climate change] are profoundly challenging revelations for all of us raised on the Enlightenment ideals of progress, unaccustomed to having our ambitions confined by natural boundaries. And this is true for the statist left as well as the neoliberal right." (Klein N, 2019, page 79)

Ecological economist Richard B. Norgaard draws attention to the similarities between the Western idea of endless progress and **Social Darwinism** (i.e. fallacious interpretation of the evolution theory):

Norgaard: "The Western idea of progress easily aligns with the idea of the tortoise becoming more and more fit. Social Darwinists (in the late 19th century) falsely adopted the idea of the survival of the fittest to justify, under a banner of progress [i.e. becoming better and better], how superior people were outcompeting inferior in the newly emerging corporate industrial economy." (Norgaard RB, 2019, → Economism and the Econocene)

Social Darwinists either misinterpreted or deliberately distorted the meaning of "fittest" in the phrase "survival of the fittest", which actually means "best adopted to environmental conditions" (i.e. fitting in the sense of a key's fitting to a keyhole); not best, superior, or fittest in the sense of being fit in sports. In the evolutionary sense, a humble rat can be much fitter than an imposing lion.

Nevertheless, the idea of endless progress resembles **Social Darwinism** in the sense that it claims, there should be a single and well-defined direction independent of all environmental conditions, like the Western-style economic development, which defines the road to endless progress.

Norgaard argues, that the historical development of societies can't be properly described with concepts like progress or decline, because there is not a single best direction which is much better than all other possible directions, even if a society (like Western societies) claims its direction is the real progress, real civilization and so on. Besides, "which direction should be the best one" always depends on the complex social and biological environmental conditions.

That's why, Norgaard claims, the concept of **co-evolution** [in the context of cultural evolution] should be used to describe the historical development of societies, rather than single-dimensional concepts like progress or decline. Every society (like every species) can and should take its own evolutionary parthway depending on its own cultural and biological environment; no single and standard direction of development can be prescribed for all societies of the world.

Norgaard: "… with coevolution, there is no equivalent to the concept of progress. The characteristics of a species [or of a society] simply change in response to each other's changes." (Norgaard RB, 2019)

Supporting the arguments of Lasch, Norgaard writes: "… the **nature of progress** changed from moral progress during the 17th century to include material progress beginning in the latter 18th century, to become economic progress during the 20th century, and then since 1980 or so to become simply *growing the economy* or GDP growth. Values coevolved with increasingly dominant economic understandings within the knowledge subsystem as well as with the increasingly dominant market organization of the social system. As values became more economistic, the criteria of what constitutes progress changed accordingly." (Norgaard RB, 2019)

Thus, the meaning of progress changed continuously by the process of co-evolution, in response to factors like political power and business interests.

Norgaard thinks, humanity needs a radical transition from the idea of endless material progress to holistic survival and morality:

Norgaard: "The coevolution of economism with the Econocene has led humanity to the brink of disaster. **Faith in progress** has long been a part of the problem. Actions to stave off climate change have been trimmed and delayed on the presumption that countering environmental destruction has the opportunity cost of foregone human wellbeing through further investments in technology that further increase the production or provide novel forms of material goods. And yet studies show that wellbeing increases little, if at all, with further material assets after basic needs are met. Shifting from faith in progress toward a consciousness of holistic survival would be more appropriate given the challenges of climate change." (Norgaard RB, 2019)

Faith in endless progress is closely related with **faith in endless economic growth** which ignores the boundaries of nature; hence, ecology. In her latest book *On Fire* Naomi Klein writes: "Climate change is a message … telling us that many of Western culture's most cherished ideas are no longer viable. These are profoundly challenging revelations for all of us raised on Enlightenment ideals of progress, unaccustomed to having our ambitions confined by natural boundaries. And this is true for the statist left as well as the neoliberal right." (Klein N, 2019).

Vandana Shiva explains, how the faith in linear progress serves to the narrow **interests of rich and powerful minority** (1%) against the wellbeing and survival of 99%: "In just 500 years of colonisation,

including 200 years of fossil-fuel age and 20 years of corporate globalisation, humanity has done enough damage to earth to ensure its own extinction. The blindness of the 1% to the potential life, to the rights of people, to the destructive impacts of their constructs, has endured that going over the precipice is inevitable. They define their destructive, colonising power as superior while the creative, nonviolent forces of nature, and of women, indigenous people and farmers, is perceived as *backwardness* or *passivity*. In their constructed narrative of **linear progress**, there is only one way; forward. But when you are already standing at a precipice, going forward means hurtling down" (Shiva V, 2019, → Oneness vs 1%)

Undergraduate economics education in Switzerland, Germany and UK

In my previous progress report, I had mentioned two already existing reports about the education of economics in Switzerland and Germany:

Switzerland:
WWF reports in German: Nachhaltige Hochschullandschaft Schweiz
Summary Report in English: Sustainable Development in Economic Sciences

Germany:
Studie EconPLUS (in German)
Summary Report in English: Pluralism in the economics curriculum in Germany (EconPLUS)

There are now two update reports for Switzerland and Germany:

Switzerland:
WWF übt Kritik an Schweizer Hochschulen: Mangelhaftes Engagement für die Nachhaltige Entwicklung (2019)
(In English: WWF criticizes Swiss universities: Inadequate commitment to sustainable development)

Germany:
Forschungsergebnisse des Themenbereichs Neues ökonomisches Denken

(In English: Research results in the field of new economic thinking)

UK:
This is the information I received from RethinkingEconomics.org (Ross Cathcart):

"Research has been done that covers the limitations of UK economics education although it tends to be framed and discussed in a more way about the limitations of a 'mainstream' education (as in the German example you linked above) rather than explicitly dealing with questions on sustainability specifically (as in the Swiss example above).

I firstly recommend reading the Econocracy which, among other things, includes a review of the economics curricula of 7 UK redbrick universities and demonstrates the deficiencies of them which include a lack of discussion of sustainability.

I would recommend taking a look at this summary of research put together by one of our Trustees, Mapping Pluralist Research. It provides a useful summation of the different pieces of research conducted by students over the past decade or so in the UK but also globally."

First of all, I aim to understand the **general education landscape** of each country with questions like:

1. Which universities have economics departments that are perceived as "most prestigious" (i.e. high ranked), and why?

2. Are there economics departments with their own traditions, education methods and schools of thoughts?
3. Because I don't have time for all universities, which universities could I investigate as a representative subset?
4. Are the other reports related with economics education, or related with more general issues like ecological literacy or sustainability in education?
5. What have been done so far for a more multidisciplinary (broadband) and pluralist education as the student associations from 32+ countries requested in their Open Letter?
6. What is the general tendency of economics education with respect to pluralism, multidisciplinarity (i.e. broadband view) and ecological literacy in recent years? Is it getting better or worse?

I realized that **mission statements** of economics departments tell quite a lot about the dominant mindset and priorities of the department. So far, I analysed the mission statements of some Swiss universities; I will report about them in my next progress report or draft PhD dissertation.

I also tried to get more information about the economics curricula and textbooks of some Swiss universities, but the exercise has proved much more difficult than I had initially thought. So far, my impression is, economics departments are quite reluctant to give information because they seem to be inclined to keep the status quo (i.e. the dominance of neoclassical/neoliberal economic thought) as long as possible. As the last WWF report underlines, Swiss universities have done virtually nothing for a more pluralist and broadband economics education, except for some insignificant initiatives for the sake of appearance and formality.

The response of an academic (an environmental economist) from the University of Bern to my questions about pluralism can give you an idea about the dominant mindset: "The work of our department is based on **quantitative methods** both in education and research. I don't think, anyone from this department can help you with your questions."

Nevertheless, I will try to get more information about the current situation in Swiss universities from different channels.

I will first analyse all the available reports before deciding for my next steps for German and UK universities.

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All critiques, comments, new ideas and new suggestions are welcome.

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