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**The Need for and Meaning of Social Ecological  
Economics**

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# The Need for and Meaning of Social Ecological Economics<sup>1</sup>

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## Abstract

Ecological economics has arisen over a period of three decades with a strong emphasis on the essential need to recognise the embeddedness of the economy in the biophysical. However, that element of realism is not matched by an equally well informed social theory. Indeed the tendency has been to adopt mainstream economic concepts, theories and models formulated on the basis of a formal mathematical deductivist approach that pays little or no attention to social reality. Similarly mainstream economic methods are employed as pragmatic devices for communication. As a result ecological economics has failed to develop its own consistent and coherent theory and failed to make the link between the social and the economic. In order to reverse this situation the social and political economy must be put to the fore and that is the aim of social ecological economics. This paper provides a brief overview of the arguments for such a development. The prospect is of unifying a range of critical thought on the social and environmental crises with the aim of informing the necessary social ecological transformation of the economy.

Keywords: ecological economics, social economy, political ecology, political economy, social ecological transformation, biophysical reality, mainstream economics, neoliberal environmentalism.

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<sup>1</sup> A version of this discussion paper will appear in the forthcoming book: Spash, C.L. (ed.) (2017). *Routledge Handbook of Ecological Economics: Nature and Society*. Abingdon: Routledge

## **Introduction**

Social ecological economists have been present since the creation of the International Society for Ecological Economics and provide the main approach in the European Society (Røpke, 2005; Spash, 1999). They recognise the importance of political economy, social ecology and the role of institutions for understanding the economic system and its interactions with Nature. They practice serious interdisciplinary knowledge integration across social and natural sciences (Spash, 2012b). They realise the need for a radical social ecological transformation based on their (natural and social) scientific knowledge. Social ecological economics is for many the core understanding of ecological economics (Spash, 2013; Spash and Ryan, 2012).

Ecological economics was founded upon the importance of placing the economy within its biophysical limits, while recognising the need for the conduct of human society to respect others both present and future, human and non-human. Key concerns included the failures of economic policy to address environmental impacts and the existing economic structure and its institutions to meet minimal standards of ethical conduct. However, different forces have shaped how the field of knowledge has combined topics and addressed (or not) these various issues. In particular, the gradual but persistent neoliberalisation of society since the 1980s has pushed an ecologically informed environmental policy discourse into the language of economics and finance (Spash and Aslaksen, 2015). The result has been a mainstreaming of environmentalism in general and ecological economics in particular (Spash, 2013).

Economics has become identified with what Polanyi (1957) termed “formal economics”, where a narrow market exchange model dominates, a model that misconstrues the historical meaning of markets, trade and money, and so is blind to the potential alternative forms of social integration and organisation. Many have lost their way due to the supposed necessity

of being pragmatic in terms of adopting formal economic concepts, converting Nature into capital, ecosystem functions into goods and services, and pollution into a traded commodity. Explicit ethical judgement is replaced by the dogma of saving money to meet an ill-defined goal of economic efficiency, as if this had no ethical implications.

If the journal of the name *Ecological Economics* is taken as an indicator then the field is disunited, conflicted and internally self-contradictory. This situation occurs because the journal was allowed to become a commercial project of Elsevier, with rapid expansion beyond the ability of meaningful content to be provided by the fledgling ecological economics community of the early 1990s, with its anti-establishment concerns for limits to material and energy throughput and restricting the scale of the economy. Success measured by publishers' citation metrics, growth and returns are ironically what has determined the content, while quality in production has declined and academic direction is lacking. In the process, the journal has become a contested space in which mainstream environmental and resource economists fight to obtain kudos through formal models and monetary valuation studies, while new environmental pragmatist compete to find the easiest formulae for supplying palatable messages in the hope of courting unconcerned corporations and unconscious consumers (Spash, 2013). The foundational social ecological ideas are lost in the mix. A good example is coverage of climate change in the journal, a discussion that largely ignores key contributions from the field and instead conducts a formal mainstream economic discourse (Anderson and M'Gonigle, 2012). The editors seem oblivious to the need for getting contributors to actually read or address the relevant ecological economics literature. Thus, core papers, arguments and critiques run in parallel with a mass of totally separate formal economic, and other, content that ignores the essence of ecological economics, its concepts and their meaning.

One result of the neoliberalisation of environmentalism, and the adoption of concepts from formal economics, is the increasing prevalence of pseudo science, especially in the form of numbers. This is evident in natural scientists adopting whatever aspects of social science appear to them to be convenient. A typical approach is creating money numbers from thin air in the vain hope of impressing the mythical decision-maker and general public that the environment matters (Spash, 2013; Spash and Vatn, 2006). Along the way the importance of social science is downplayed, and often treated as some simple add-on to the ‘objective’ natural science information that is believed to supply all we really need to know. Inevitably the division between environmental and social concerns has grown as the expression of plural values and complexity are replaced by monistic measures and simple messages. Perversely, the politically naïve use of formal economic language, concepts and methods by ecologists and conservation biologists has undercut their own message, disempowered their policy relevance and damaged the environmental movement in the process (e.g., in the area of biodiversity see Spash, 2015b). Rather than progress in uniting an understanding of the biophysical, social and economic, what we have seen is the domination of the social and biophysical by a narrow discourse that reduces everything to exchange in price-making markets.

Social ecological economics is then a call for the interdisciplinary reunification of different bodies of knowledge in a way that reflects their competencies in relation to the objects they study (Spash, 2012b). The social, in social ecological economics, emphasises the necessity of understanding the reality of how humans and their societies operate if we are to gain any insight into the multiple crises that the current system is plunging the world. Historical and

descriptive analysis of the past and its institutions is essential to understanding the future and its potentiality (Spash, 2011).

Ecological economics lacks a coherent social theory and connection with other social scientists working on the same topics in other fields (e.g., political science, political ecology, sociology, social psychology, social anthropology). Some have felt threatened by the social and have downplayed if not derided its relevance. In the USA the social is quickly connected to socialism, which since McCarthyism has been associated with communism and branded as un-American. There have even been attempts to suppress those following the social ecological economics agenda within ecological economics itself, while promoting mainstream economists in their stead (Røpke, 2005; Spash, 2011). This suppression failed, not least because social and environmental problems are inseparable and formal economics is no substitute. Polanyi (1957) thought formal economics was valid in a restricted field of knowledge relating to 19<sup>th</sup> and 20<sup>th</sup> Century market economies. In contrast, I argue that it fails as either a description, explanation or predictor of the modern market economy, and as a result is dangerously misleading as a guide to social and environmental policy.

In this brief overview I will start by substantiating this last point, not least because there are too many apologists for mainstream thinking and the extent of economic inadequacies is not well or widely understood. This leads to the need for alternatives to current formal economic theories, but also to the current economic system it advocates with its pricing, capital accumulation, competition, growth and social and environmental exploitation. After dismissing the dominant economists' defensive stance—that there are no alternatives—I explore in turn why the economy must be understood as a social ecology economy in biophysical and social terms. This is carried out by over-viewing the environmental and

social implications of the current economic system, its problematic elements and the biophysical and social implications of its operations. That sets the agenda for new directions and the needed research to achieve the necessary social ecological transformation.

### **Modern Economics as a Distraction from Reality**

Economics as a discipline has become a narrow prescriptive field which defines itself by its methodology rather than its content or object of study, namely the social economic system. To be an economist today means being able to abstract from reality using mathematical symbols to represent loosely defined concepts such as goods, services, labour, land, capital, prices, money, markets, trade, employment and utility. The approach employs deduction, which means the foundational axioms, and inferences drawn from them, have no requirement for realism at all. The inferences need only be logically drawn from the axioms and the derived equations and models internally consistent. On this basis the discipline has created a deductive dogma that is divorced from actual and empirical economic systems and their operations. This is something that is only disturbed by the invasion of reality into the economists closed world.

Reality comes in the form of economic collapse, misdirected policy and publicly visible ignorance. A financial disaster, such as the 1929 or 2008 crashes, brings home to many (otherwise generally unconcerned) citizens of industrially modernised economies how economics has become detached from the reality it is supposed to explain and the future it promises to predict. Yet, the economics profession seems to remain amazingly untouched by the irrelevance of their own theories. Like the neoliberals, who created the 2008 crash and on-going world economic crisis through deregulation and financial greed, the majority of economists continue to recommend price-making market mechanisms on the basis of

arguments that have no relationship to real markets and their operation. They justify passing power to the least trustworthy without even realising this because their models have no concept of power. If they did, their dogmatic commitment to mathematical formalism would make it merely another symbol in an equation of little practical consequence. They make recommendations for society on the basis of a discipline that has no theory of society, nor indeed any conception of social structure, but rather merely regards society as an aggregation of individual agents, each pursuing their own self-interest (i.e., methodological individualism).

Microeconomics, based on preference utilitarianism, regards humans as optimising machines whose decisions leave no room for emotion, psychology or social embeddedness. *Homo oeconomicus* is an automaton, maximising utility on the basis of a preordained set of preferences. If such individuals existed they would have no freedom to choose because all their choices would be preprogrammed, they would merely execute the optimising rule. This machine-like human is matched by a similar model of the business enterprise or firm. Firms are assumed to merely execute a rule of profit maximisation. They have no structure, no people, and no institutions within which they operate and of which they are constructed. They are involved in no struggles over ownership of the means of production nor concerns over exploitation, no lobbying of politicians nor regulatory capture of government agencies. There is nothing like a multinational corporation in the microeconomic literature, let alone the aggressive mining industry, fossil fuel sector, petrochemical and agro industries, loggers, aerospace/telecommunications/computing/robotics industrial-military complex, soft drinks and fast food franchises, supermarket chains, property developers, building contractors, speculators, stock traders, bankers and financiers. Accordingly, there is no theory of cost-shifting enterprises that deliberately harm others in order to profit themselves (see Kapp,

1978), but instead the dominant characterisation of firms is as neutral agents of production at the service of the sovereign consumer (Fellner and Spash, 2015). Economic theory explains systemic failures as externally caused and so absolves economic agents of responsibility. Thus, pollution is termed an ‘externality’ that is only problematic because it lies outside the pricing system of which firms are mere functionaries. The historical development of the modern economy, dominated by corporations and the financial sector, is as inexplicable for the economist trained in modern theory as is the necessity of a biophysical reality.

Macroeconomics is just as unreal and ontologically flawed. The basic economic model that underlies all macro theory assumes a totally isolated economic system with no inputs and no outputs of either materials or energy. There is only a flow of goods and services between firms and households. Households supply labour to firms and get paid, they in turn demand goods and services for which they pay. Physical flows in one direction are matched by monetary flows in the other. Economic growth is merely how fast the flows occur. In this ontology the presumption is that economic reality consists only of the firm and household and their exchanges, and economic growth can go on forever as an exchange between the two. Nothing could be more utopian. Sophisticated models may add a government sector, although the major concern has increasingly become that such a sector is problematic for an efficient economy and its role should be minimised. Treasury models have no banking or finance sector and cannot then say anything about the need for their regulation. Instead government must take the blame for financial crises and be cut back through austerity measures. The focus, whether orthodox or heterodox macroeconomics, is upon a utopian economy of production, growth and capital accumulation. All else is secondary or treated as of no consequence.

Paradoxically, the very irrelevance of modern economics as a means for understanding the functioning of the economy is why it can exist. It is harmless for key power interests, namely a political elite, the rich and multinational corporations. They can use its models and concepts as rhetorical devices when convenient and ignore them just as easily. Yet, the paucity of economic analysis has real implications because it supports claims such as: all is well with the world, there is such a thing as an efficient competitive economy, the rich deserve their wealth, corporations are a valid and good institution, markets supply freedom and economic growth will eradicate poverty. The world is defined as a market economy that is the highest form of human evolution. This results in the propaganda slogan that “there is no alternative” to the capital accumulating market economy driven by competition, innovation, technology and the desire for ever more material affluence.

If you spend time engaging with the economics profession, and the related defenders of faith in the current economic system, there will repeatedly be points at which they are forced to admit the validity of criticisms both of their own economic understanding and the current political economy. In fact they will admit so many criticisms as to leave no doubt that an alternative to both should be adopted. However, their last line of defence is that there is nothing better to replace the existing approach, that alternatives have been tried and failed, and while things are bad the alternatives are much worse. In terms of supporting the current economic system their arguments will cite the failures of the Soviet Union, the bureaucracy of planning systems, the inefficiency of barter and so on. Defence through this means of rhetoric aims to divert attention from the actual economic system and claim all its flaws must be accepted because nothing else can be done.

Can you imagine a bridge built with poor materials and structural flaws and yet being defended on such a logic? Who would trust an engineer who admitted their bridge was clearly defective, and also prone to collapse, but argued you should still use it because there is nothing better available, or we tried boats in the past but they were less efficient. Following economists, the engineer could respond to those exposing the dangers of the bridge by saying: “you are not experts so what do you know?” and “you have no right to criticise my structure before building your own and showing it is better”.

The logic of these arguments, as commonly employed by economists, is as flawed as the theory and system they try to defend. There is no onus on somebody pointing out the failings of either the economics profession or the management of the economy to keep quiet because they have not written an alternative textbook or constructed their own economic theory. At the same time these defensive arguments are unscientific and aim to divert attention away from seeking legitimate alternatives. They paint the attempts to pursue alternative economic systems in the worst possible light, without actually taking any time to research them. They attribute to all alternatives the word ‘utopian’, as a derogatory expression, while ironically placing their own faith in a totally romantic utopia of modernist techno-optimism and ever expanding materialism. A scientific approach would explore potentialities, analyse alternative structures and question the necessity and usefulness of existing approaches. Most importantly it would relate to biophysical and social reality.

### **The Social Ecological Economy**

What is the aim of an economy? The typical answer to such a question revolves around resource allocation. Real economic systems move goods and services through a process of extraction, transportation, transformation and on to ‘final use’ by a range of social actors

before returning all energy and materials to the environment. The complexity of the system of resource use is misleadingly simplified by reduction down to ‘production’ by a ‘firm’.

Similarly, the range of social actors is not reducible to ‘consumers’, let alone sovereign ones (Fellner and Spash, 2015), but involves the government at multiple levels, the military, firms, corporations and social groups, as well as individuals. This social complexity requires institutions (i.e., conventions, norms, rules) for coordination and social integration. The institutions humans employ also create, preserve and destroy values in society, they promote some and demote others (e.g., competition vs. cooperation). What is permitted and restricted in this social process of material and energy use determines how the economy interacts with the environment.

### *The Biophysical Economy*

Traditionally human society has consisted of a mostly rural population and agriculturally based activities. Supply chains, the modern term for getting resources from origin to production and onto consumption, for most of human history were generally short and localised. Goods that could be traded were restricted and the use of money exchange limited to specific types of trade, while money was not simply (or even principally) a means of exchange but performed a variety of roles (Hodges, 1989; Polanyi, 1957). Some items of trade did travel over long distances already by the late Medieval period and early Renaissance (e.g., in Europe spices from Asia, herring from Norway, wine from the Mediterranean, silk from China, gold and silver from South America, slaves from Africa), but daily life for the vast majority involved much self-sufficiency and only local trade, which was not limited to price-making markets.<sup>2</sup> The difficulties of long distance transportation, most conveniently

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<sup>2</sup> The Roman Empire achieved widespread maritime trade, including routes from North Africa to Northern Europe. According to Polanyi (1957: 256), ‘trade’ in the late Roman Empire was for redistribution, not sale in markets. Roman ‘trade’ included large quantities of

undertaken by sea, meant highly valued commodities were the main trade items for most of human history. This meant self-sufficiency, kinship, cooperative and non-market exchange and bioregional economies were the historical norm for most people (Cato, 2017). Material flows were largely kept within regional ecosystems and the primary source of energy was solar transformed via agriculture, forestry and fisheries.

A major transformation began with the industrial revolution and the increasing use of coal via steam engines leading to the development of steam trains and ships in the 19<sup>th</sup> Century, and an associated increasing use of iron and steel. Yet, most economies and the majority of people, even in the industrialising world, did not engage in this revolution but remained within the social metabolism of the traditional economy, working and living close to food and resources for local and regional use and employing animals, not machines, to supplement labour. Vast technological leaps, driven by State investment in the military, substantively changed the world economic system. Two world wars accelerated the role of oil, gas and petrochemicals as the foundation for new modes of processing and transporting resources and transforming them into new products. Traditional social organisation of the economic process, that was already being removed by the drive for capital accumulation aided by the industrial revolution, now became explicitly targeted for eradication.<sup>3</sup>

The arrival of this latest phase of modernity would change all social ecological interactions. Farming would use artificial fertilizers from the Haber-Bosch process developed to supply

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grains. For example, boats brought 175,200 tons of Egyptian grain to Constantinople as late as the 6<sup>th</sup> Century (Hodges, 1989: 94). Such large scale transfers (and trade in basic commodities) disappeared as the Empire collapsed first in Northern and Western Europe and then more slowly in the East within the surviving Byzantine Empire. Similar levels of trade only reappeared in the late Medieval period circa 11<sup>th</sup> Century.

<sup>3</sup> A process that continues today and in recent times has been most dramatically enforced in the modernisation drives of China and India.

explosives and based on natural gas. Commodities would be shipped by metal boats powered by oil engines and flown around the world by metal airplanes using jet engines and high octane fuel. People would live at ever greater distances from their places of work and commute back and forth daily in metal cars driven by petrol engines. The biomass and solar driven local/regional economy was being replaced by a petrochemical national/international economy with dependence upon the use of concentrated minerals and fossil fuel energy. This was a major shift in the social metabolism of human systems and their requirements for reproduction.

The concept of a social metabolism is used in ecological economics and industrial ecology to capture the need of any human society for materials and energy, in the same way as any biological organism has a similar metabolism (Krausmann, 2017). Order is created on the basis of using low entropy (Georgescu-Roegen, 1971), and the sources upon which humans are most dependent are stocks of concentrated minerals and the solar flow of radiant energy (Dieter, 2017; Mayumi, 2017). Traditional societies relied on direct and indirect means of using the latter with minimal use of the former. Modernity is built upon massive exploitation of the former.

A simple truth that ecological economics has been at pains to state and restate is that by definition a given stock is finite. A society built and dependent upon depletion of a non-renewable resource will collapse. Only if the resource stock can be replenished or substituted can this be avoided. Modernity's stock dependence in terms of materials and fossil fuel energy therefore leads directly to the drive for new technologies and innovative ways of substituting resources. That means creating an ever changing society without any stability because the economic process must continuously seek new ways of doing things and social

practice must change accordingly. The fundamental requirement is to maintain the exploitation of low entropy at a rate that renews the economic structure.

The growth of the economy in material and energy results in always needing more for the reproductive process to continue. In addition, the fact that energy and matter are never destroyed, but merely transformed, means all that goes into the economy comes out in equal amount but qualitatively different—high entropy, unconcentrated—form at the other end. This matter and energy, that humans call waste, must go into either the land, air or water. Pollution ‘control’ shifts the waste of the human system from one medium to another, in search of a way to neutralise the worst impacts, often with unintended feedbacks for humans and non-humans alike. Pollution is an inevitable part of the economic process not an avoidable externality that disappears if the prices are ‘right’, and it inevitably increases with economic growth because that growth is dependent upon material and energy throughput. In addition, the drive for new innovative products and substitutes for materials and energy means creating novel artificial substances that change and destabilise existing structures and their functions with unknown consequences. For example, chlorofluorocarbons changing the atmospheric chemical balance of the stratosphere and destroying the ozone layer, or pesticides and insecticides changing the balance of species and the functioning of agricultural ecosystems.

Scenarios combine with systems analysis were famously used in the 1970s to illustrate how exponential growth on a finite planet hits limits (Meadows, et al., 1972). A basic storyline was that the continuous expansion of industrial output and human population can lead to a range of possible crisis in terms of competition for resources and food supplies and environmental impacts from pollution. Contrary to critics remarks, scenarios are not meant to

be historical or empirical explanations nor predictions, but are thought experiments about plausible futures. They may aid identifying causal mechanisms leading to what would otherwise be surprise events and stimulate actions to avoid them.

This raises a foundational issue in the conduct of science policy. The empirical dominates scientific discourse, which requires that phenomena must be both actualised and observed. Hence, for example, awaiting empirical evidence of substantive harm due to human induced climate change will prevent action to avoid substantive harm. This is the reason for precaution (Stirling, 2017), and safe minimum standards (Seidl, 2017). Humans may well maintain exploitative relationships with Nature that empirically appear unproblematic for a long time. This was a central argument made in the 1970s explanation of how exponential growth patterns in human society could lead to collapse without being recognised by traditional scientific empiricism (Meadows et al. 1972). The structure of our material and energy throughput economy is incompatible with maintaining the structure and functioning of ecological systems, but empiricism is backward looking and will reveal the full scale of the disaster only after the event, when action is too late.

The capital accumulating growth economy is a system in a continuous battle against the instability it creates through the destruction of that upon which it depends. It is also socially divisive and empirically selective. Environmental impacts affecting the poor, indigenous, disenfranchised and non-human are easily ignored in a system obsessed by financial flows. At the same time social and economic systems mediate how environmental crises actually materialise and there is a legitimate criticism that these aspects have been poorly theorised in ecological economics. Beyond the biophysical reality of an economic system there is the social reality.

### *The Social Economy*

If we qualify economic with social what does this mean? Can an economy exist without a society? Clearly the answer is “No”. Can an economy be understood without the social context? Here there is division with the mainstream economist answering “Yes” and many heterodox economists and other social scientists generally answering “No”. On what basis could the mainstream justify their position? The argument is an engineering one. That is, for example, studying a car engine and its operation can make sense without the context of a road system or even knowing the exact design of the car into which the engine might be placed. The efficient running of the mechanical device alone is an object of study. This mechanistic epistemology has been incorporated at the heart of mainstream economics (Georgescu-Roegen, 2009 [1979]: 107).

Rejecting the engineering approach to economics quickly leads to the necessity of placing the economy in its social context, which involves knowing the specifics of institutions and politics. The economic engine is meaningless outside of this context and cannot be understood as an independent object of study. Engineering economics could only then be justified for a small field of specialists who would be embedded in a larger team bringing together the necessary social sciences. In contrast, economic practice today regards the engineering economist as the only legitimate members of the team and treats the need for others as superfluous. The result is that economic engines are being designed without any idea of whether they would be of any practical use for humanity and ignoring their social and political implications. There is no conceptualisation of the vehicle they are supposed to drive or what is required in terms of the social system that would make such vehicles operative.

That the mechanistic epistemology dominates economics also explains why economists are obsessed with efficiency.

Yet, even engineering efficiency is not a primary concern for transportation, let alone economies. For example, cars today can have very efficient engines in terms of fuel consumption, compared to the past, but can be embedded in massive vehicles used by single occupants burning more fuel per passenger mile than in a system of less efficient smaller vehicles that are shared. The institutional design and social structure of the system, and resulting human behaviour within that system, are far more important than technical and engineering design (e.g., aerodynamic vehicles or low fuel consumption engines). The American idealisation of the car created a cultural icon connected with freedom, the idea of roaming freely across the open plane. The construction of desires for a fast car or motorbike has targeted male egos and connected the powerful engine to sexual attractiveness, e.g., advertising using bikini clad female models. This macho car culture need bear no relationship to social reality. That reality is the hum drum daily commute, stuck in traffic and polluting the air that the occupants pump into their luxury metal boxes to fill their lungs, while the road infrastructure has cut up the open planes and created motorway, autobahn and highway systems that act as barriers to non-humans and non-motorised humans alike. The removal of peace and quiet and contamination of air, soils and water is absent from the iconic image of the car, as is the discrimination entailed against the freedom of others (an implicit power relationship).

The configuration of and requirements for transport, like all human activities, is socially and politically conditional. That means that what are taken as essential requirements under one social structure are unnecessary under another. Indeed, why do we organise society in cities

structured to require millions of people to go back and forth everyday from home to work? Towns and cities were redesigned in the 20<sup>th</sup> Century to serve the car, creating extensive physical infrastructure and a social structural lock-in. State and public funds have massively subsidised this mode of transport. The same is true for flying and airports. These are major State planned investments including extensive supporting infrastructure. Yet, only directly State owned railways are generally recognised as planned and subsidised.

The role of the State is indeed a major issue in social and political economy. Neoliberalism as actualised has made the State a support for corporate, rather than public, interest, but at the same time the hope of many is that the State will be an environmental protector and enforcer of justice. The State's role in promoting technology and infrastructure then becomes crucial, e.g., transport, aerospace and telecommunications. For example, industrial-military technology developed the rockets that allowed construction of a military satellite infrastructure that led to use of weapons targeting global positioning systems that are now common in vehicles and mobile phones. Such technologies change human expectations and behaviour in unpredictable ways but are also potentially invasive (e.g., security and military monitoring). Innovation and technology are heavily supported by States as the hope for avoiding the otherwise inevitable end of the growth economy through finding substitutes for disappearing energy sources and concentrated minerals, as well as finding miracle cures for the consequences of environmental pollution (from bugs that eat waste to geoengineering the planetary climate). The State and corporations have a vested interest in promoting all technological developments as inherently good, under funding and suppressing research into problems and overriding public concerns (e.g., over nanotechnology, biotechnology, genetic modification, nuclear power, microwave transmitters, radiofrequency electromagnetic fields, household chemicals, plastics).

An interesting aspect of new products with innovative technologies is how readily they are actually accepted, along with the major changes in social relations they entail. This is in stark contrast to direct social planning to which people strongly object. Indeed social acceptance in the market economy is defined by owning the ‘right’ technological device, and having the most up-to-date version, which changes at least every year. The ownership of products has become an expression of identity. The corporate marketers know the importance of linking into society and making their products part of daily practices. Those who resist technological advance are regarded as Neanderthals who should be ostracised, and overtime the construction of physical and social infrastructure makes resistance harder and results in social exclusion. The lie of (neo)liberal political philosophy is that agents always have a free choice. Why do people have mobile phones? Because other people have mobile phones and now you are expected to have one to be ‘normal’. In fact, technology is designing our social systems and not the other way around.

Regaining social practices from the corporations and their products is a major task as they use the internet and mobile phone technologies to reconceptualise friendship through ‘social media’, and redefine social standing via new metrics (e.g., ‘likes’, ‘hits’ and ‘followers’). This capture and redefinition of social interaction happens almost imperceptibly, as does technologically driven behavioural change (e.g., adults habitually checking their phone, ignoring each other in preference for their phones, giving children a mobile phone or computer rather than interacting with them). The type of technology incorporated into an economy has social implications and hi-tech, not appropriate technology, is demanded by the growth economy. Corporate self-interest and government commitment to hi-tech, innovation

and growth mean positive social, economic and environmental aspects are always highlighted and the new is always promoted as better than the old.

That there are other forms of social economy is both an historical fact and present reality. Yet these alternatives are dismissed by equating economic growth with development and technology with progress. Under this paradigm the rural is derided in favour of the urban. Urbanisation is a policy of the growth economy that targets the destruction of rural livelihoods in the drive for mechanised industrial agriculture and the creation of an urban underclass to work in the unskilled jobs of factories and to carry out undesirable reproductive tasks. On a measure of poverty based on a dollar metric (e.g., the World Bank's \$1.25 per day) the process might appear to successfully reduce poverty, because the metric does not account for anything non-monetary. There is, for example, a high rate of suicide amongst subsistence farmers who lose their livelihoods due to on-going 'modernisation' in India and China that replaces unpaid subsistence work and familial exchange with wage labour in factories and industrial agriculture. Meaningful lives are made, quite literally, meaningless.

Adoption of formal economics, price-making markets, and equating money trade and exchange, all narrow down the richness of human relationships and their potential.

Reciprocity and redistribution as forms of social integration and coordination are far older than market exchange. Market exchange is also possible in different forms than suggested by the economists' equilibrating supply-demand models suggest (Polanyi, 1957). Yet such alternative institutional arrangements are again derided as backward and not progressive, because the presumption is that price-making market exchange has achieved freedom from such social requirements. In contrast, a substantive economic understanding reveals markets,

as institutions, depend upon a whole range of ancient institutional arrangements including centralised rules, norms and conventions built around creating trust.

Ecofeminism has also emphasised another black hole in the formal economic understanding. That is the failure to address the role of care giving and social reproduction because this is “women’s work”. There are then serious issues in the failure of modern economics to address the social reality of how the economy operates on the basis of the role traditionally played by women, their exploitation by men and the conceptualisation of what constitutes work (Salleh, 2017).

Social relationships to others also extend to the way in which resources are obtained and the rules for their use or non-use. The productivist growth economy requires land, minerals, energy and cheap labour on an ever increasing scale. These requirements must come from somewhere and that somewhere is ever more distant from the final users (aiding ignorance and dismissal of social and environmental exploitation). Resource appropriation means intervening in the lives of others and removing resources from their use. Formal economics reduces this relationship down to free trade and comparative advantage. In contrast, land grabbing, for example, is one aspect of the ‘development’ project on-going internationally and has been a tradition of the Western ‘development’ model enforced via imperialism. Real resource control is based on military backed political power and the use of that power to force allegiances that allow resource exploitation and trade. For example, the USA has repeatedly destabilised other countries using ‘intelligence services’ leading to the overthrow of governments and the establishment of regimes that will ‘trade’ and support their corporate interests. This has nothing to do with promoting democracy, for example the removal of a democratic left wing government in Chile replaced by a bloody military dictator in the form

of Pinochet who was actively supported by the USA, or consider their training of paramilitary groups around the world, or their willingness to trade with oil rich undemocratic totalitarian nations. Industrialised economies did not get rich through fair trade but unequal exchange (Hornberg, 2017), and modern economies persist in the exploitation of others in order to maintain their populations in an imperial mode of living (Brand and Wissen, 2017), or at least enough of the population to keep the lid on social unrest.

The remaining missing 'other' being exploited is the non-human world. Some living in the industrially developed economic systems have even postulated that there is only society. The likes of Bruno Latour appear to vacillate between regarding Nature as a social construct, existing only in our minds, to having to admit there must be something existing in an external reality (Pollini, 2013). Perhaps living in cities has made such postmodern theorists unable to look at the sky and see the Milky Way every night to get a daily reminder of how insignificant humanity is in the universe. That such positions can be seriously advocated and considered as valid is an indicator of how far modern humanity has become divorced from the natural world on which it depends and in which it is embedded. There is a certain arrogance in considering humanity as so dominant in the universe that there is nothing else but that which humans create. It is also disturbing in terms of the implications for the ethical treatment of non-humans.

In economics the non-human is merely a resource to be exploited subject to individual preferences. If nobody has a strong preference for say species preservation or the species fails to provide a good rate of return (e.g., reproducing too slowly) they can be eradicated on efficiency grounds. The ethics of preference utilitarianism leaves no room for anything but that which humans deem useful and it must be useful enough to outweigh its maintenance

'costs', measured as opportunity costs, i.e., doing something else with the resources (Spash, 2015b). Leaving space for other species to flourish, for no other reason than that they should be allowed to do so, is beyond the comprehension of such economics. The idea that non-human social organisation (as revealed by socioecology) might have value in itself also has no place. Environmental ethics has questioned the ability of any of the dominant anthropocentric ethical systems to adequately value the non-human world, so raising the need for new ethical approaches. What is clear is that the current economic system is wiping out species at an unprecedented rate (Spash, 2015a). In summary, the structure of the social economy not only defines personal identity and the relationships between humans, but also humanities relationship to the non-human world.

### **Future Directions**

Social ecological economists have strong associations with communities and movements seeking serious social ecological transformation and see activism as an essential part of being a committed ecological economist. Social practice should link to self awareness. As research opens the eyes of the researcher to what is wrong and needs to change they have a duty of responsibility to act on that information. As recognised in philosophy of science by the logical empiricism of the left wing of the Vienna Circle, articulating and defending a scientific worldview is then both an academic position and a political act aimed at social reform and emancipation (Spash, 2012a: 38); a position shared by critical realism (Puller and Smith, 2017; Spash, 2012a: 44).

A core aspect of social ecological economics is a foundation in philosophy of science: ontology, epistemology and methodology (Spash, 2012a). The synthesis needed must combine critical social science with a realist perspective, but one that recognises the role of

social construction in the creation of knowledge through conceptualisation. This approach builds on both logical empiricism and weak social constructivism in placing science within the context of social learning while not denying the reality and independence of biophysical entities, systems, structure and their mechanisms of operation. The epistemological limits of human ability to understand the consequences of any given action are no more self-evident than in environmental policy. Yet, that humans are fallible is denied by claims that more scientific research is needed to remove uncertainty before action can be taken, and/or that scientific claims, such as humans are inducing climate change, have not been ‘proven’. Public policy is rife with the failure to understand the meaning and content of uncertainty, and its different forms (Seidl, 2017; Stirling, 2017; Strand, 2017), as well as ignorance as to what makes a claim valid. A critical realist position can help provide the required philosophy of science (Puller and Smith, 2017), but that still leaves the need for a social theory.

The social here is taken to include the cultural and political without which no economy can be run or understood (as argued above). A critical institutional economics is essential to analyse the conventions, norms, practices, rules and regulations that humanity employs to coordinate social interaction including those that are economic (Vatn, 2017). Social ecological economics is then an appeal to return to the roots of concern for how society is structured and the direction it takes as a result—as expressed in the political economy writings of the likes of Kapp (1978), Georgescu-Roegen (2009 [1975]) and Polanyi (1944). The open assertion of social ecological economics is a wake-up call to those drifting into unthinking economic conformity, as well as to those social scientists (including heterodox economists) who ignore environmental and biophysical reality.

In this paper I have outlined the importance of combining the social, ecological and economic. The future direction required is one that builds alternatives that are better than the capital accumulating growth economy of today, that is built on exploitation and which is driving humanity towards ever more serious resource wars and inequity under the guise of free trade and competition. I have not attempted to describe the constituents of an alternative social ecological economy, that is work for the future. However, I have touched upon some of the key elements that have been, and are, central to a meaningful radical and deep ecological economics in performing that much needed work. Here I mean radical in its original sense of going to the very root of an issue (*radicalis* from *radix* or root; *Oxford English Dictionary on Historical Principles*). Radical social ecological transformation from the present economy requires identification of the fundamental things and principles that matter.

Progress has been made in recognising the radical elements of a social ecological economy and the needed transformation. The monism of economics is replaced by value pluralism and acceptance of incommensurability (O'Neill, 2017). A return to political economy means explicitly addressing power and structure in society (Stör, 2017). Efficiency is relegated to a secondary, or even lesser, goal while the primary goals are meeting basic needs in a society that is ethical (Rauschmayer and Omann, 2017), respects the moral standing of others (both human and non-human animals), seeks equality and upholds justice. The meaning of economic activity including work and leisure is redefined once the productivist logic of modernity is removed (Fellner, 2017). Rather than being focussed on production the emphasis is on the reproduction and reproducibility of society in ways that do not transgress social and ecological constraints. Biophysical reality and the role of energy and materials is then central (Dieter, 2017; Hornberg, 2017; Krausmann, 2017; Mayumi, 2017), but also the role of women and the real division of labour in social reproduction (Salleh, 2017).

The growth economy is leading to an inevitable series of ongoing crises, creating harm, death and destruction. However, total collapse of the social and economic system is not as inevitable as Marx thought, and major crises have been repeatedly overcome by capitalism. The current trajectory is one of further divisions within society both nationally and globally, so that the 'successful' capital accumulating economies can persist much longer through securitisation, militarisation and an increasingly authoritarian system of governance. Instability has been used to play on fear of others and an atmosphere of hatred means representative democracies have become susceptible to governance by the extreme right, as a united minority oppresses a disunited majority. As the growth economy stumbles and falls into recession and stagnation more desperate means of seeking growth are pursued. New means for the financialisation of Nature, more speculation, new derivatives markets, more novel hi-tech, faster innovation, more resource extraction with ever greater environmental and social harm pushed on to 'others'. The category of others expands as the system must create more social division in an economy built on an ever diminishing set of resources essential to reproduce the system. The privileged will maintain that system as long as possible in a process of self-preservation that sacrifices the many for the few.

That the resources required by the modern capital accumulating economy are becoming scarcer is a basic fact, as is the diminishing capacity of the Earth to handle human pollution. This is no more self-evident than with the limited capacity for further releases of human generated greenhouse gases, and especially carbon, if further climate forcing is to be prevented; indeed, the much touted 2°C target has already been passed (Spash, 2016). Yet, human induced climate change is also being used as a distraction from the broad range of systemic issues and is only one of the many environmental problems existing today— soil

erosion, deforestation, water salinisation, insecticides and pesticides, particulates in the air, tropospheric ozone pollution, stratospheric ozone loss, acidic deposition, toxic chemical waste, heavy metals, asbestos, nuclear waste, biodiversity loss, acidification of the oceans, hormone discharges into the water supply, pollution from plastics, light, noise and so on. The material and energy throughput of the economy cannot continue to grow without destructive effects socially and ecologically. As I have argued elsewhere (Spash, 2007), humanity would do better to create an economic system that is smaller by design, not disaster. A social economy that reproduces itself in harmony with Nature rather than through domination over it. That is the job ahead.

## **Conclusions**

Humanity can no more afford to continue giving credence to a redundant economics profession than it can persist with a destructive and divisive economic system. Social ecological economics explains how and why the modern mode of production and consumption is socially unjust and ecologically unsustainable. The next step is to develop the theoretical basis for alternative structures, a scientific utopian vision and a radical social ecological transformation. The motto of social ecological economics is: “There are only alternatives”.

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