Chapter 1

Introduction: Pie in the sky to reality on the ground

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Despite 26 Conference of the Parties (COPs), Climate Change has taken on a Kafkaesque quality and morphed to a Climate Emergency. This suggests the current patterns of global development are not sustainably viable. Consequently, solutions - institutional, technological, behavioural, or otherwise, needed to address the multiple challenges of the Climate Emergency - are urgently required. For example, to remove the barriers between People, Planet and Profit since the explanation in its current form creates polarisation as bias on one pillar or another acts as a barrier to understanding that each is a function of the other. Thus, actions, to be effective, need to be accompanied by a balance between the urgent precipitous reductions in emissions, reductions in the total level of consumption and production of goods and services as well as a realignment of how products and services are offered and consumed in order that a section of global society is not marginalised.

Problem Areas in need of immediate attention:

a. The consumption and production cycle are among the key drivers of greenhouse-gas (GHG) emissions. So far, there is little evidence that the decoupling of the economy from GHG emissions is occurring at either the scale or speed required.
b. Investments in a more sustainable infrastructure - including renewable energy - will themselves, require extensive amounts of energy - largely from fossil sources. Combined with a lack of any robust measurement of environmental return on investment equal to financial return on investment, then this too will significantly sap the global carbon budget established by the Intergovernmental Panel on Climate Change (IPCC) to remain within 1.5 degrees.
c. To improve the standard of living and well-being of the world's lowest income communities will claim another major portion of the carbon allowance.

Socio-environmental decline

Against the backdrop of rising affluence of the few what we see is increasing economic insecurity for low-income households. Contributing issues to this divergence can be seen as declining wages (in real terms), increasing migration, technological change, declining resource availability, human rights abuses, illegal land-grabs, and skills gaps between education and work.

Indeed, the pervasive lack of multidisciplinary skill sets, specifically to managerial and engineering perspectives, can also be seen as a driver of socio-environmental decline. This owes much to the traditional silos within structure and governance where the negative impact between pools of knowledge are not accounted for and thus contribute to resource depletion, waste, emissions, pollution, biodiversity loss and poor health amongst others.

Likewise, as with policy makers who are far too keen to focus on the role of consumer decision making to influence acquisition and market behaviour on resource exploitation. As a result, much policy supports suboptimal technology shifts formed from an over reliance on technologies that don't yet exist and there is no evidence the pie-in-the-sky technologies could ever be delivered at scale. Consequently, policy is driven on blind faith that a miracle will happen tomorrow supported by billions of tax-payers money, that ultimately supports only a business-as-usual agenda where burn now pay later is the overarching rule of thumb. This has left low-income sectors marginalised or excluded, and the effects on resource decline and climate change have been worsened: particularly, in key consumption areas such as transportation, food, agriculture and energy. Regrettably, what appears plain, is that the background theoretical work reflects little of the real-world as evidenced by the Kafkaesque morphing of Climate Change to the Climate Emergency.

Accordingly, it is increasingly acknowledged that siloed sub-optimal technological interventions to stem the adverse effects of dangerous climate change are likely to prove insufficient. This suggests more creative strategies to reshape prevalent production / consumption practices are required.

Emissions measurement paradox

There is an expanding use of consumption based GHG accounting, which assigns emissions on the basis of embodied carbon content at points of consumption. Yet, since measurement boundaries are a variable and there is no practical understanding of feedback loops, misbehaviour in GHG accounting is rife. It follows, net-zero is a vague number. Consequently, any sense of urgency to reduce emissions today is diminished and the only upward trend is the lack of public trust.

Evidence shows emission levels in a number of the world's largest cities are approximately 60% greater than generally calculated and reductions have been extremely limited even when governments have implemented what appears to be relatively ambitious climate policies.[1]

1 Consumption-based Emissions of C40 Cities

As a result, there is growing realisation that current interventions to encourage the re-engineering of individual products (or infrastructure) - or to incrementally modify the consumption behaviour of end-users - are likely to be ineffectual, inadequate and create a myriad of unintended consequences. This is true not only from the position of reducing GHG emissions and reducing the pressure on the biosphere, but also with respect to addressing other major challenges such as the effective disposal of waste and stopping exposure to hazardous materials.

Consequently, it is necessary to adopt a more innovative sustainably viable stance and to focus on more holistic systems-level modes of analysis and intervention that increase the decision space and move us from incremental initiatives to exponential improvement.

Thus, we need to harmonise:

i. Interdependent consumption and production cycles as producers seek to raise sales volumes and higher consumer purchases incentivise more production.

ii. Since business and policy agendas are dependent on maintaining the above arrangements through the economic growth imperative, tension is created among the effects of multiple interacting investment, organisational, environmental, governance and social ecosystems. How actions of each affects the many.

iii. Technological and human systems are affected by both function and time. Technologies and human interaction are currently arranged in silos. The barrier's silos create not only hamper the effectiveness of climate action but ignore the negative side-effects of and between decisions. To take a whole-systems Sphere Economy approach will reveal not just synergies but symbiotic relationships along and across value chains at the nexus of energy, water, food, health, shelter, land, and transport amongst others.

iv. Increasing efficiency of natural resource use risks stimulating demand from counterinitiative rebound effects. It follows, this will, at least partly, offset initial technological achievements.

v. The objectives of policies aimed at reducing the adverse effects of consumption and production often compete with equally important social goals to reduce societal inequalities and poverty.

> "Sometimes it's not about things but the relationship between things." - Christopher Gleadle, 2015

Making Three Dimensional Decisions in a Three Dimensional World

The current unsustainable choreography of consumption and production cycles requires the interlocking of interdependent global challenges that include climate change, biodiversity loss, water, food, energy, poverty,

and inequality. Yet, policy interventions to date focus nearly exclusively on isolated technological innovation of technologies that are unproven both in terms of capability and scalability. And where the role of consumption has been recognised it has in the most part been framed in terms of individual decision-making, primarily within a market context. Over time, it has become clear that this approach will not yield the results critically needed. It follows, to be effective, policymaking needs to generate greater empirical insights that reflect the real world. This will involve developing a comprehensive systemic understanding of production-consumption systems based upon a rigorous reporting criteria similar to that of financial return on investment to provide a platform for greater governance.

Additionally, precipitous reductions in consumption-related emissions of the wealthier nations will be essential if there is to be equitable near-term economic development of poorer nations. In contrast, the trend observed (1998—2013) has been for increased inequalities in carbon emissions between individuals within countries.

Global CO_{2e} emissions remain highly concentrated today: top 10% emitters contribute to about 45% of global emissions, while bottom 50% emitters contribute to 13% of global emissions. Top 10% emitters live on all continents, with one third of them from emerging countries.[2]

And, while the circular economy mark's a germ of change in attitudes, prevailing knowledge gaps hinder progress beyond that of business as usual since it still doesn't take account of misbehaviour at the nexus of hard and soft systems or the lack of imagination within managerial, operational, investment and governance decision making.[3] It follows, the circular economy needs to shift to a holistic systems paradigm — a Sphere Economy (Fig 1) — to affect the way goods and services are provided. And, while digital technologies can enable a reintroduction of product to service swaps – the benefits of these innovations are ambiguous[4] due to dubious impact accounting.

> "If you can't imagine it, your model can't capture it, and that means the evidence won't reflect it."
> - Christopher Gleadle, 2018

2 Global Inequality of Carbon Emissions (1998–2013) and Prospects for an Equitable Adaptation Fund. Paris: Paris School of Economics. Lucas Chancel, Iddri & Paris School of Economics Thomas Piketty, Paris School of Economics
3 Gleadle C, 2018, The 5 Essential Steps to Sustainable Viability
4 Gleadle C, 2021, Sustainability, ESG and the Productivity Paradox

The role of Integrated Economics

Consumption and production outcomes are derived from the allocation of capital, as well as how the profits derived from these allocations are apportioned among various stakeholders. The political economy approach emphasises efforts to alleviate inequalities embedded in these arrangements as a route toward the creation of more sustainable provisioning arrangements.

To advance this position, the Sphere Economy has its roots in ecological economics and industrial ecology that takes account of the feedback loops between decisions and actions. Consequently, the Sustainably Viable Sphere Economy designs, and audits flows of material, energy, information and thus the relationships, that can then be used to model how spheres of Production and Consumption can be remodelled to reduce pressure on ecosystem services, the inflow of raw material, and absorption of outflow that it will be useful in various ways - for environmental management, biodiversity, community well-being and economic management - from the enhanced understanding and benefit of the feedback loops. Thus achieve zero-waste systems and improved social equivalence.

Therefore, to reorient from obsession on the process and moving to an outcome focussed integrated Sphere Economy approach provides a useful foundation for more systemic analysis. Systemic Integration reveals the interdependencies of consumption-production cycles to show the relative sustainable viability of the system. This means it is essential to stop narrow sectoral insights as the basis for policy and practice. For example, studies of productivity tend to be classified by economic systems, with resource use being typically defined by material categories, and indicators of economic and environmental health being generally organised by national borders. Yet, overseen by critical systems thinking of the SV Sphere Economy can accelerate progress toward zero-waste consumption-production systems that create secondary symbiotic markets across and along value chains that will support the well-being of communities.

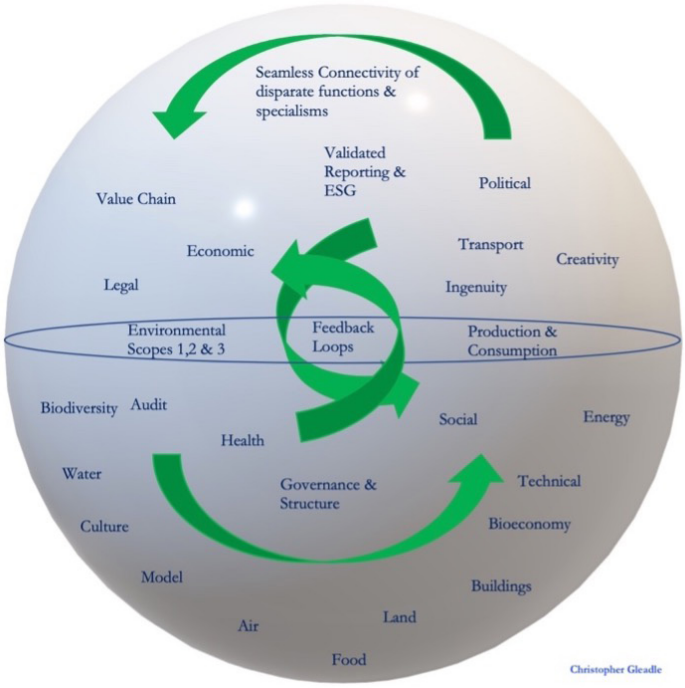

Fig 1 – The Sphere Economy.

Sphere Economy applies a holistic three-dimensional systems perspective over time to decision making. This enables consideration of alternative ways to govern the provisioning of resources not only at points of activity but along and across value chains. Thus, issues of equity and valuation of capital – economic, human, and natural – are visualised to help temper protectionist reactions that are detrimental to that capital. Thus, reduce risk.

Sphere Economy leapfrogs the two-dimensional circular economy since it includes feedback loops within decision making in a manner similar to the abundance creating feedback loops of the Biosphere. By this action risk, waste, emissions, and impact are better understood and can be better audited for comparability.

Sphere Economy tackles multiple issues simultaneously accelerating action toward an equitable and authentic net-zero world. It implies making three dimensional decisions in a three-dimensional world.

Mind-the-Knowledge-Gaps

Sustainably viable consumption and production systems require reduced GHG emissions and resource demand. Consequently, current perceived organisational logic of contemporary consumption-production cycles needs to be shifted toward a better understanding of how, at the nexus of hard and soft systems, what technological, institutional, and social changes are required for sustainable viability to be accomplished in

ways that ensure a just transition to net-zero, zero-waste, organisations.

It follows, understanding the feedback loops within the Sphere Economy highlights understanding of the relationship between both decreasing inequality within societies and reducing impacts upon society and the biosphere.

> "...theoretical work can spin off under its own momentum, reflecting little of the empirical world"
> - Elinor Ostrom, Governing the Commons, 1990

Understanding systems of consumption and production

Evidence shows that due to a lack of understanding as to the interdependence and feedback-loops of consumption and production cycles, policy interventions have created unintended consequences that have escalated social and environmental impacts on one hand and hindered demand-side reductions on the other.[5]

It follows, to shift from a programme of siloed policy making to a holistic paradigm of policy commitments that harmonises policy will improve value to meet societal and environmental objectives. Consequently, it is vital to account for the effects of multiple interacting investment, organisational, environmental, governance and social ecosystems. Such action will be key to improving both sociotechnical and socioeconomic change.

Policy tools

Currently, governance at all levels contributes to growing inequality and marginalisation. This phenomenon is prevalent between urban and rural regions as well as within cities. These disparities are absent even from recognised sustainability strategies that emphasise popular notions such as circular economy, green growth, and the New Green Deal.

In addition to their relative neglect of climate justice, the dominant schools of sustainability research and policy tend to study issues from technical and managerial perspectives that overemphasise quantification, efficiency, and markets as siloed topics. This orientation results in inadequate attention being devoted to the misbehaviour at the nexus of hard and soft systems and misses the opportunity to optimal outcomes.[6] Accordingly, research needs to account for the feedback loops within structural power relationships to help overcome conflicts among contrasting institutional as well as geopolitical governance and structure.

5 Sustainable DNA For Policy Makers. C Gleadle 2018
6 Naïve Modelling, C Gleadle 2020

The Sphere Economy enables consideration of alternative ways in which to govern the provisioning of energy, water, waste, mineral resources, products (agricultural as well as others), not only at particular points of activity (for example through markets or trade agreements), but along entire transnational value chains.

And while the pursuit of justice is becoming ever more prominent in global climate and environmental negotiations, policies based upon sustainable viability and the sphere economy can advance fairness and temper 'hard-wired' protectionist reactions that are detrimental to both society and nature. For example, while there is popular support for sustainability initiatives that involve constraints on personal consumption, such policies are undermined by inequality. Yet, accounting for feedback loops within systems of production and consumption new modes of governance can foster harmonised partnerships with social movements that seek to promote inclusiveness.

The negative impacts between power groups

The contribution of the finance industry in perpetuating unsustainable economic practices as a barrier to change deserves special attention. Indeed, in the face of rising ESG (Environmental Social Governance) activity, sever knowledge gaps coupled with the absence of globally binding rules on advancing authoritative zero-waste standards as well as the lack of rigorous accountability to environmental and social returns on investment, both corporations and national economies are caught in a competition spiral that compels them to perpetuate various forms of degradation and to amplify social and environmental inequities. For example, global value chains are structured and governed by powerful and highly influential actors that are not adequately informed of the benefits, thus not incentivised, to design and implement three dimensional systems – for example, the food system and the interaction between agriculture, processing, logistics, storage, retail, and service.

The role of the city / region / district in policy making

The city/regional/district level provides a solid geographic basis for projects close to citizens and therefore consumers and enables societal, technical, and economic co-development. Beyond municipal or regional impact, small-scale local initiatives can become engines of change since the opportunity to scale-up will come in various forms as illustrated by the sphere economy. But importantly, supportive policies and governance at the local/regional level must be accompanied by harmonised policies and governance at national as well as cross border levels. This will require strong stakeholder engagement to gain agency at inter and intra levels.

For example, in countries such as Africa, where rural communities are spatially distant, to operationalise SV integration of hi-tech, low-tech, biotech and skills emphasises the increased use of all resources and creation of zero-waste systems. Accordingly, the sphere economy approach understands, and maps extended relationships that define the continuous operations, growth, and profitability of production and consumption value chains and installs a programme of actions that create secondary symbiotic markets that increase job diversity, energy security, educational opportunity, economic development, land, and agricultural output, with the amelioration of biodiversity and natural resources.

Accordingly, such an approach underpins local and national economies acting as an incubator for new eco-innovative developments. As a result, emissions and waste are reduced with impact to land, air and water tackled to provide support for health and well-being.

Conclusion

If we are to achieve true net-zero, zero-waste economies, there needs to be a precipitous decline in emissions today and not at some vague point in the future where hopes are pinned on technologies that do not even exist yet, and there is no evidence that they can even be scaled. Therefore, it is necessary to develop ways to stimulate the establishment of political and institutional configurations to ones that are sustainably viable and take advantage of the Sphere Economy. To do more with what we have. Such a change can accelerate positive climate action to avoid the moral hazard of target failure.

The multiple interacting investment, organisational, environmental, social and governance ecosystems will shape the hope of the many for sustainably viable lifestyles. Consequently, to enable society to live within the consumption levels compatible with IPCC targets it is vital for decision makers to broaden their decision space that will enable the ability to formulate policy measures that encourage and enable sustainably viable lifestyles that accord with the thresholds of the IPCC and most importantly the biosphere.