CASCADING RISKS OF CLIMATE CHANGE ON WATER SECURITY AND THE POTENTIAL FOR RAPID ADAPATATION

Consequences of modernity', potential of the double hermeneutic and implications for human security

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Abstract:

Giddens stressed in the 'Consequences of Modernity' that trust is contingent and that risks escalate when transfers are disembedded from local contexts. This paper concentrates on the need to develop policy and praxis to protect the commons. A critical and systemic approach explores Inglehart's (1997) notion of culture shift. Giddens' (1990) essay on the 'consequences of modernity' informs the analysis.

The aim of the paper is to explore the cascading interconnected challenges associated with energy and water security. The paper focuses on the impact of urbanisation in a context of climate change in Cape Town, South Africa where little preparation has been made for accommodating the higher population that has migrated to Cape Town.

This is partly due to the higher cost of a desalination plant because of a corrupt energy sector (Bond, 2012). It uses a case study approach based on a range of primary and secondary sources to explore water insecurity in Cape Town.

Rapid adaptation to conserve water in Cape Town has been achieved through a combination of fear for the future and a desire not to be shamed through a transparent water management mapping system and through generous donations of water by farmers within the region and by NGOs across South Africa.

In this paper a case is made for a way forward to address the cascading effects of climate change in the Western Cape region of South Africa by redressing the rural-urban imbalance in development opportunities.

Key words: consequences of modernity, cascading, risk, connections, double hermeneutic, trust, re-generation

1. INTRODUCTION : POLITICS AND POLICY ON HUMAN SECURITY

The paper makes the case that Capetonians across all suburbs made an effort to reduce their water consumption and the paper provides some basis for hope as it discusses what it means or could mean to be an ecological citizen. Ecological citizenship(Cao, 2015, McIntyre-Mills et al 2014, 2017) entails conserving resources through everyday decisions.

The ecological citizen sets an example by making changes which drive transformation 'from below'.

Cao (2015:11) drawin gon Victor Hugo stresses: " Environmental citizenship is an idea whose time has come."

This paper explores what this means in the context of Cape Town and how the case study can be used to inform our understanding of the processes involved in changing conservation behaviour .

Rising food costs are prevalent in South Africa associated with high living costs associated with a coal and petroleum economy[1]. The cost of a heavy carbon footprint results in food and water insecurity as the effects of climate change deepen. The focus of our research to date has been on ways to address the IPCC formula through participatory governance and democracy to protect the commons: The Intergovernmental Panel on Climate Change (IPCC) formula, namely E (Emissions) = Population X Consumption per person X Energy Efficiency X Energy Emissions..

To sum up, the paper explores a case study of rapid adaptation in Cape Town to water shortages that are a result of increased migration to the Cape and a lack of forward planning to address the effects of climate change. Forward planning to introduce a desalination plant stalled, because of the high costs associated with an unreliable energy system. Rapid adaptation to conserving water has been achieved through a combination of farmers and NGOs donating water, residents of Cape Town saving water.

The case study adds to the literature on that culture shifts by providing an in depth example of the cross cutting social, cultural, political and economic dimensions of changed behavior associated with water conservation. It provides an example of the lack of mitigation foreward planning offset by a rapid adaptation made at a household level to changed water availability. Current policies in South Africa do not have a strongly ecological focus, but the pragmatic approach adopted by Capetonians shows what can be achieved when people face a shared sense of risk.

Fear for the future, a desire not to be shamed through a transparent water management mapping system and increasing willingness to adapt as reduction became a new norm. Consequently, the risk of municipal water supplies running out appears to have been averted in the short term.

The paper then makes policy suggestions as to how the commons could be protected by extending the current system. We suggest that the development of engagement software *could* extend triple bottom line accounting and accountability (see Elkington, 1997, UN Local Agenda 21) by addressing social, cultural, economic and environmental indicators that enhance transparency and that this would help to build trust.

Rapid adapation to conserve water in Cape Town has been achieved through a combination of a) fear for the future, b) a desire not to be shamed through a transparent water management mapping system as

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[1] Rifkin (2011: 13) stresses that the new economy will focus on communication systems, enhanced mobility of people and services and decisions will need to be taken to conserve energy. He explains that with the rising cost of oil the cost of transporting goods becomes higher, but the petrochemical industry provides fertiliser and pesticides and it is involved in the production of building materials. The entire global economy is shaped by oil costs. Rifkin (2011: 14) goes on to stress that :" With 40 percent of the human race living on $2 dollars a day or less, even a marginal shift in staples could mean widespread peril"

well as c) through generous donations of water by farmers within the region and by NGOs across South Africa. The change in behaviour can be attributed in part to governance through mapping water useage on an internet website. Despite initial misgivings, the use of the transparency tool helped to restore a sense of community trust, because piped household water consumption could be monitored. Inglehart (2016) made the case that increased disparity in wealth and life chances leads *to less support* for democracy and that post material values are *less likely* to be adopted by people with low incomes.

But this is not (as yet) the case in Cape Town. The Capetonian response to cascading risks has avoided worst case scenarios (Bond, 2018) and has drawn the community together to eke out the water supply until the next rains and until better adaptation strategies are implemented with the state and private sectors. Water saving and water donations from the 'Gift of the Givers' and from farmers have helped to stave off day zero in Cape Town

However, distrust in the state and market has increased and political debate which eased (for a short while after the election of Ramaphosa) has also escalated once again. Protests now focus on individuals who are blamed for the corrupt use of resources. The General Sales Tax on food resources is a very recent decision on the part of the ANC[2] that places an additional burden on the poor as the cost of basic food items, (such as a loaf of bread) has increased. The tension between the haves and have nots can only escalate when basic food costs become less affordable (along with all the other living costs). The context is a neoliberal economy where class and race add additional layers to life chances.

1.1   Aim

The aim of the paper is to explore the cascading interconnected challenges associated with energy and water security and to point to the transformative potential of positive cascade economics (Pauli et al, 2010) developed in forthcoming volumes (Wirawan in McIntyre-Mills, Romm and Corcoran Nantes, 2018).

This transdisciplinary sketch (Darian-Smith, and McCarty, 2017) aims to address poverty and displacement and to show that transparent use and distribution of resources can help to mitigate and adapt to climate change through addressing thinking and practice relating to consumption and conservation decisions.

1.2   Background

A highly urbanised, environmentally affected region of the Western Cape is addressed in this paper along with the cascading impact on the habitat of   domestic, liminal , agricultural and wild animal life (to draw on Donaldson and Kymlicka,2011). A design is suggested for extending engagement to protect habitat as detailed in Planetary Passport (McIntyre-Mills, 2017)

Rapid urbanisation and displacement from rural areas poses a challenge for service provision in cities. Urbanisation in Africa and Indonesia is amongst the highest globally and most of the population will be living in cities in Africa and Asia by 2050. Environmental changes associated with increased risk of drought and consequent **food and water insecurity** pose an 'existential risk' (Bostrom, 2011).

The greater the participation in decision-making process, the better the social, economic and environmental development outcomes. Engagement needs to enable people to work out what they have, what they need, turning points for the better and worse, barriers to change.

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[2] https://www.ft.com/content/10d65ecc-1715-11e8-9e9c-25c814761640   South Africa increases VAT for first time in democratic era. Critics warn tax rise will hurt the poor, as new president targets state's poor finances.

Highly urbanised regions face food and water insecurity are at risk of becoming food deserts unless everyday strategies are explored with service users and providers to find better pathways to resilience and wellbeing for the most vulnerable members of the population.

The potential for rapid adaptation   aided by a water management map has been demonstrated in Cape Town (at least in the short to medium term). Capetonians have responded to a shared sense of risk and a common goal to save water. The challenge is to enable monitoring and transparency from above and below.

Training in the use of engagement software in schools and community contexts needs to occur, in order to compare and contrast the participating communities.

In line with the Paris Declaration (1997), public administration needs to be framed together with co-researchers with local lived experience. The workshop at Flinders University and the Symposium at UnPAd in West Java explored the challenge of increased urbanization and movement towards cities[3] and the implications it has for the life chances of unemployed women who become increasingly vulnerable to trafficking. The UN 2030 Agenda[4] is:

> "the new global framework to help eradicate poverty and achieve sustainable development by 2030. It includes an ambitious set of 17 Sustainable Development Goals…. The 2030 Agenda for Sustainable Development sets out the global framework to eradicate poverty and achieve sustainable development by 2030."

Globally water insecurity is increasing in major cities around the world as climate change deepens. The same federated news 24 report[5] cites Emeritus Professor Graham Cogley, of Trent University, Ontario Canada as follows:

> "Dozens of mega-cities, rich and poor, are sinking: Jakarta, Mexico City, Tokyo and dozens of cities in China, including Tianjin, Beijing and Shanghai have all dropped by a couple of meters over the last century".

The same report then cites Arjen Hoekstra, University of Twente, Netherlands directly as follows , and I quote it in full:

> "Half a billion people in the world face severe scarcity all year round… More than one in three live in India, with another 73 million in Pakistan, 27 million in Egypt, 20 million in Mexico, 20 million in Saudi Arabia and 18 million in war-torn Yemen."

The United Nations report in January 2018 stressed that we are fast approaching critical levels in temperature: and cites the Secretary-General's Special Representative for Disaster Risk Reduction, Robert Glasser:

> "A three-year streak of record hot years, each above 1° Celsius, combined with record-breaking economic losses from disasters in 2017 should tell us all that we are facing an existential threat to the planet which requires a drastic response... We are getting dangerously close to the limit of the 2°C

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[3] In Indonesia the rate of urbanization is faster than other Asian countries: According to the World Bank: "Indonesia is undergoing a historic transformation from a rural to an urban economy. The country's cities are growing faster than in other Asian countries at a rate of 4.1% per year. By 2025 – in less than 10 years – Indonesia can expect to have 68% of its population living in cities". http://www.worldbank.org/en/news/feature/2016/06/14/indonesia-urban-story

[4] http://europa.eu/rapid/press-release_MEMO-15-5709_en.htm

[5] https://www.news24.com/Green/News/for-global-water-crisis-climate-may-be-the-last-straw-20180213

temperature rise set out in the Paris Agreement and the desired goal of 1.5° will be even more difficult to maintain under present levels of greenhouse gas emissions."[6]

Globally more people are at risk of displacement currently than ever before in human history, according to the past UN High Commissioner for Refugees (Guterres, UNHCR, 2014). Women, children and other vulnerable members of the population are most likely to encounter water and food insecurity in **disaster prone regions** (Figures, 2015) and to face the cascading risks associated with displacement.

The paper is informed by the findings of the mutisite symposium[7] at Flinders University and at the University of Padjadjaran (UnPad) West Java. The symposium aimed to enable students and staff across a wide range of disciplines to explore some of the cascading interconnected challenges associated with food, energy and water security that have resulted in displacement, loss of habitat, land, sense of place and identity [8]

As such the symposium made a practical continution to improving educational and training pathways to address displacement and unemployment in Indonesia and South Africa (as both have high rates of urbanisation and high growth in cities). The transferability of lessons learned from Australia and Indonesia for South Africa and vice versa were part of the agenda of a mixed methods symposium[9] on which this paper draws.

What potential pathways can promote opportunities? What can Australian government contribute with Partner Organisations (University of South Africa, Universitas Padjadjaran, Wirasoft, Universitas Sultan Ageng Tirtayasa) to mitigate risk (Usamah, 2014) and maximise plausible pathways to resilience and wellbeing based on extending current research to mitigate cascading risks? The paper discusses a case study of changed water management practices and how the potential for transformation rests with people

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[6] UN news 2018 'Near-record warm temperatures fuel deadly, costly weather events in 20'17 – UNhttps://news.un.org/en/story/2018/01/1000721

[7] This paper is informed by the symposium, entitled: 'Mixed methods for transformative research on human security and the commons' a case is made for a way forward to address gendered, cross-cultural perspectives on what it means or could mean to be an ecological citizen who conserves resources through everyday decisions and who sets the example by making changes which drive transformation from below. The transferability of lessons were part of an agenda aimed at making a practical difference to vocational education and training to address displacement, loss and unemployment in Indonesia and South Africa, both of which have high rate of urbanisation and high population growth in cities.

[8] The aim of the multisite symposium at Flinders University in South Australia and University of Padjadjaran (UnPaD), West Java was to enable students and staff across a range of disciplines to explore some of the cascading interconnected challenges associated with food energy and water security that have resulted in displacement, loss of habitat, land , sense of place and identity . The aim of the Mixed Methods Symposium was to make a practical difference to policy in Indonesia and South Africa, both of which have a high rate of urbanisation and a high population grow in cities. A case study approach is used for studying cascading risks. The aims of the symposium and the forthcoming volumes are to explore:

- What are the socio-economic and environmental resilience challenges for the vulnerable and voiceless? What projects contribute to extending multi-species rights to a 'life worth living' in line with Nussbaum (2006, 2011)? Representation, accountability and sustainability and re-generation challenges need to be met through addressing very unequal life chances (Dobson, 2009, Dryzek, 2010) for the voiceless and (almost) complete silence for other sentient beings and the environment.
- How does engagement in education for social, economic and environmental resilience contribute to sustainable livelihood options across vulnerable stakeholders?
- What forms of social, economic and environmental regional support best contribute to improved resilience amongst vulnerable groups (Ford, 2015, Raikhel, 2010)?
- With a specific focus on food, energy and water security, how can households and local communities be engaged to overcome disadvantage and enhance resilience and balance to address the size of carbon footprints (Rees et al 2008)?
- What can be done to redress the rural-urban balance?

[9] Based on the findings we hypothesise that: The greater the participation in decision-making process, the better the social, economic and environmental development outcomes. Engagement needs to enable people to work out what they have, what they need, turning points for the better and worse, barriers to change.

who can bring about transformation . In Cape Town , South Africa the experience of trying to conserve water through consuming less is part of the response to the plummeting water levels in the six dams serving Cape Town.

The first author reflects on time spent during January helping family prepare for Day Zero , an event that has been staved off through conserving water and by donations of water from agricultural users to the city of Cape Town. She uses 'news' as a lens to reflect on the everyday, in order to understand contemporary issues that are bandied around as *real* versus *fake* news in Cape Town as it prepared for Day Zero. The transparency map helped to build trust and co-operation across Cape Town suburbs. Presentations on real news and the lobbying by social movements has driven some of the culture shift that has enabled Cape Town to push back day zero to 11th of July at the time this paper was written. Daily reflection on every day challenges in the Anthropocene (where choices matter in a very real sense) provides a lens for critical reflection. Culture shift has achieved changes in consumption in Cape Town through policy and governance changes *from above* and social pressure *from below* to change water consumption and delivery practices.

Giddens (1990:15) stresses that the so-called 'double hermeneutic' provides transformative potential for research. We are part of our subject matter and we can transform the 'real' situations through re-framing the way in which areas of concern are addressed and through constructive engagement to change thinking and practice on water management . Emancipation, however from old styles of left –right thinking need to be carefully considered.

The left/right dichotomy seems to mean less and less in the political spaces left by monopoly capitalism in a neoliberal nation state that has open boundaries for global capital, but closed boundaries for the free movement of people. Examination of the principle values that underpin parties and policies should be a starting point. The extent, to which people and the ecosystem on which they rely are protected, should be the basis for decision making that is systemically ethical and sustainable. Self-reflection and the ability to think about our thinking and practice is a first step.

"Yes, game changer approach is the way forward ..." said a colleague

Yes, I agreed: "As an academic in the meantime we have to play within the systems and try to push the boundaries through publications on alternative visions, based on small pilots."

2. CASCADING RISKS AND POLICY CONTEXT OF THE WATER CRISIS IN SOUTH AFRICA.

Highly urbanised regions face food and water insecurity are at risk of becoming food deserts((Battersby, 2012, 2017 , Battersby and Crush, 2014) unless everyday strategies are explored with service users and providers to find better pathways to resilience and wellbeing for the most vulnerable members of the population.

The potential for rapid adaptation aided by a water management map has been demonstrated in Cape Town (at least in the short to medium term). Capetonians have responded to a shared sense of risk and a common goal to save water. The challenge is to enable monitoring and transparency from above and below.

Training in the use of engagement software in schools and community contexts needs to occur in order to compare and contrast the participating communities.

Environmental changes at a global level are associated with increased risk of drought and consequent **food and water insecurity** as detailed by the UN Habitat report (2016). These events are more than one off droughts and as such pose an 'existential risk' (Bostrom, 2011). The most marginal groups (the poor) are most likely to encounter water and food insecurity (Figures, 2015).

In Cape Town, there is a strong migration from the north. Potential policy pathways need to address displacement and loss that results in a flow of people from North Africa (less developed and more populated), down to Southern Africa (more developed and with a lower population growth rate) (Harper, 2016). The push factors from the North are population growth affecting human food security (Harper, 2016). These push factors are linked with the political dynamics of social exclusion, crop failure, land grabbing and land loss, food and water insecurity that make people vulnerable to migration or trafficking and the pull of urban life, the so-called 'Dick Wittington syndrome' where life in the city is hoped to hold more opportunities. Thus, the case study focuses on climate change, displacement, loss, unemployment, poverty where drug trade and trafficking the vulnerable exist in the context of social and environmental injustice and insecurity. Cape Town, South Africa's largest metropolitan city faces a water crisis in the rain shadow areas behind Table Mountain that creates upward currents and precipitation. Urbanisation and increased migration to the Western and Eastern Cape in search of work, results in increased pressure on water, energy and food. We are confronted daily of news of displaced people fleeing conflict or natural disaster. In 2018, Cape Town faces a water crisis because of:

- drought and water insecurity associated with climate change that has impacted animal and plant life
- an energy crisis,
- greater immigration from the north of Africa to the south,
- lack of governance and planning,
- failure in democracy and a crisis in the financial system that has disregarded living systems.

The water crisis is a result of cascading risks. Potential pathways to address displacement and loss that results in a flow of people from North Africa (less developed and more populated), down to Southern Africa (more developed and with a lower population growth rate, Harper, 2016) need to be addressed by more innovative policy approaches.

The challenge is to balance the complex individual and collective needs in significant urban centres and the regional heart on which they depend for their survival. If we consider life chances and experiences across cohorts then we are likely to understand that the social determinants of wellbeing such as access to safe habitat, housing, home ownership, full time, permanent employment will have an impact on resilience to disaster. Further research is needed to provide a better understanding of the intersections across the ecological humanities and ethics (Rose, 2015, McIntyre-Mills, 2017), demographics and multispecies ethnography.

According to Boulding's (1956) analysis of the science, the relationship within and across the levels becomes increasingly complex from the inorganic to organic plant and animal life and then social and cultural systems. Although he uses an organic analogy he divides the science into categorical levels – as if they are rungs of an Aristotelian hierarchy – without explicitly stressing that human beings are indeed animals and that we are hybrid hosts to organic life in the form of a range of micro-organisms. We produce waste materials that in turn provide the organic basis for plant life and we are unable to survive unless we maintain a chemical and mechanical balance.

The potential for augmenting our intelligence (or not) by using digital technology connects human beings directly with artificially designed forms that could become post human (for better or worse). Thus, designs and the design choices of human beings are very important for the future of living systems. Whilst General Systems Theory has the potential to inform our understanding of the world and to alert us to the way in which organic life and intelligence builds as a continuum across inorganic and organic life, it needs to be open to critical revision.

Ecological citizens need to recognize a shared stake in protecting the global commons. Without supporting the essentialism of categorical politics, a rights based argument is vital if we are to extend the ethics of care and solidarity with others beyond the boundaries of our family, friends, nation state and care about others by virtue of their right to a life worth living[10]. As Kabeer (2015) explains, the life

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[10] Ariel Salleh (2016) and Donna Haraway (1991, 1997, 2010) analyze the way in which science, politics and ethics are interrelated and gendered. However, knowledge discourses as Foucault and Gordon (1980) and Bacchi (2009) have cautioned

chances of women are shaped by both vertical and horizontal experiences of power and disadvantage. Vertical power, for example can be expressed in terms of class in many contexts, whilst horizontal power can play out in terms of the way patriarchal advantage plays out in the domestic sphere (where resources are not distributed equally). In times of crisis, Kabeer stresses that women may in fact experience drought and disadvantage quite differently as their nutritional requirements may be met last. Thus an intersectional analysis is important when understanding cascading risks. This is made possible through a fine grained study of haves, needs, turning points for the better and worse and barriers. The era of the Anthropocene needs to be seen as the result of unequal power dynamics that are class based, gendered and rooted in a colonial past and a global economy that remains alive and well and persistent in striving for profit at the expense of those who cannot resist dispossession or wage slavery[11].Identity politics (informed by gender mainstreaming) needs to strive to build solidarity globally so that poverty and climate change are addressed.

   According to Purvis (2016)[12], water stress is faced by at least 2.7 billion people globally for at least one month every year. In South Africa the drought in the Western and Eastern Cape is thought to be linked with the change in temperature and a high-pressure area that has prevented rain. The cold Benguala current[13] also influences the winter rainfall and summer droughts[14]. Day zero has been adjusted at the time of writing from to 21st April to the 12th of April and then to the 11 July as the residents of the Cape continued to reduce their water usage to 50 litres per person for a household of four people[15]. As I finalized the paper in May, Day Zero had been pushed out to 2019. Water usage has sharply reduced from the January usage when many holidaymakers visiting Cape Town and 60 percent of Capetonians at that stage had not changed the way in which they used water[16]. Without winter rain in June, there could be three months without tapped water. At the time, small businesses such as launderettes, restaurants, hairdressers and nurseries speculated how they would survive. Farmers are struggling to keep their crops alive in the wine and fruit growing areas. Others raised concerns about hygiene and the prospect of epidemics.[17] The six dams on which Cape Town relies are together unable to ensure water is supplied once they fall below 13 percent. One of the dams is the Theewaterskloof Dam[18] that is so arid that it was

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are also shaped by power imbalances. An intersectional analysis reveals how much worse off a woman can be if she is also working class, destitute , a member of a marginal political group, a refugee or disabled. Nussbaum's (2006) discussion of injustice to those who are outside the protection of the social contract, namely women (in some nation states), young people and sentient beings who are voiceless is later developed into a plea for rights for all sentient beings (based on an idealist categorical type argument).

[11] Thus although I accept the argument by Ariel Salleh (2016) that gender is vital for understanding poverty and climate change, social movements need to create solidarity in cross cutting intersectional networks. Socio-economic paradigms as we know them today are merely a reflection of current politics and have the potential for change through drawing on the potential of a new form of ecology and economics.

[12] Purvis, K. 2016 https://www.theguardian.com/cities/2016/jul/29/where-world-most-water-stressed-cities-drought The Middle East has more desalination plants than anywhere else. Whilst Los Angeles and California have experienced water stress and insecurity in 2014 and 2015, they continued to use water liberally and relied on dwindling underground water supplies, according to Purvis. North Africa, the horn of Africa and Southern Africa (particularly the western and eastern cape are experiencing the worst droughts in recorded history.

[13] https://www.britannica.com/place/Benguela-Current

[14] http://learn.mindset.co.za/sites/default/files/resourcelib/emshare-show-note-asset/859_fdoc.pdf

[15] How will day Zero work? Don't ask the City of Cape Town. Times Live, 20th January, 2018.

[16] Watts (2018) stresses that water consumption by the rich in the leafy suburbs will need to reduce consumption in order to conserve water resources. He includes a video explainer in which Kristy Garden, a UCT academic stresses that the highest levels of consumption are people living in the leafy suburbs. Out of 4 million people, the 1 million with higher incomes are the ones who use more water.

[17] Hygiene biggest worry in water crisis Echo Thursday 25th January, 2018

[18] http://www.huffingtonpost.co.za/2017/12/13/watch-joburg-ballets-epic-rain-dance-for-cape-town-drought_a_23305710/

used to site a rain dance by a Phetla of the Johannesburg Ballet who invoked the legendary Queen Modjadji of the Balobedu people[19].

Watts[20] (2018) sums up the implications of the worst droug.ht in 384 years. All water from the designated water collection points will be free. The number of collection points at the time of writing was revised regularly. Legally they should be no more than 200 metres from a household. The cost of delivering free water will be in the region of 200 million rand. As the water must be delivered free of charge to everyone, this will result in a loss of 1.4 billion rand.

Watts (2018) cites the deputy mayor, Ian Nielson who stresses that because the city of Cape Town has a budget of 40 billion rand, it will be possible to provide water at the collection points. Christine Colvin a spokesperson for the WWF and member of the mayor's advisory board who stresses that cutting off water to taps to a million homes (75% of all homes) in Cape Town:

"It is going to be terrifying for many people when they turn on the tap and nothing comes out".

Colvin continued by explaining that the Cape will be in one of the driest zones as a result of rapid climate change and stresses that planners have been caught out because the diversification of water supplies such as boreholes and desalination plants were only scheduled for 2020.

Watts cites a botanist, David Gwynne-Evans:

"You go to the shops and sees people buying 20 bottles of water. It is ridiculous increase of disposable plastic."

In Cape Town, drought has resulted in the need to re-think water usage. Recycling and reusing water is a matter of survival and the new phenomenon of water theft and water smuggling has become part of the struggle. For example using water in unregulated ways from boreholes and springs became illegal from February 2018. Although regulation will remain a challenge for the province. Theft of water from a local government reservoir was identified when a water truck was seen at an unusual time departing from the reservoir in Mogale. Apparently, this illegal smuggling had been operating for a few weeks until it was discovered by a councillor who noticed the irregularity and stopped the driver.[21]

The donation of water to the city by fruit farmers has enabled Cape Town to push out the date when water would cease to flow from taps. The historical lessons of how to survive sustainably in the Cape need to be revisited along with the latest research on integrated sustainable living approaches (Pauli, 2010) and supporting the commons (Bollier and Helfrich, 2012) and by learning from Indigenous first nations .

The National Water Act (1998) stresses that bulk water supply is a national government function, but the Department of Water Affairs and Forestry[22] stresses in the Preface of a document detailing responsibilities for local government that:

"Since 2002 Local Government has the responsibility to implement water supply and sanitation services and the Department of Water Affairs and Forestry now acts as sector leader, by regulating, monitoring and supporting to ensure effective service provision".

According to the constitution of South Africa, it is the right of all South Africans to receive water. The Department of Water Affairs and Forestry (under the Minister of Water Affairs and Forestry):

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[19] https://www.thesouthafrican.com/joburg-ballet-rain-dance-drought-western-cape-video/

[20] Watts, J. 2018 https://www.theguardian.com/cities/2018/feb/03/day-zero-cape-town-turns-off-taps

[21] https://m.news24.com/SouthAfrica/News/tanker-company-says-it-was-duped-in-water-smuggling-scam-20180202

[22] Department of Water Affairs and Forestry, Republic of South Africa. Water and Sanitation Business: The roles and responsibilities of local government and related institutions , dwa.gov.za

"sets the national objectives for protecting the resources in the national water resources strategy. Each catchment management agency is then responsible for protecting the catchments and aquifers within their water management areas in accordance with the national water resource strategy."

2.1   Count down for change

The next sections explore the challenges in Cape Town and then makes suggestions for alternative approaches to governance and democracy. It refers to past and current pilots to try out different ways to manage the commons, in order to mitigate and adapt to climate change.

Inglehart's (1997) thesis on culture shift, his ongoing research on values (Inglehart, 2016) and impact on attitudes informs the research.

On 21st of January Zille, Western Cape Premier[23]   made a video saying that she had requested assistance from the Minister of Water and Sanitation but that the minister was out of the country at that time . According to Zille, desalination plants are in progress and these will produce 16 million litres, but at that time, the city used 600 million litres per day. So pumping aquifers and drilling in the short term, which will be critical in the short term.

Major desalination is the only answer in the medium and long term for the Cape. Apparently, desalination plans were delayed, because they were considered too costly. This was the wrong decision.

The Department of Water and Sanitation has also not offered financial assistance. The talk on the streets and in the digital and print media is that the department is corrupt, that is mismanages funds and that politically the DA can be made to look bad as Cape Town is the first large city at risk of running dry. But the Eastern Cape is in a very similar situation and Mandela Bay is equally at risk.

Zille then stressed that the Constitutional mandate has to be respected and that the national Water and Sanitation Department has not met the bulk water supply. Zille stresses that buck-passing is unacceptable and that although water must be saved to help stave off Day Zero for as long as possible that water at collection points must be free and that the drought levy is not an option.

In terms of Chapter 2 of the constitution, human rights are protected through the Bill of Rights. It protects the right to health care, food, water and social security (Moran, 1996, 16).

In Section 27 page 13 of the Constitution it states:

"the state must take reasonable legislative and other measures within its available resources to achieve the progressive realisation of each of these three rights."

The National Water Act stresses that the responsibility is disaster management and also water treatment, but not the provision of bulk water. Nevertheless, in the past the city of Cape Town did construct the Berg River Dam and without it day zero would have been earlier.

The collective level across all the dams needs to be above 15 percent. When it reaches 13% the taps will be turned off and only designated areas in the city centre would continue to receive water. Part of the sacrifice to save water has been made by the agriculturalists who will no longer have enough to irrigate their crops. In 2015, Zille requested a natural disaster be requested, but had to wait until March /April 2017 for the Cape to be declared a disaster zone.

J.P Smith who heads the crisis team stressed that unless water is saved Capetonians will need to queue.[24]

The Democratic Alliance have been accused of shifting responsibility for the water crisis[25]. However, they stress this is a national responsibility and they have complied with the terms of reference of the

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[23] Helen Zille speaks on Cape Town water crisis – YouTube. 22nd January

[24] J.P. Smith answers Day Zero questions: "it's going to be really unpleasant'. News 24

[25] Water woes: Maimane, Zille shift blame to Nomvula Mokonyane, News 24

constitution and the Water Act. The current minister of Water and Sanitation Nomvula Mokonyane has not provided any funding for emergency infrastructure to date.[26]

A practical intervention was promised by Ramaphosa at the Davos meeting[27] but no support has eventuated to date. Unfortunately, water provision had been neglected in the Western Cape. The Democratic Alliance was voted in by Capetonians and the Democratic Alliance (DA) is being held responsible for the lack of forward planning to cope with the increased immigration to the cape and the increase in tourism in the context of climate change.

Water has become a political means to ensure that the DA take sole responsibility for the crisis, despite the boast that the Cape was one of the best run provinces. In Cape Town, the Democratic Alliance won the vote and it is believed that Zuma has politicized his opportunity to block funding to the Cape by not signing the documentation to declare the Cape a disaster zone.

Agency can and does play a vital role in re-shaping the bleakest of analyses of South Africa's future. South Africa has defied the blood bath scenarios and can defy the 'shit storm' scenario (Bond, 2018). Service delivery protests, state capture protests (Bond and Mottiar, 2013) and fees must fall protests have resulted in the successful election of a new president of the ANC who has been installed with dignity whilst creating alliances that will enable those who have been left behind (particularly the unemployed young people) who will need to be given a stake in the increasingly divided cities[28].

The poverty gap is widening in South Africa, according to an Oxfam report (2017)[29].

"According to Oxfam, in SA the richest 1% of the population has 42% of the total wealth".

In the latest UN Habitat report (2016:206) it is stressed that:

"South Africa Cape Town 2005 was listed as 0.67, South Africa Ekurhuleni (East Rand) as 2005 as 0.74, South Africa eThekwini (Durban) 2005 as 0.72, South Africa Johannesburg 2005 as 0.75."

Cape Town is slightly less divided than other cities according to the UN Habitat figures for 2011 cited a year later by Zille (2012). However, the statistics used are for 2005 and they were used in both the UN Habitat Report for 2016 and the same earlier one to which Zille was referring. I repeat and quote in full so that the point can be made clearly:

"All SA cities show a high level of inequality. The measure the UN-Habitat uses is the Gini coefficient, a measure of the inequality of income. A Gini coefficient of 0 means total income equality – where everyone has the same income. A Gini coefficient of 1 means maximum inequality. One person has it all"

She then goes on to cite the report directly in detail, which I check:

" A rating of 0.4 is considered the international alert line for high inequality. In South Africa, Johannesburg and East London have an 0.75 rating, the East Rand and Bloemfontein 0.74, Pietermaritzburg 0.73, Pretoria, Port Elizabeth and Durban carry a 0.72 rating, while Cape Town has a rating of 0.67.This clearly shows high levels of inequality in Cape Town, but still makes it lower than other cities"[30].

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[26] Our mandate for water provision and support knows no politics- Nomvula Mokonyane, News 24

[27] Ramaphosa to put together team to mitigate Cape Town's Day Zero crisis. News 24.

[28] UN-Habitat Executive-Director Joan Clos discusses how cities are affected by climate change — and what they are doing to lower carbon emissions. Follow our COP23 coverage: un.org/sustainable development/COP23

[29] https://www.businesslive.co.za/bd/national/2017-01-16-sas-rich-poor-gap-is-far-worse-than-feared-says-oxfam-inequality-report/

[30] 3rd Dec 2012 Zille says the Cape Town rich-poor divide is narrowest in SA https://africacheck.org/reports/zille-right-to-say-the-cape-town-richpoor-gap-is-narrowest-in-sa/ These figures refer to 2011 figures but more recent reports from UN Habitat confirm these statistics.

Therefore, although Cape Town is not the most unequal in South Africa it is certainly one of the world's most unequal cities. Research design, approach and future direction

3.   THE CAPETONIAN RESPONSE: SOLIDARITY OF RESIDENTS WITHIN A REGION

Rapid adaptation to conserving water has been achieved through a combination of farmers and NGOs donating water, residents of Cape Town saving water as a result of fear for the future and a desire not to be shamed through a transparent water management mapping system[31]. Consequently, the risk of municipal water supplies running out in the short term appears to have been averted at the time of writing (March 2018). However, more needs to be done to achieve a change in values to enable more sustainable living.

The transfer of dammed water to the metropolitan area has staved off day zero, but the drought impacts reliance on springs and may place increasing pressure on animals.

3.1   Unintended consequences: animal suffering and the proliferation of plastic

The impact of the drought on all quality of life of sentient beings (Nussbaum 2006) has been underestimated and the last 'frontiers of justice' need to take into account policies to mitigate and adapt to climate change in the Western Cape[32]. Highly urbanised regions in disaster prone regions convergent challenges of insecurity and are at risk unless strategies are explored with service users and all levels of government to find better pathways to social and environmental justice for human and animal life and their shared habitat. The systemically interconnected nature of social, economic and environmental danger and risks are explored elsewhere (McIntyre-Mills, 2017).

In the Cape the impact on the displacement of animal life (as their habitat becomes unlivable) is evident as primates and birds, for example move into domestic gardens to find food and water. Dirk (January 2017) stresses in her article that whilst bottled water has been donated through volunteers to the Western Cape, the impact on animals has not been thought through. She makes a plea for more water and feed for animals and highlights how the drought has already affected farm animals other areas. She stresses: [33]

> "Farmers in Namaqualand and Kalahari have had to feed potatoes to their cattle to keep them alive. Other farmers have had to kill their animals because they cannot afford to feed them. "It is heartbreaking to see a calf look for shade in which to die because its mother has starved to death," said Gerber. … 2 000 bales of hay have been collected and transported to feed these starving animals".

Another problem that has not been thought through (not mentioned in her paper) is the way in which the many plastic bottles are being used to rush water to the Cape. The cascading effects of heavy use of carbon resulting in climate change (Stiglitz, 2006) are now leading to reliance on plastic (carbon based

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[31] Water useage dash board www.capetown.gov.za/dayzerodashboard and water.restrictions@capetown.gov.za

[32] For example, Jejani (2017) stressed that primates in the Western Cape are encroaching onto domestic properties as they are displaced from their own spaces. A plea is made to give them time before they are 'euthansised' if they are moved away and then return. However, the problem is incorrectly represented merely as a need for more time to get used to being displaced. Instead, they need secure territory of their own and they need safe passageways to reach the springs from where they seek water. Another indicator of displacement and loss that is commonly observed in the Western Cape is that large numbers of Guinea fowl are now seeking water in suburban gardens.

[33] https://www.iol.co.za/capetimes/news/help-rush-water-animal-feed-to-drought-areas-1968817

and non-renewable forms) to provide water in an emergency that could be staved off by using available water more carefully.

I draw on Giddens (1990:71) in terms of the crisis of trust and rising risk and discuss the water crisis in the city of Cape Town as a symptom of convergent challenges. These are associated with the way in which the nation state interacts with the global economy aligned with military power and capability.

Neoliberal economics has played out in South Africa in ways that have resulted in protests against the lack of education, services and basic infrastructure, but although some protests have been made by social movements (Bond, 2012) in the build up to the climate change conference in Durban in 2011, a carbon based, anthropocentric approach to governance has prevailed to date.

The carbon economy has been supported by a World Bank loan to set up the Medupi coalmine, despite protests. Bond stresses that government has seen fit to support cap and trade measures to offset dirty coal but that this approach to carbon trading and as yet untried ways to reduce successfully the impact of coal burning emissions is problematic. Coal mining in areas where it is costly to mine has resulted in passing on costs to consumers. In addition, the lack of forward planning in providing an energy market for rapidly urbanizing cities resulted in black outs in Cape Town and Gauteng. This resulted in delaying the decision to build a desalination plant capable of supporting the needs of Capetonians.

 The problem is that with the convergence of social, economic and environmental challenges governments such as the Provincial Government of the Western Cape were unable to afford desalination plant. At the time when some of the climate change experts advised on a desalination plant, Cape Town (like the rest of South Africa) was experiencing irregular power supply. This was partly because of the mismanagement of Eskom and allegations of corruption[34] that are part of the forthcoming inquiry into state capture that has been initiated prior to Ramaphosa's becoming president in February 2018. Some reports make it clear that the decision not to pursue desalination was because of the associated costs, whilst other reports stress that advisers considered desalination a risk to the environment. Zille stressed that the refusal to recognize the Cape as a disaster zone at the national level resulted in a lack of funding to address desalination soon enough. Another argument is that climate change has 'come sooner' than anticipated, according to a News 24 report[35].

Despite the legacy of Apartheid the potential to do things differently needs to be documented as an example of community spirit. Albeit driven by a shared fear of the consequences of not doing the right thing and by the transparency provided by the water usage map that is readily available.

The point made in 'Planetary Passport' (McIntyre-Mills, 2017), is that ecological citizenship is possible. This example shows how resource usage can change as a result of shared will and a form of governance that enables a fair distribution of resources for all. Bond' stressed in a *Real News* interview January, 2018[36] that Cape Town is one of the most climate affected cities in the world and one of the most unequal, and cited UN Habitat. His analysis of global capitalism and the inadequate role of BRICS (Brazil, Russia, India, China, and most recently, South Africa) as a network of the global south to stand against the developed world provides a necessary reminder that change needs to occur from below through social movements, in order to hold the state and the market to account[37]. The cascading and interrelated effects of climate change can be detailed as follows:

- **Firstly,** the problem of water has *not* been explicitly linked as a disaster of national scale requiring a change in policy direction to mitigate and adapt to climate change --   although it is acknowledged to be worst drought for more than 300 years it is only recently been acknowledged as part of a pattern of climate change that will affect the Western Cape for the foreseeable future (UN Habitat, 2016).
- **Secondly,** desalination was considered with caution due to possible environmental risks associated with raised levels of salinity and

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[34]https://www.timeslive.co.za/news/2017-11-18-bongo-tried-to-bribe-parliament-evidence-leader-of-eskom-state-capture-inquiry/

[35] https://www.news24.com/Green/News/for-global-water-crisis-climate-may-be-the-last-straw-20180213

[36] https://m.youtube.com/watch?v=SLXByr1ax18 on January 18th Real News.

[37]https://theconversation.com/brics-needs-a-new-approach-if-its-going-to-foster-a-more-equitable-global-order-84229

- **Thirdly,** desalination was considered to be too expensive as a result of rising energy costs and the rolling cuts to power that were experienced, called 'load spreading', for much of 2014.

The Third Way approach of Anthony Giddens (2000) has been shown to be lacking as social democracies need to keep the relationships between the state and market transparent through ongoing democratic engagement, in order to avoid the most cynical ploys such as carbon trading, carbon sequestration that shifts the burden from developed to developing nations, from the powerful lobbyists to the powerless. Those without access to a strong voice in the market or the state need to rely on using civil society to exert pressure on the state. This requires a careful consideration of the role of law, which can be used progressively to protect the commons or retrogressively [38] in ways that protect what Bond (2012: 54) calls 'ecological modernization'.

In 'Consequences of Modernity' (Giddens, 1990) emphasizes risk and the breakdown of trust in terms that would seem to be too nuanced today as the risks seem to outweigh the opportunities, unless the processes of democracy play a greater role in structuring the relationships in ways that suit a new form of economics that honours cascade economics (Pauli et al. 2010) to counterbalance some of the risks associated with the current structures that allow varying degrees of state capture.

Whereas Bond (2018) predicted a 'shit storm'[39] as Cape Town faces the worst drought in over three hundred years. During the last, the culture shift to conserve water has been successfully driven by a combination of governance changes, such as a Water App[40] that maps the water usage of households transparently across all the suburbs of Cape Town [41] and acts of generosity by farmers donating water to the city of Cape Town as a voluntary donation as well as mass movement to donate water to Cape Town. Whilst Bond's analysis of the causes of climate change and the politics of climate justice is apt (Bond, 2012) he is perhaps too pessimistic about the capabilities of people to adapt.

In fact Capetonians showed more resilience and a greater capacity for adaptation than he expected. The response by Capetonians to the call for change has resulted in successfully pushing back Day Zero to the onset of the rainy season. Whether this will be sufficient remains to be seen. It is an example of effort

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[38] "Under the Environmental Protection and Biodiversity Conservation Act 1999 there are precisely defined circumstances that govern suspension or revocation of federal environmental approval. Opposition environmental spokesman Tony Burke told ABC's (Australian Broadcasting Commission) Patricia Karvelas…that under the law, as ministers "you must never prejudge a decision". If so, you risk legal action from the aggrieved company…" (Kelly, 2018: 16-16Kelly, P. Shorten showed up as an opportunist too smart by half: Adani a test case for coal, climate change and foreign investment. Inquirer. Weekend Australian. 15-16. March3rd – 4th. In Australia, the limitations of Environmental Protection and Biodiversity Conservation Act 1999 are evident in managing cascading risks associated with the impact of coal industry on climate change, such as warming temperatures and Queensland's Coral reefs. The pro-business as usual lobbying by Kelly (2018) revealed the inadequacy of the EPA to protect the environment. Kelly wished to highlight the hypocrisy of mainstream political opposition – in this case Labour – but without acknowledging the extensive criticism of the mine and the hypocrisy of job creation. Nevertheless, the point that his article also reveals is that the current law (supposedly to protect the environment) does not sufficiently protect the commons because it is pro market and controlled by neoliberal market economics. The Aldani mine which is currently being contested by green lobbyists, but which is protected by market interests and promoted with (false) promises of jobs for the currently unemployed. Analysts, such as Krien (2017) in her essay 'The long goodbye' are likely to be mostly for professionals, whilst other skilled jobs are likely to be mechanized. The issue of employment potential for indigenous people has been raised by Langton (2012) in her Boyer lecture, but the issues (whilst rooted in neoliberalism and the long shadows cast by our as yet unacknowledged colonial wars) t does not fully explore the long term impacts on living systems or the extent that all the stakeholders are in agreement (see McIntyre –Mills, 2018, forthcoming).Nevertheless, EPAs, can be re-framed to protect the environment far more vigorously and law to protect the commons is an obvious next step. This can only be achieved by active agency.

[39] The silencing of the poorest of the poor has resulted in what Bond (2018)refers to in A Real News interview by referring to the way Trump made reference to a developing nation as a 'shit hole' and how political fracas are described as 'shit storm', to use the terminology that is bandied around quite openly in the mainstream media.

[40] Source:https://citymaps.capetown.gov.za/waterviewer/
   http://www.capetownetc.com/news/green-light-for-cape-town-water-map-despite-objections/

[41] Water useage dash board www.capetown.gov.za/dayzerodashboard and water.restrictions@capetown.gov.za

made by a city residents acting together across the diverse suburbs and the surrounding farming regions. It will require the active support of all levels of government, transparent governance of resources and ongoing mobilization from below[42].

When the marginalized are unable to voice their concerns and they become desperate they will use whatever means possible to symbolize their sense of outrage. In South Africa, the use of sanitation as a symbol of disgust at authority was used by protestors on the University of Cape Town Campus. It was also used recently on the Cape Flats by residents who felt it was their only way to protest their fears about being without water.

Water management systems that rely on performance management by experts and that place a monetary value on the fabric of life do not protect the commons. They commodify it[43].

Thus, the approach I have suggested is to enable local people to think in terms of being the change through being rewarded for living differently. So instead of pricing nature as a commodity, those who live virtuously and well through measuring their personal consumption and demonstrating that they care, will be given recognition points that can be exchanged for other services within the local community. By valuing certain kinds of knowledge at the expense of others human beings have created a new age, namely 'the Anthropocene', characterised by rapid urbanisation and unsustainable development.towards systemic intervention to protect the commons

The we/they thinking between citizens who have the security of a home and an income versus non-citizens without a home and destitute deserves attention, given that more people are currently displaced as a result of social and natural disasters than after the Second World War.

According to the United Nations High Commissioner for Refugees (Guterres ,UNHCR 2014), for the first time since the Second World War, the global figure for displaced persons has now passed 50 million and, by 2050, this figure could be as high as 150 million (Rusbridger 2015, 13) . The social and environment challenges have been exploited by people traffickers in Africa, for example where slavery has become more visible than ever in Libya as desperate people fall into the hands of traffickers who sell them, 'like goats' in the market place[44]. The notion that sentient beings have rights is not even on the horizon in some socio-political contexts.

4.   RESOURCING THE COMMONS : POLICY CONTEXT

The challenge is to face up to our interconnectedness and to be able to hold in mind many variables. "Us /them" need not expressed in terms of tribes, organisations and nations. Space ship earth is a metaphor used by Kenneth Bounding to help reconnect humanity's sense of geography with the planet and the universe of which we are a part. It is a plea that we should strive to achieve transcendence. Human beings face the challenge of wanting to be individuals and also to be part of group. They have evolved through ability to co-operate and compete. [45]

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[42] Avaaz has called people to support Capetonians and to depoliticize the attitude of the current leader of the ANC. Avaaz has run a campaign to raise awareness and to ask people to declare the Cape a disaster zone:

"Day Zero is getting closer and closer -- and it will affect every one of us. We all want to help, but real action is being held hostage by political bickering. Together we can still stop the worst by getting Zuma to declare a national disaster -- but to break the political deadlock, it has to come from the people, every single one of us. So I've just joined this campaign, I hope you will, to https://secure.avaaz.org/campaign/en/day_zero_11/?knPhtab". The Minister of Water and Sanitation at national level will need the support of Ramaphosa to find funding to support infrastructure development. Ramaphosa has stressed at Davos that climate change is a reality that will need to be addressed in the Western and Eastern Cape.

[43] Molinos-Senate, M and Maziotis, A. and Sala-Garrido, R. 2017 Assessing the productivity change of water companies in England and Wales: a dynamic metafrontier approach Journal of Environmental Management 197 1-9

[44] http://www.aljazeera.com/news/2017/12/outrageous-reality-libya-171201085605212.html

[45] In order to address areas of concern in a manner that is appropriate it is necessary to develop ethical literacy by working across disciplines in the social and natural sciences. The argument that I develop is that by drawing on primatology we can

Both a priori norms to guide development and a posteriori considerations are needed to measure the performance of the UN Sustainable Development goals to protect living systems and the habitat on which we are depend. Resilience is defined as the adaptive capacity of the physical environment, of an individual or of a group. It concerns factors such as the capacity of members of a community to act together and through creatively transform the current ways in which we live our lives (Rose, 2005, Hulme 2009, Shiva, 2012).

The United Nations Declaration of Rights of Indigenous Peoples (2007) provides a vital pathway for engagement.   Representation, accountability and sustainability challenges need to be met through addressing very unequal life chances (Dobson, 2009, Dryzek, 2010). The 2030 Agenda[1] is:

> "The new global framework to help eradicate poverty and achieve sustainable development by 2030. It includes an ambitious set of 17 Sustainable Development Goals…. The 2030 Agenda for Sustainable Development sets out the global framework to eradicate poverty and achieve sustainable development by 2030."

The point of this article that reviews an area of concern through drawing on research published in Contemporary Systems Series, is to underline the importance of sociological research across boundaries and so-called Mode 2 knowledge production (Gibbons et al 1994) based on systemic approaches that span conceptual boundaries and support working across disciplines and sectors in order to respond to the cascading consequences of modernity and to address the new cascade economics (Pauli et al 2010) that maximize opportunities in new creative ways that flow from an ecosystemic approach.

The research contributes to a new area: namely the commons as a process and a sense of connection to living systems, rather than as a resource 'held in common', to cite Bollier (2011)[46]:

> ***"The commons is not a resource.*** It is a resource *plus* a defined community *and* the protocols, values and norms devised by the community to manage its resources….
>
> ***There is no commons without commoning*** – the social practices and norms for managing a resource for collective benefit".

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learn that animals (primates and many mammals) have the capacity for empathy, reciprocity and fairness and that human beings have evolved because of their capacity to co-operate and not only their capacity to compete. But the next step for transcendence is to recognise our interdependency. Therefore, the thesis I develop in 'Planetary Passport 'and an article on hybridity (see McIntyre-Mills, 2017a, b) is the next step in our evolution is an appreciation of our interdependence. The case is made that the social, economic and financial crisis is propped up by shifting burdens to the voiceless and powerless in this generation, namely women, the disabled, refugees and future generations of living systems by commodifying them, to draw on Bond (2012: 63) by exploiting the 'credit system' where money is borrowed and living costs are funded by debt, the extraction of profit is moved from developed to developing economies and thus has a spatial dimension. The 'Environmental commons' is exploited through 'Indigenous economies' and 'Women's unpaid labour for household reproduction' and through criminal 'biopiracy', to mention and extrapolate from some of Bond's examples.

I also draw on Butler and Athanasiou (2013) to stress the need for performative agency to protect the commons and the need to concentrate on dynamic ways of working with others. We need to be cautious about the application of use and exchange value to the functionality of the basic fabric of life and stress that we need to attribute a value beyond price. The pilot is informed by   the concept of 'wellbeing stocks', developed by Stiglitz et al (2010: 15) , but instead refers to the need to take on board the points made by Nussbaum (2011) in her work on capabilities about the need to appreciate 'he determinants of a life worth living' and the idealism underpinning her approach. This is extended by making a case for rights and stewardship to protect living systems and sentient beings as all life is interdependent

[46]

07/15/2011 "I am always trying to figure out how to explain the idea of the commons to newcomers who find it hard to grasp. In preparation for a talk that I gave at the Caux Forum for Human Security, near Montreux, Switzerland, I came up with a fairly short overview, which I have copied below…:http://www.bollier.org/commons-short-and-sweet"

The research on which this paper draws contributes to a new area: namely the commons as a process and a sense of connection to living systems, rather than as a resource. It is a sine qua non of critical[47] systemic research that wicked[48] problems need to be addressed through exploring issues with stakeholders to establish areas of overlap and difference. The design of inquiring systems approach (West Churchman, 1971, 1979) can be used to enable collaboration across stakeholders, guided by the axiom that 'We can be free and diverse to the extent that our freedom and diversity does not undermine the common good of both current and future generation of life'. This axiom has been explored in depth in previous work (McIntyre- Mills 2006, 2014, 2017).

In order to manage the commons mutual agreements need to be negotiated and records need to be kept, in order to protect the interests of stakeholders. The commons needs to be theorized as a legal concept (Marella, 2017), a transformative governance concept (see 'Planetary Passport', McIntyre-Mills, 2017) and a basis for 'Systemic ethics' (McIntyre-Mills, 2014)[49]. The engagement processes (see 'Balancing *Individualism and Collectivism'*, McIntyre-Mills et al 2017)[50] that enable protecting the commons are explored further in the companion volumes: 'Mixed Methods and Cross Disciplinary Research Towards Cultivating Eco-systemic Living' and 'Democracy and Governance for Resourcing the Commons : theory and practice on rural-urban balance' [51] in which the rationale for a new way of living is developed with participants in Africa and Indonesia, where risks associated with displacement and loss are explored in more depth[52]. The focus was on exploring together with a range of stakeholders

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[47] A critical reading of the sociology and anthropology of development (Gibson-Graham and Miller, 2015) and capabilities studies (Nussbaum, 2011, Sen, 2003) provides the lens through which human rights are considered.   The case study contributes towards integrating data on wellbeing stocks spanning the health of multiple species, habitat, housing and social inclusion informed by mixed methods (Hesse Biber 2010; Mertens, 2010, 2016), comparative case studies and a critical reading of everyday news media.

[48] They comprise many, interrelated variables that are perceived differently by different stakeholders and must be explored contextually. (See Flood and Carson, 1993, Rittel and Webber, 1984, West Churchman, 1979, 1982).

[49] This paper builds on Boulding's (1956) notion of the skeleton of science that stresses that complexity increases as we move from inorganic to organic life to plant and animal life and to human beings and the designs they create for living. Large city populations become unstable when living costs are unaffordable. It is not surprising that the so-called Arab Spring started because of rising food costs. In Solo, Indonesia riots occur when living costs and cooking oil become too expensive for the small street traders to survive. The demographic (dividend) namely high population growth and rising number of young people could become the trigger for political unrest in rapidly urbanising cities such as in Africa and Indonesia where the rising levels of unemployment and poverty result in the vulnerability of women and children (crime and trafficking).

[50] The volumes also stress that policy choices made by this generation shape the wellbeing of both current and future generations and aim for a better understanding of socio-cultural discourses, life chances and behaviour to inform policy and to improve public administration by learning what does and does not work and why from the most vulnerable populations. The focus is on protecting 'wellbeing stocks' a concept adapted from Stiglitz et al. (2010: 15) to refer to a multidimensional measure of wellbeing.

[51] Both volumes can be considered as sources of ideas for policy makers and those engaged in strategic thinking to protect living systems of which we are a part and to begin with re-generation not merely sustaining so-called 'wellbeing stocks' a concept adapted from Stiglitz et al. (2010: 15) to refer to a multidimensional measure of wellbeing . The aim of the wellbeing stocks concept is to enable people to re-evaluate economics and to become more aware of the way in which we neglect social and environmental aspects of life. The pursuit of profit at the expense of people and the environment is a central problem for democracy and governance. The vulnerability of cities is a symptom of the lack of balance between individual and collective needs. In volume 1, '*We are the land and waters'*, my chapters addresses metaphors and praxis for weaving together strands of experience. It extends the concept of 'wellbeing stocks', developed by Stiglitz et al (2010: 15) to refer to dynamic ways of working with others[51]. In Volume 2, '*Getting Lost in the City'*, her focus is on exploring together with a range of stakeholders including leaders in the field, stablished and early career professionals ways to re-generate and invigorate employment opportunities.   As a whole, the volume explains the process of anthropogenic change and makes a case for non-anthropocentric approaches that protect the web of living systems on which we depend.

[52] These two volumes explore the notion that our fate is determined by a realization of our interdependence. We need to address gendered, cross-cultural perspectives on what it means or could mean to be an ecological citizen who respects multiple

including leaders in the field, established and early career professionals ways to re-generate and invigorate employment opportunities.

The article emphasizes ways to promote social and environmental justice through fostering job creation towards sustainable development. Since the Stern Review on Climate Change (2006), little has been achieved in addressing the warnings concerning high carbon emissions globally and the cascading effects on food, energy and water security.

This study on rapid adaptation to climate change in Cape Town, South Africa relies on mixed methods comprising participant observation , secondary data and a review of unfolding media content to address the water crisis and the associated cascading risks.

Inglehart's domains of study[53] are used to guide the case study and ongoing research on cascading risks associated with climate change. It is suggested that the greater the participation by stakeholders with an understanding of environmental issues in decision-making process, the better the social, economic and environmental development outcomes for all. Rifkin (2011) [54] stresses that:

> "In the sharing economy, ownership gives way to access, sellers and buyers are replaced by providers and users, social capital becomes as important as market capital, consumerism is upended by sustainability, and quality of life indicators become more important than GDP. The sharing economy can become a circular economy in which goods and services are redistributed among multiple users, dramatically reducing society's ecological footprint. But with climate change now ravaging the planet, the transition to a new economic era has to happen fast. Change of this magnitude requires political will and a profound ideological shift".

The discussion paper shows that adaptation to challenges *could* be bought about by a culture shift stemming from personal will , fear of alternatives and public pressure from below and above to comply with water rationing. This has brought about a tendency to save not only water but other resources.

Giddens (1990: 171) outlines the high consequence risks[55] as 'Growth of totalitarian power', 'nuclear conflict or war', 'Collapse of economic growth mechanisms' and 'ecological decay or disaster'.

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species and the commons through re-generation of the environment on which they depend.The collection aims to increase an understanding of life chances and dynamics of vulnerable population groups in areas most affected by climate change related areas. Significantly, the collection responds to complex ethical policy challenges posed by the Paris Agreement and the UN Sustainable Development Goals (2017) and UN Agenda 2030, in order to narrow the gap in living standards between rich and poor.

[53] http://www.worldvaluessurvey.org/WVSContents.jsp 'WVS-7 questionnaire is an extensive research tool comprising of 290 questions and measuring cultural values, attitudes and beliefs: social values, attitudes & stereotypes (45 items);societal well-being (11 items);social capital, trust and organizational membership (49 items);economic values (6 items);corruption (9 items);migration (10 items);post-materialist index (6 items);science & technology (6 items);religious values (12 items);security (21 items);ethical values & norms (23 items);political interest and political participation (36 items);political culture and political regimes (25 items); demography (31 items)'.

[54]   https://impact.vice.com/en_us/article/bj5zaq/watch-vices-new-documentary-the-third-industrial-revolution-a-radical-new-sharing-economy

https://www.youtube.com/watch?v=QX3M8Ka9vUA

[55] Giddens (1990:59) outlines four dimensions of modernity that I draw on and to which I add comments and which I extend in square brackets:

'Surveillance (through control of information and supervision of labour and the market)' [now applied through increasingly formalized means as exposed by Greg Snowden and Julian Assange through in WikiLeaks]

'Military power (control of means of war)' [through industry with support of capital and the state which explains the importance of weapons races between nation states competing for power and ensuring that they have control through superiority in weapons of mass destruction]

'Capitalism [capital for some at the expense of others through competitive labour and markets' [that explains the way in which people and the planet are increasingly commodified]

'Industrialism' [through striving to achieve transformation of existing ecosystems through mastery and a non-ecological approach]

Internationally we are on track to experience all these scenarios; however, we do have the potential to redress them through critical systemic intervention. The double hermeneutic could enable ecological citizens to manage the commons.
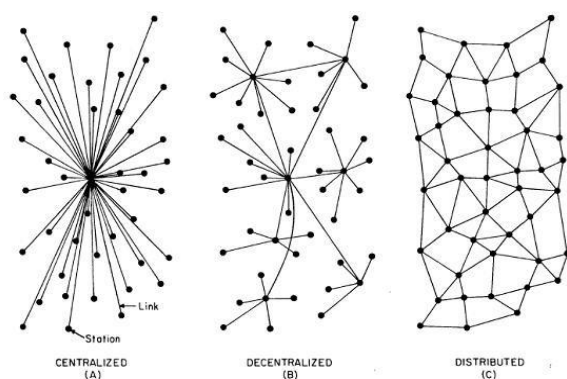
Monitoring 'from below' (Keane, 2009, Dobson, 2006, Dobson 2007, 2012) to ensure a fair and equitable share of resources could help to bring about transformational praxis that makes a difference socially, economically and environmentally through everyday choices that protect human and animal habitat.

The post materialist 'culture shift' (Inglehart, 1990, 1997) is both personal and as a result of political shifts brought about by policy transformations.Late capitalism plays out at the margins in developing nations where globalisation impacts the market through offering carbon credits to offset polluters as suggested by Bond (2012) who links corrupt dealings across the market and the state that impacted the delivery of affordable safe electricity in South Africa. The World Bank and the South African state are complicit in supporting the Medupi coal plant. Thus by not limiting carbon emissions and continuing to support a coal economy , the IPCC formula has been ignored.[56]

4.1   A way forward?

The potential for block chain programming to enable transdisciplinary distributive networks to co-develop and check the way in which users and providers meet socio-cultural, economic and environmental indicators of wellbeing is currently being developed as a pilot through distributed hubs in Indonesia (Wirawan, 2018).

Test out and pilot on a new form of governance: from centralised to distributed

Source: Darien-Smith and McCarty (2017: 16 cites Source: http://www.rand.org/pubs/research memoranda/RM3420/RM3420-chapter1.html)

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[56] The IPCC formula stresses that E (Emissions) = Population X Consumption per person X Energy Efficiency X Energy Emissions. The need to explore the notion of footprint as a series of interconnections that flow as a result of the consequences of our personal and public decisions is elaborated in Planetary Passport (2017).In this paper a case is made for a way forward to address the cascading effects of climate change in the Western Cape region of South Africa by redressing the rural-urban imbalance in development opportunities and placing more emphasis on finding ways to enable people to make a living in rural area and to maximise the way in which resources are used by adding value to the products from rural areas and to find ways to engage young people in designing regional areas that are re-generated as places where they wish to remain.

Each node in the network connects with other nodes to check on information available. A distributed network is characterized by cross checking. An outcome of a distributed network is participatory governance based on transparency and the empowerment of local people who have instant access to verifiable data. The potential for misuse of resources is thus reduced. It could provide a way to protect food, energy and water security through protecting the commons. A completely new approach to economics is needed if we are to have a hope of addressing the consequences of the worst aspects of modernity.

This discussion paper contributes to a new area: namely transformation of social, economic and environmental choices and ways to support the commons as a process and a sense of connection to living systems, rather than as a resource 'held in common', to cite Bollier (2011).

The water useage map[57] called 'Day Zero Dash Board' makes usage transparent to all and has played a role in reducing usage. The water management application map in Cape Town enabled people to see the pattern of water usage across Cape Town from the household, to the street, suburb and locality of Cape Town. Although individuals who did not comply are not named their residences do not appear with a green or pale green dot.

At a personal level people have changed the way that they choose to live their lives by using much less water. J.P Smith, 'Safety and Security mayoral committee member stresses that Capetonians will have to save water and reduce usage to less than 50 litres per day or queue:

"It would be catastrophic if we end up having to collect water at pods".[58]

The message sent out by Smith, namely save water now or queue for water later instilled a new discipline which was widely applied as a result of the water Ap[59] which mapped the usage of water across households. The importance of emotions on climate change and political action is important (Hulme, 2009, Hoggett, 2010). The need to link positive vocational training with positive digital engagement through social, economic and environmental pathways to wellbeing is very important for human security. The training in joining up the dots is facilitated by the pathways to wellbeing software. All the points are made in 'Planetary Passport' (McIntyre-Mills, 2017)[60] and 'Balancing Individualism and Collectivism' (McIntyre-Mills, Romm and Corcoran Nantes, 2017)[61] for the Contemporary Systems Series.

The value of transparent mapping systems is indicated by the rapid adaptation in Cape Town which suggests the value in further extending the pilot outlined in Transformation from Wall Street to Wellbeing'(McIntyre-Mills et al, 2014) and the conceptualization of alternative architectures for governance in 'Planetary Passport' (McIntyre-Mills, 2017).

When human security is threatened by social, economic and environmental pressure social unrest is inevitable[62]. The UN Sustainable Living Goals c*ould* be achieved through transformative approaches. It

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[57] www.capetown.gov.za/dayzerodashboard

[58] J.P. Smith answers Day Zero questions: "it's going to be really unpleasant'. News 24

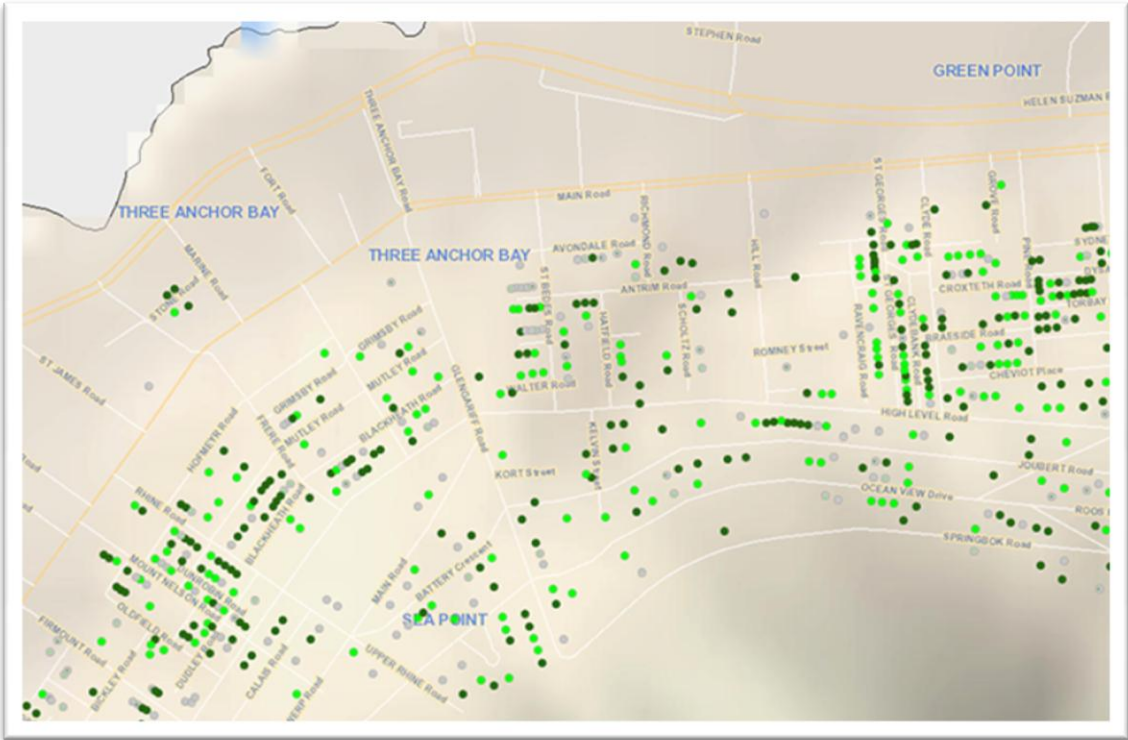[59] Source:https://citymaps.capetown.gov.za/waterviewer/

http://www.capetownetc.com/news/green-light-for-cape-town-water-map-despite-objections/

[60] Planetary Passport (McIntyre-Mills, 2017) conceptualizes a way to map and manage social, economic and environmental resources. The post materialist 'culture shift' (Inglehart, 1990, 1997) is both personal and as a result of political shifts brought about by policy transformations. The hope for mitigation and rapid adaptation is that we recognise our potential and complicity in shaping outcomes. As Haraway (1992) stresses: 'we are the boundaries'. Alternatively we can see ourselves as part of the positive or negative feedback loops. The double hermeneutic enables ecological citizens to address the challenge through transformational praxis that makes a difference socially, economically and environmentally through everyday choices. The 'double hermeneutic' quite simply means that we are part of our subject matter and that through research and everyday decisions we can change the policy context.

[61] The chapter entitled : Pathways to Wellbeing—Low Carbon Challenge to Live Virtuously and Well: Participatory Design and Education on Mitigation, Adaptation, Governance and Accountability by Janet McIntyre-Mills, Rudolf Wirawan, Bambang Shergi Laksmono,Ida Widianingsih and Novieta Hardeani Sari pages 37-74 in 'Balancing Individualism and Collectivism', Springer, New York.

[62] I explained this point at the Flinders symposium Yogyakarta and shared how in Solo (at a conference on participatory democracy, politics and digital engagement) where I gave an invited contribution a few weeks prior to the Flinders

needs big game changing pilots across the Public, Private and Volunteer sectors and through emphasizing so-called mode 2 type research (Gibbons et al, 1994) within and beyond the boundaries of the nation state to address the 'consequences of modernity' (Giddens, 1990). Working with international organisations can help to enable us to join up the dots (Zapp, 2018) and by working across nations and across organisations we can strive to ensure that the rhetoric of the 2030 Agenda is addressed.

Source:https://citymaps.capetown.gov.za/waterviewer/
http://www.capetownetc.com/news/green-light-for-cape-town-water-map-despite-objections/

It is suggested that the water management system could be extended to consider the consequences of a range of social , economic and environmental choices as suggested in 'Planetary Passport' (McIntyre-Mills, 2017), for example[63]:

I have the following social , economic and environmental resources – each of which appear as a drop down menu to act as prompts to which people can add new categories or subcategories plus comments
I need the following social, economic and environmental resources
I will add the following contributions

Symposium at Gadja Madah. More money and effort is spent on digital radicalisation than positive vocational education and training. In Solo, I participated in plenary panel for a Politics Conference and stressed the potential for radicalisation. During the break, a fellow panelist explained he was en route to hear more about radicalisation from Abu Bakar Bashir with whom he was having a meal.

[63]   We   have   piloted   a   scorecard.   (see   McIntyre-Mills   et   al   2014,   2017)   see https://ia801606.us.archive.org/20/items/pathway_DEMO_1/pathway_DEMO_1.mp4

The aim is to make policy recommendations by exploring what works, why and how through the local lived experiences of people who participate this is an attempt to address the issues.

I will discard the following
Self-reflection on *the turning points* for the better or worse – hope that consumption can be replaced with greater sense of attachment to others and the environment
Consideration of the barriers that currently exist and consideration of what could be done to transform society and our relationship to the environment.

   The following web link to the Wirasoft web site[64] gives details of the proposed design. It is an abridged set of slides to the Venture Institute, Flinders University and details the way in which the software could be extended to address the challenge, namely energy, mobility and communication applied to address food and water security. The mapping system could aid a comprehensive intersectional understanding and address the concern that people currently feel 'let down' by current policies and they need to ensure that the risks are addressed in a transparent way which ensures that consumption of scarce resources are addressed in ways that are representative and accountable. This applies to food, energy and water management. Existential risks (Bostrom, are likely to increase unless the Intergovernmental Panel on Climate Change (IPCC) [65]formula is addressed in ways that engage ecological citizens

   We need a human security system to identify social, economic and environmental risks through enabling people to participate in using a resilience scorecard. By addressing so-called 'wellbeing stocks' (Stiglitz, Sen and Fittousi, 2010: 15) [66] a multidimensional measure spanning social, economic and environmental makes steps towards protecting the commons. Some aspects of life are beyond price[67] and needs to be regarded as part of the fabric of life.

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[64] http://wirasoftfoundation.org/web/smartenergy

[65] The Intergovernmental Panel on Climate Change (IPCC) formula, namely E (Emissions) = Population X Consumption per person X Energy Efficiency X Energy Emissions.

  suggests that the privileged urban lives of some could lead to 'existential risk' for people and the planet (Bostrom, 2011) which is why it is necessary to enhance our understanding of consumption. **.** Nussbaum discusses the essential capabilities that are needed by sentient beings to live a life worth living. She takes the initiative to design and construct the essential conditions. She is not suggesting that people should be limited, she is making a case for extending rights beyond the human and in many ways she is re-framing in the way that Haraway advocates when Nussbaum (2006) wrote 'Frontiers of Justice' and discussed the current limitations of social contract theory to protect those who fall outside the boundaries of the nation state or outside the parameters of state protection as they are non-citizens. These include asylum seekers, those who have lost citizenship because they are labelled criminal and 'other', the disabled, and she importantly extends protection to all sentient beings and the need to protect the environment on which we all depend. In this way she introduces protection of habitat for all living systems, although she does not specifically spell out our hybrid inter dependency. Andrea Nightingale has developed an intersectional study on access to land in Nepal that are shaped by caste and gender. Thus intersectional analyses need to take categories as just one dimension of more comprehensive analyses to support social and environmental justice.

[66] "1. Material living standards (income, consumption and wealth), 2. Health, 3. Education, 4. Personal activities including work, 5. Political voice and governance, 6. Social connections and relationships, 7. Environment (present and future conditions), 8. Insecurity, of an economy as well as a physical nature."

[67] All life is interdependent and vulnerable, but as human beings we need to act as stewards as we are responsible for achieving Boulding's notion of transformative culture (Boulding, 1956). I also draw on Butler and Athanasiou (2013) to stress the need for performative agency to protect the commons and the need to concentrate on dynamic ways of working with others. I caution the application of use and exchange value in terms of measures of the so-called 'functionality' of the basic fabric of life and stress that we need to attribute a value beyond price. Thus, I expand   the concept of 'wellbeing stocks' developed by Stiglitz et al (2010) to take on board the points made by Nussbaum (2011) about the need to appreciate the 'determinants of a life worth living'. The capabilities approach needs to draw on both Amartya Sen's functionality and Nussbaum's a priori idealism. In re-working the capabilities approach I make a case for both *rights and stewardship* to protect living systems and sentient beings, simply because it is the right thing to do.

Boulding stressed that transformation requires the highest level of response as the level of complexity required for transforming society increases as we move from inorganic to organic life, to animal and human life.

The neo-liberal agenda has pushed developing countries to the brink (Bond and Mottiar, 2013). The level of human insecurity and distrust was at its height when this article was written. Nevertheless the agency shown by Civil Society movements , responses (albeit belatedly by the state, despite the political stand offs) set an agenda that needs to be met by innovative economic transformations that are not in line with the same old paradigm that has been emulated by the BRICS network (Bond and Garcia, 2015 and Bradlow, 2017). In these references, it is stressed that BRICS has done little to address sustainability and has instead repeated the same old messages.

This requires simple systems that support representation for enhanced equity, accountability to enhance fairness and Transparency and re-generation for the restoration of the commons and the assumptions and values that support it.

4.2   Critical systemic approach to transformation

The Critical Systemic Approach relates to the way in which people perceive the world and the purposive way in which human beings try to address areas of concern. The complexity of the system increases as the number of variables increases, the relationships across variables increase and the way the variables are perceived differently by different stakeholders. Transformation requires transcendence based on an appreciation of our interconnectedness with all living systems and our responsibility for all life: ecological governance informed by a sense of cosmopolitan values and rooted in an appreciation of nature may provide the seeds for re-generation (Bignall et al 2016). This purposive aspect needs to be addressed through systemic intervention informed by thinking through options.

The Design of Inquiring Systems developed by West Churchman is extended to explicitly appreciate many ways of knowing that take into account the rights of sentient beings and the living systems on which they depend, so that a non-anthropocentric approach to governance and public policy can be achieved (McIntyre-Mills, 2014, 2017). These ways of knowing include:

- Logic
- Idealism to protect all sentient beings
- Empiricism based on qualitative and quantitative data to protect living systems
- Dialectic based on exploration of thesis, anti-thesis and then striving for a synthesis
- Expanded Pragmatism based on considering consequences of our decisions in the short, medium and long term *for all life*.

In order to manage the commons mutual agreements need to be negotiated and records need to be kept, in order to protect the interests of stakeholders. The commons needs to be theorized as a legal concept (Marella, 2017), a transformative governance concept ('Planetary Passport*'* McIntyre-Mills, 2017) and a basis for systemic ethics (McIntyre-Mills, 2014)[68].

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[68] It explores the notion that our fate is determined by a realization of our interdependence. It aims to increase an understanding of life chances and dynamics of vulnerable population groups in areas most affected by climate change related areas. It responds to complex ethical policy challenges posed by the Paris Agreement and the UN Sustainable Development Goals, in order to narrow the gap in living standards between rich and poor. Policy choices made by this generation shape the wellbeing of both current and future generations. The outcome will be a better understanding of socio-cultural discourses, life chances and behaviour to inform policy and to improve public administration by learning what does and does not work and why from the most vulnerable populations. The focus is on protecting 'wellbeing stocks' a concept adapted from Stiglitz et al. (2010: 15) to refer to a multidimensional measure of wellbeing spanning:

The double hermeneutic [69]enables us to address the challenge through transformational praxis that makes a difference socially, economically and environmentally through everyday choices.

The post materialist 'culture shift' (Inglehart, 1997) in Cape Town is both personal and as a result of political shifts brought about by policy transformations.

The systemic interventionist approach by Midgley (2000) also provides a way forward through providing steps to address diverse values and the conflicts that ensue[70]. Critical heuristics need to include social, cultural, political and economic variables, in order to enhance decision-making(McIntyre-Mills, 2006). Churchman (1982) in 'Thought and Wisdom' stresses that decisions (derived from Latin to cut) need to be made based on our values and that we should remain ever vigilant about the way in which religion, morality, politics and a sense of aesthetics can filter the way in which we see the world. He calls these 'the enemies within', because they make us human and compassionate or passionately inhumane.

Thus the summary of 12 boundary questions developed by his colleague Werner Ulrich (based on his work) are only a guide to decision making and should not be confused with a compartmentalist approach that ignores that all decisions need to be constantly revised to protect the webs and flows of living systems in which we are only a strand.

Decisions made in the policy context need to be mindful of our responsibility to protect the commons and these can be informed by using critical systemic thinking tools, starting with a critical review of Senge's (1990) archetypes to help student think about their thinking and to recognize patterns in data, but also the assumptions and values that underpin them. The archetypes include the following:

- **Limits to growth**, for example: the higher the level of carbon emissions associated with economic development , the higher the GDP and the higher the rate of climate change
- **Shifting the burden**, for example cutting the costs in one region by shifting the costs of pollution and poverty elsewhere. Or shifting the burden of work to the less powerful and voiceless , namely women and young people , those who are not protected by the mantle of the social contract
- **Accidental adversaries**, for example: two regions in competition lead to undermining the other region and the entire nation suffers. Alternatively, two nation states competing for power undermine human security for all. Once the feedback loops have been identified the area of concern needs to be identified with stakeholders and boundaries need to be drawn. By questioning 'what is the problem repreented to be' (Bacchi, 2009 policy from below can re-frame the the boundary questions and identify the patterns of relationship and then explore the way in which assumptions and values shape approaches.

'1. Material living standards (income, consumption and wealth), 2. Health, 3. Education, 4. Personal activities including work, 5. Political voice and governance, 6. Social connections and relationships, 7. Environment (present and future conditions), 8. Insecurity, of an economy as well as a physical nature'.

[69] Giddens (1990: 171) outlines the high consequence risks as: 'Growth of totalitarian power', 'nuclear conflict or war', 'Collapse of economic growth mechanisms' and 'ecological decay or disaster'. Internationally we are on track to experience all these scenarios; however, we do have the potential to redress them through critical systemic intervention.

[70] Analysing ways to address an area of concern can be assisted by using an application of Ulrich's 12 boundary questions based on C. West Churchman's Design of Inquiring Systems approach. Whist Churchman talks of unfolding values and sweeping in, this is extended in the West Churchman Series volume 3 (McIntyre-Mills, 2006) to include social, cultural, political and economic variables in order to enhance decision-making. Churchman (1982) in 'Thought and Wisdom' stresses that decisions (derived from Latin to cut) need to be made based on our values and that we should remain ever vigilant about the way in which religion, morality, politics and a sense of aesthetics can filter the way in which we see the world. He calls these 'the enemies within', because they make us human and compassionate or passionately inhumane. Thus the following summary of 12 boundary questions developed by his colleague Werner Ulrich (based on his work) are only a guide to decision making and should not be confused with a compartmentalist approach that ignores that all decisions need to be constantly revised to protect the webs and flows of living systems in which we are only a strand. So decisions made in the policy context need to be mindful of our responsibility to protect the commons (Ulrich & Reynolds, 2010, p. 244).

- **Reinforcing loop**, the more we emphasise national boundaries the more containerist our policy approaches to climate change, displacement and poverty, according to a critical thinker. However, the same issue could be framed as follows: the more we emphasise the closing of boundaries and the offshore management of asylum seekers, the less likely people traffickers will choose Australia as a destination. Thus, the recognition of archetypical relationships is just a starting point and needs to be combined with a values based approach, such as the critical heuristics approach that can easily be grasped through the 12 critical questions posed by Ulrich as a distillation of West Churchman's work.
- **Balancing loop,** for example increased income from tourists visiting for Two Ocean's Race in Cape Town   will be balanced out by increased costs for building de-salination plant. Here is another example: Building dams that provide up stream users with power/water at the expense of the security of downstream users will lead to regional tensions. Another example of a balancing loops. The rhetoric of the UN Development Goals is undermined by the lack of post national regional governance to enable the implementation and monitoring of the goals
- Relationship '**fixes' that backfire'**, for example closing national boundaries to people seeking asylum leads to increased risks of conflict.   Another example of fixes that backfire, would be adding GST to food in South Africa , will lead to greater food insecurity and more opposition to current policies
- **Tragedy of the common**s can be interpreted differently depending on our assumptions and values. Typical relationships can be characterised by the work of Peter Senge who calls these relationships archetypes. I explain that definitions of tragedy of the commons differ, depending on our assumptions and values.

Although Peter Senge stresses the need to recognise patterns of feedback as 'archetypes', a critical systemic thinker strives to recognise areas of concern and to intervene to address the issues. Most of the patterns he identifies are helpful as detailed below with the exception of the tragedy of the commons. I use the different explanations of the concept to illustrate how different assumptions and values shape the way in which we make sense of the world.

Whereas Senge's (1990) work stresses the need to intervene at an organisational or wider level, he stresses that without management, the commons can be abused. An example from this perspective could be as follows: increasing car traffic to large central city areas lead to congestion, pollution and time loss.

Hardin (1968) 'stresses that the commons can and should be privatized and in this sense he echoes the original source of the notion of enclosure, put forward by Locke in his justification of enclosing the common land to 'encourage' tenant farmers and the landless to seek work in factories. Neither Locke nor Hardin's thesis that common land should be privatized in based on empirical research. Shiva (2002) stresses that this is not the case and that   access to the commons needs to be protected. This approach is supported by Bollier and Helfrich (2013) who stress that wealth exists beyond the market place and that the environment needs to be fostered through social processes. A realization that feedback loops based on systemic interconnections are vital to understanding risk has been raised by mainstream thinkers in sociology and economics. For example whereas in his early books Ulrich Beck (1992, 1998) writes of the 'boomerang effect' of poverty and climate change and   in his later work (Beck, 2010) he explicitly recognises carbon emissions and climate change and the risks they pose for people and the planet. Sir Nicholas Stern (2006) in 'The Economics of Climate Change' stresses that climate change will lead to increased feedback loops that could lead to rapid warming.

Donna Haraway (1991,1992, 2010) stresses that some of the challenges need to be addressed within very specific contexts. Haraway stresses that all knowledge is situated and that we need to develop specific responses by appreciating the many factors that shape life chances within context. How we make sense of the world is shaped by our life experiences. Being aware that we are indeed the boundaries, because we can make and remake the boundaries through our policy decisions is an important starting point for design. A great deal of the writing by Haraway critiques the notion of essentialism and instead stresses that being boundary creators frees people from the limitations of categories and recognizes our

hybrid relationships with others including living systems of which we are a part[71]. Haraway blurs the dualisms of the human nature divide by reminding us of our hybrid, co-evolution as human beings with companion species and how these cultural relationships shape both human beings and other species in terms of breeding and interspecies health.[72] This requires us to do interspecies ethnography,in order to understand where we have come from and where we are headed. This is perhaps not what Haraway means by the notion: 'we are the boundaries'.

4.3   A critical review of everyday news on democracy, agency and governace

A critical systemic reading of the sociology and anthropology of development (Gibson-Graham and Miller, 2015) and capabilities studies (Nussbaum, 2011, Sen, 2003) provides the lens through which human rights are considered. 'Planetary Passport'(McIntyre-Mills, 2017) makes a contribution towards proposing an alternative form of architecture to protect so-called 'wellbeing stocks' spanning the health of multiple species, habitat, housing and social inclusion informed by mixed methods (Hesse Biber 2010; Mertens, 2010, 2016), comparative case studies and a critical reading of everyday news media.

5.   SOCIAL AND ENVIRONMENTAL JUSTICE SUPPORTED BY VALUES BASED GOVERNANCE

Giddens (1990) stressed in the 'Consequences of Modernity' that trust is contingent and that risks escalate when transfers are disembedded from local contexts and local controls. The need for representation and accountability to remain connected to the people has never been more important. As democracy and governance in modern nation states requires working across social, economic and environmental boundaries it becomes important that bureaucracies remain accountable to the electorate. The non-anthropocentric state is supposed to serve the people and the planet who are principles and not the narrow interests of the elites. This is clearly not the case in South Africa at the time of writing.

Stiglitz et al (2010) in 'Mismeasuring our lives' reminds us of the importance of representation and accountability for justice. Branko Milanovic in a blog posted on the Global Policy website[73] discusses the apt aptness of the critique made by Adam Smith of late capitalism in the 'Wealth of Nations'[74].

Milanovic stresses the way in which exploitation by big companies has resulted in the impoverishment of nations and local economies and how the Dutch destroyed spices and corn in order to keep up prices:

> "The government of an exclusive company of merchants is, perhaps, the worst of all governments for any country whatever" (Book 4, Ch. 7, p. 722).

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[71] Haraway's perspective differs from Martha Nussbaum's perspective. Nussbaum is normative in prescribing the conditions for human rights. I think that whilst their approaches are different both have much to offer in terms of providing guidelines for protecting people and the environment. Haraway analyzed the oppositional logic of scientific and sociological narratives to explore the way in which we make sense of the world in terms of us/them, west/east/ animal /human, machine/human. Haraway's mission was to demonstrate that we can make choices about how we draw and re-draw these boundaries.

[72] https://www.youtube.com/watch?v=lqglzX_y5wM

https://www.google.com.au/search?q=donna+haraway+and+utube&ie=UTF-8&oe=UTF-8&hl=en&client=safari https://www.youtube.com/watch?v=59N5xwmw5x0, Uploaded on Oct 3, 2007.

https://www.youtube.com/watch?v=59JD2eKIZfQ

http://www.egs.edu/

[73] http://www.globalpolicyjournal.com/blog/06/02/2018/bitterness-adam-smith

[74] Smith, A. 2003. *The Wealth of Nations, Bantam Classic*, 2003; edited with notes and marginal summary by Edwin Cannan; preface by Alan B. Kruege. Cited by Branko's ***blog***.

He specifically mentions the role of the Dutch East India Company in Indonesia and India and although he does not specifically discuss the role in South Africa , the long shadow that colonialism casts, this will be a focus of the current paper and the volume from which it is extracted. My reading of the Wealth of nations (a different copy from his) makes it clear that even during the era of the Dutch East India company the exploitation by a company is not good for development as people do not have their independence and are exploited to the extent that it erodes hope and trust in the future.

 "The Dutch settlements in the West, as well as those in the East Indies, were originally put under the government of an exclusive company. The progress of some of them, therefore, though it has been considerable in comparison with that of almost any country that has been long peopled and established, has been languid and slow in comparison with that of the greater part of new colonies". (Smith, 1776 : 967)

He was not however very critical of capitalism and aruged that if capitalism is well organised it delivers a better quality of life than living in a natural state. This of course depends on what one means by *capitalism* and *natural state.*

 Modernisation has moved from extraction of profit in factories and mines at the industrial centres of powerful nation states to the colonial periphery where extraction and profits were enhanced through exploitation of the labour of people and the environment on which they relied. The process of treating people, sentient beings and living organica and inorganic systems as things (re-ification) to be exploited like commodities has become central to a form of capitalism that evolved through the insititition of the welfare state and ebbed through the erosion of the protection it once provided through balancing the state, market and civils society in a form of social democracy that no longer is applied.

Today capitalism needs to be re-framed completey, along lines that protect people and the planet through a better understanding of our interconnections as one strand in a living system that has cascading positive and negative effects depending on how it is managed.

Thus the stewardship role of new approaches needs to consciously work with sources of abundance in nature . Although Pauli et al (2010) have much to offer, it is important to place the principles of social and environmetnal justice at the centre and to realise that democracy depends on constant surveillance or monitoring from below as well as global benchmarks set to protect the common good (as per the argumeent of Held, 2004 in Global Covenant). The balancing process requires that this be done very carefully through working out the socuial, economic and environmental impact of our choices. This takes Giddens (1990, 2009) 'consequences of modernity' and the 'politcs of climate change' as a starting point for developing a transformational approach to protecting living systems .

Giddens (1990) discusses trust as part of the challenge for modernity. Trust in elected leaders is at a low ebb given the extent to which self-interests rather than the public good prevails. An understanding of the commons and the common good is greatly needed. Unfortunately, trust has been eroded by big business from the era when companies operated for profit and in the name of the nation state. The lack of insight into the interconnected context of policy formation and the extent to which politics should strategically support policies that will protect human security is part of the problem. Ramaphosa delivered the address and used the symbolism of past leaders to try to invoke the time when ANC was seen as a beacon of hope to the dispossessed in which he stressed:

"We should put behind us the era of diminishing trust in public institutions and weakened confidence in leaders. We should put all the negativity that has dogged our country behind us …"

At this point he is referring to the problems associated with the so-called Zuma era, which was characterised as an era of state capture. He then returns to the theme of the leaders who stood for justice and asks for a renewal of the vision of the founder members:

"It is a new dawn that is inspired by our collective memory of Nelson Mandela and the changes that
are unfolding. As we rid our minds of all negativity, we should reaffirm our belief that South Africa
belongs to all who live in it. For though we are a diverse people, we are one nation. There are 57
million of us, each with different histories, languages, cultures, experiences, views and interests. Yet
we are bound together by a common destiny. For this, we owe much to our forbearers – people like
Pixley ka Seme, Charlotte Maxeke and Chief Albert Luthuli – who understood the necessity of the
unity and harmony of all the people of this great land. We are a nation at one".

The symbolism of past heroes of resistance are held up to encourage South Africans to have trust in
the future of the ANC. He also stresses the importance of honouring diversity and in this sense; he
follows the 'rainbow nation symbolism' of his mentor, Mandela. Ramaphosa then went on to stress the
importance of practical engagement to address the problems associated with the current education system
that does not provide enough places for vocational training linked with immediate employment
opportunities:

"Next month, we will launch the Youth Employment Service initiative, which will place unemployed
youth in paid internships in companies across the economy. Together with our partners in business, we
have agreed to create a million such internships in the next three years"

He then goes on to stress the importance of listening to their voices:

"If we are to respond effectively to the needs of youth, it is essential that young people articulate their
views and are able to engage with government at the highest level. I will therefore be establishing a
Youth Working Group that is representative of all young South Africans to ensure that our policies
and programmes advance their interests"

5.1   Trust, politics and policy based on interconnected knowledge

The need to address sustainable development and to ensure that those who are displaced and disposed
have access to land. Food security is one of the aspects on which he focused. Much of the commentating
on News 24 is by white South Africans. The context of apartheid history is never far away (but goes
unacknowledged) as a vital aspect of the current crisis. The DA have been associated with the old
apartheid era. It has been called part of the problem along with 'white monopoly capitalism'. The
characterization of capitalism in racial terms is problematic and a result of the lack of real transformation
in the lives of many South Africans as stressed by Alexander (2010) in his analysis of the protests linked
with the lack of service delivery. However, these political issues cannot escape the fact that the colonial
past is one shared by both the British and the Dutch as stressed by Adam Smith[75].
The announcement that the NEC of the ANZ has asked Zuma to step down was made by the ANC
secretary, Ace Magashule[76]. Clearly, the invitation couched in the language of political risk-taking
underlines the importance of a voluntary resignation and a face-saving opportunity as it was stressed that
Zuma needed to step down in the interests of the party. Any allegations of corruption over Nkandla or the
allegations of State Capture were left out of the request.
The language of 'monopoly capitalism'[77]is used by Zuma in his response to the request that he 'step
down'. However, Zuma is hand in glove with private sector companies and playing the 'white monopoly
capitalism card' becomes potentially problematic, as does the potential to play the tribal card, given

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[75] http://www.globalpolicyjournal.com/blog/06/02/2018/bitterness-adam-smith

[76] https://www.news24.com/SouthAfrica/News/zuma-has-done-nothing-wrong-but-he-must-go-magashule-20180213.

[77] https://www.news24.com/Video/SouthAfrica/News/zexit-goodbye-zuma-jacob-zuma-in-his-own-words-20180213

Zuma's Zulu links. The request for his resignation has already been tabled by the Economic Freedom Fighters (EFF) the party of ousted Julius Maleme who was once a youth leader in the ANC. The need for Zuma to step down with dignity was carefully handled by Ramaphosa who won the ANC presidency against the other candidate, Zuma's ex-wife, Nkosazana Dlamini-Zuma.[78]Speculation that Zuma had asked to stay on for 3 to 6 months in order to secure the contested nuclear deal with Russia was also denied. The drought in South Africa has resulted in three provinces[79] being declared disaster zones[80]. Despite the declaration of Cape Town as a disaster zone by Provincial government, Zuma refused to escalate the provincial level declaration to a national level. Without a declaration of national disaster, funds could not be released to assist the province. The management of water provision to address the worst drought in over 300 years requires co-operation across multiple levels of organization at the local city government level, provincial level and national level.

The political dynamics of Helen Zille (DA Provincial leader) and Zuma are partly to blame for delays in responding to risks of climate change and a lack of trust between the   ANC leader and the DA Provincial leader.

State capture is the subject of an official inquiry into the role of Zuma's relationship with the Guptas. The issues were raised by the Public Protector and advocate, Thuli Madonsela who bravely asked questions, despite threats to her safety. The current Minister of Security has broadened the terms of reference[81]. But a balance will need to be achieved to ensure that the focus is on the role of the state in relation to big business

This is an example of how people can work together to address risks. They have faced a common risk through effort and despite some outbreaks of violence, water points at springs have been self-managed, based on trust.

The spirit of Ubuntu has prevailed and hopefully shone a light on the risks of a divided society.

Because of the action by civil society, farmers and civil society together with local and provincial government In Cape Town, they have managed to get people to become water warriors through a combination of factors:

- Reducing consumption to 50 litres a day per person (or less) - A digital water map – to show those who are meeting the water restrictions
- Water pricing and policing – to make people value the commodity
- Public education – 'save water now or queue' for water when the taps run dry
- Public-spirited donations of water through 'gift of the givers', farmers donating their water to Cape Town.

6.   REFRAMING KNOWLEDGE THROUGH RESEARCHING RELATIONSHIPS TO PROTECT THE WEB OF LIFE

As stressed in 'Democracy and Governance for Resourcing the Commons : theory and practice on rural-urban balance   (McIntyre-Mills 2017: 88-89) the purpose of the policy research is to deepen an understanding of the complex, inter-related factors underpinning decision making and resource sharing, in order to respond to the UN Sustainable Development Goals. The most impactive element of a transformative system needs to develop water and energy in combination with food and shelter. Water security exists in parallel with energy harvested and those in combination of food and shelter that enables re-generation of resources to benefit the service users.

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[78] https://qz.com/1159766/anc-conference-cyril-ramaphosa-wins-in-rebuke-of-jacob-zuma-south-africa-president/

[79] https://www.news24.com/SouthAfrica/News/drought-crisis-3-provinces-declared-national-disasters-20180213

[81] http://www.thenewage.co.za/widen-state-capture-probe-say-mps/

Ecosystemic approaches to regenerative service delivery needs to work with nature by using natural energy sources , designing rural – urban linkages that support food and water security are core to supporting wellbeing and resilience of living systems.

In his preface, Adam Smith (1776:4) discusses the imbalance in development:

"Some nations has given extraordinary encouragement to the industry of the country; that of others to the industry of towns. Scarce any nation has dealt equally and impartially with every sort of industry"

Adam Smith (1776:24):
"It is not from the benevolence of the butcher the brewer, or the baker that we expect our dinner, but from their regard to their own interest. We address ourselves, not to their humanity, but to their self-love, and never talk to them of our own necessities, but of their advantages. Nobody but a beggar chooses to depend chiefly upon the benevolence of his fellow-citizens".

Enlightened self-interest in today's context would require re-thinking the example and re-thinking what cascade economics could look like[82]. I find it hard to accept that the time and motion principles (embedded in the wealth of nations) that provide the basis for factory organisation and the commodification of labour and extraction of rent were discussed by Smith without actually questioning the way in which the economic system operates. He seemed to think that *if capitalism is applied in an ideal and organised way* then the profits would flow on to all. Growth does not entail a fair distribution of resources to protect all living systems.

The wicked nature of climate change, displacement of people, loss, unemployment and poverty is explored as it affects multiple species.

The cascading effects of climate change can be better understood and hopefully redressed through pathways to mitigate the causes and adapt to the effects of climate change. These pathways include:

- Identifying issues and working with the community
- Identify what the problem is represented to be by different stakeholders (Bacchi , 2009)
- Identify what and who is currently included and excluded and why in policy planning processes and then
- Identify what, who and why ought to be included in a better design to address wicked challenges that have many interrelated problems that are perceived differently from different stakeholders
- Identifying ways to prevent loss of land
- Identifying species that are under threat as a result of habitat loss
- Match resources to their needs and
- Identify pathways that address complex needs through working with a host of factors simultaneously and in a non-linear manner as detailed in McIntyre –Mills and De Vries (2010 , 2014) and McIntyre-Mills and Wirawan (2017)
- Lobby to address policy changes

The notion of virtuous living needs to be explored in terms of:
- **A priori norms** that are guided by accepted rules of behavior that protect the fabric of life
- **A posteriori indicators** that measure performance of both service users and providers.

Both are needed, in order to guide practices and to hold people and their elected government representatives to account.

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[82] Low carbon options may exclude meat and many cultures will abhor brewing.

Post script

I conclude by acknowledging my thanks to J.P Van Gigch (2003) and his Meta level design process inspired by C. West Churchman that has informed this paper.

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