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Sustainability and Government – A Case Study of the South Australian Government

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Abstract

Purpose of the paper: This paper reports on a PhD project (the **Project**) concerned with what it means for humans to live sustainably, that is, for there to be a **sustainable-world**. In particular, the Project considers why, despite the need for humans to live sustainably having been of international concern for many years, humanity is still living unsustainably and this situation is worsening.

Research method: A literature review using inductive and theoretical thematic analysis was conducted to develop a typology representing different approaches to a sustainable-world. A case study of the South Australian Government's (**SAG's**) sustainable-world approach was also conducted.

Findings: Two main sustainable-world approaches are evident: a Reformist approach and a Transformational approach. Reformism is the current dominant approach. A Footprint-Analysis and socio-ecological resilience critique of Reformism casts doubt on its ability to see the primary sustainable-world goal achieved regardless of how aggressively it is pursued. The SAG's sustainable-world approach follows the Reformist theme. Concerns at Reformism's ability to see the primary sustainable-world goal achieved flow through to the SAG setting.

Implications: The findings have important social implications, including policy implications for government, strategic decision making for business, through to day-to-day lifestyle decisions for communities, households, and individuals. The key point is that pursuit of the Reformist approach may, rather than see a sustainable-world come about, continue to drive humanity towards a social and ecological sustainability crisis point, whilst simultaneously acting as a barrier to the more decisive action that it needed.

Keywords: Sustainability, Reformist, Transformational, Footprint-Analysis, Socio-ecological resilience, South Australian Government

1. Introduction

1.1 Purpose of this paper

This paper reports on a PhD project (the **Project**) concerned with what it means for humans to live sustainably, that is, for there to be a **sustainable-world**. The paper overviews the entire Project. Due to the Project's broad scope, a number of its aspects are reported in brief with reference to supporting papers. Further details on any of the Project's aspects are available from the author.

1.2 Purpose of the Project

Although concerns about the need for humans to live sustainably have roots dating back thousands of years (Hughes, 2001), and the sustainable-world concept, often expressed as sustainable-development, has been prominent on the international stage for over 20 years since the 1987 release of the World Commission on Environment and Development's report "*Our Common Future*", humanity is still not living sustainably. Absolute and persistent poverty continues to affect hundreds of millions of people, the resource-use gap between the rich and the poor is increasing, and the Earth's ecosystems continue to deteriorate (Bell, 2009; Brown, 2008; UNEP, 2007, 2009).

But why do these problems persist? The Project explored this question by considering whether the current dominant sustainable-world approach is itself the problem in that, regardless of how aggressively it is pursued, this approach may, by its nature, be unable to deliver the sustainable-world outcome it promises.

1.3 Questions addressed

The Project comprised two components. The first was a literature-based answer to research Q1: What does it mean for there to be a sustainable-world? Specifically, Q1 considered:

Q1(a): What different sustainable-world approaches are evident in the literature?

Q1(b): Of these approaches, which is the current dominant approach and in what way is it dominant?

Q1(c): What human activities are inconsistent with any of the approaches identified in Q1(a)?

Q1(d): What best represents the current dominant human behaviour in respect to its consistency or otherwise with sustainable-world principles? (Note: the Project proceeded based on claims that humanity is not, in a collective sense, living sustainably. Q1(d) explores if humanity is nonetheless living in ways consistent with at least some sustainable-world principles, even if in an overall sense it is not).

Q1(e): Is the current dominant sustainable-world approach identified in Q1(b) a viable pathway forward for humanity, in the sense of it being more likely to see the primary sustainable-world goal achieved than if humanity instead pursued an alternate approach?

The answers to Q1(a)(b)(c) and (d) are presented in the form of a sustainable-world typology (**SWT**) shown as Appendix 1. The SWT presents a sustainable-world as having as its primary goal:

"the flourishing of life on Earth, incorporating both human and ecological wellbeing, over an indefinite time frame, [with] this wellbeing....grounded in principles of intra-generational and inter-generational justice" (Clifton, 2010a, p. 42).

Beyond this general claim however, there is considerable divergence in the two main sustainable-world approaches – the Reformist and the Transformational approaches – that are shown in the SWT.

Q1(e) was answered using two approaches: (a) Ecological Footprint Analysis (**Footprint-Analysis**) in conjunction with I=PAT, and (b) the concept of **socio-ecological resilience.** These concepts are reviewed in section 2.

The second part of the Project comprised a case study of the South Australian Government's (**SAG's**) sustainable-world approach. Governments, at all levels, are seen to have a key role to play in progressing a sustainable-world (Speth, 2008; WCED, 1987), and the SAG is an instructive example as it:

(a) Is democratically elected and, in this sense, has a purpose to act in the interests of its constituents (Parkin, 2006).

(b) Holds itself out as a sustainability leader (SAG, 2007a, 2007b).

(c) Has broad constitutional powers to pass legislation and to pursue policy initiatives within South Australia's borders (SA, 2003).

The purpose of the case study was to: (a) identify, in a practical setting, areas of confirmation or discrepancy with the Q1 findings, and (b) consider the implications of sustainable-world initiatives at the local level within a broader global sustainable-world context. This gave rise to a two-part case study question:

Q2(a): What sustainable-world approach is the SAG pursuing?

Q2(b): In the light of the findings from Q1, what implications arise from the SAG's sustainable-world approach in respect to its contribution to, or detraction from, a global sustainable-world goal?

2. Typology, Footprint, I=PAT and Resilience - literature analysis

This section considers, from a literature perspective, a number of issues of importance in answering the Project's research questions. Specifically, this section:

(a) Considers how approaches to a sustainable-world might be represented and proposes a typology as most appropriate.

(b) Reviews the Footprint-Analysis, I=PAT, and socio-ecological resilience concepts, and their application for the Project.

2.1 Representing a sustainable-world

The sustainable-world concept is pluralistic, contested, and grounded in different value systems and world views (Manderson, 2006; Porritt, 2005). To give meaning to such a concept, Dobson (1996) proposes a typology approach, as this provides a method of simple and structured concept summation, but in a way that preserves a concept's complexity and plurality. The Project followed Dobson's advice with representations of a sustainable-world presented as the SWT.

A number of existing sustainable-world oriented typologies are evident in the literature (e.g., Gladwin, Kennelly & Krause (1995), Dobson (1996) and Diesendorf (1997)). A new typology was, however, developed as existing

typologies were found to be somewhat dated, and to be either too narrow in their focus, or too limited in the scope of sustainable-world principles (**sustainable-world-dimensions**) considered and/or the descriptions of the sustainable-world-dimensions shown.

A typology is, however, a mere descriptive, and the SWT gives no indication of the merits of the sustainable-world approaches it presents. To explore this issue of merit, two approaches: (a) Footprint-Analysis in conjunction with I=PAT, and (b) socio-ecological resilience, were used to critique the sustainable-world approaches the SWT presents.

2.2 Footprint-Analysis

2.2.1 Overview and Project application

In brief, Footprint-Analysis involves: (a) the calculation of an **Ecological-Footprint** measure of human appropriation of the Earth's renewable natural resources (K_{NR}), usually expressed as a standardised measure of global hectares per capita (**ghpc**), (b) a measure of available **Biocapacity**, that is, the regenerative capacity of the Earth's K_{NR} base (also as ghpc), and (c) a comparison of these two measures to determine if humans are living in ecological credit or deficit (Footprint Network, 2010).

The characteristics of Footprint-Analysis see it suited to a number of applications for the Project namely:

(a) To provide input for answering Q1(d) by: (a) measuring the extent to which humanity is meeting a necessary, although not sufficient, condition for it to live sustainably, which is to live within the Earth's Biocapacity limits (Footprint Network, 2010), and (b) considering the implications of current human behaviour, as presented by the Footprint-Analysis data, in respect to various sustainable-world-dimensions included in the SWT.

(b) To provide insights into Question 1(e) through modelling possible future Footprint-Analysis implications of pursing the current dominant sustainable-world approach. Although Footprint-Analysis is not a forward looking measure, it is nonetheless suited to considering possible futures based on a set of assumptions as to how its components may change over time (Footprint Network, 2006). One approach to projecting possible futures using Footprint-Analysis is through application of I=PAT (I=PAT is discussed in section 2.3.).

(c) For Q2(a) and 2(b) it can, in conjunction with I=PAT, and leveraging from its application in points (a) and (b) above, be used as an external analysis tool to assess the SAG's sustainable-world approach and its contribution to, or detraction from, a global sustainable-world goal.

2.2.2 Footprint-Analysis data – some issues

For the Footprint-Analysis data to be used in a meaningful way for the Project, two key and interrelated considerations are important to address, namely: (a) the conservative nature of the data, and (b) how much available Biocapacity can be safely utilised by humans. Each of these is addressed in brief in this section (for a detailed analysis, see Clifton (2010b)). Table 1 shows the current Footprint-Analysis summary data, with humanity displaying a global average Ecological-Footprint of 2.6 ghpc, average Biocapacity of 1.8 ghpc, and a position of **overshoot** (i.e., Ecological-Footprint exceeds Biocapacity) of 0.8 ghpc.

Table 1. Current Footprint-Analysis data

Item	**Value**
Global average Ecological-Footprint.	2.6 ghpc
Global average Biocapacity.	1.8 ghpc
Ecological deficit (overshoot) – global average.	-0.8 ghpc
Ecological-Footprint as a percentage of Biocapacity.	144%

Source: Footprint Network (2009)

The conservative nature of Footprint-Analysis data means that the Ecological-Footprint is likely to be understated, Biocapacity overstated, and overshoot understated (Wackernagel, 2009). How big a gap might exist between the quoted and actual overshoot value is unclear although a study by Venetoulis & Talberth (2005) offers some insights. These authors undertook an alternate Footprint-Analysis calculation to incorporate many of the factors the standard Footprint-Analysis figures exclude. Compared against the Footprint-Analysis 2005 data, the findings showed an ecological overshoot of 39% (i.e., humanity's global Ecological-Footprint was 139% of available Biocapacity), this being about double the overshoot of 18% reported in the standard Footprint-Analysis figures.

The amount of actual Biocapacity (as opposed to calculated Biocapacity in the Footprint-Analysis data) that is available for human use is also poorly researched, with two issues being of particular importance. The first is that the Biocapacity measure ignores the Biocapacity needs of other species (Footprint Network, 2006). Estimates of how much Biocapacity should be set aside for other species range from 10%-12%, to 40%-60%+ (Soulé & Sanjayan, 1998; Wackernagel & Yount, 1998). The 10%-12% estimates are, however, seen as likely to result in continued biodiversity loss inconsistent with sustainable-world objectives, with figures in the 40%-60%+ range more appropriate (CABS, 2003; Soulé & Sanjayan, 1998).

The second issue concerns resilience, and the need to maintain ecosystem resilience in order to improve the likelihood that a sustainable-world can be realised (resilience is discussed in section 2.4.). Ecosystem resilience is poorly addressed in the Footprint-Analysis context with no reliable data available on the amount of Biocapacity that should be set aside for resilience purposes.

For the Project, two values of the amount of Biocapacity *not* available for human use were used: (a) 20% (i.e., 80% of Biocapacity available for human use), and (b) 50% (i.e., 50% of Biocapacity available for human use). These values were intended to allow for all three issues of conservative data, other species, and resilience. The 20% value takes a minimalist approach by moving a short distance beyond the '10%-12% for other species' values, and the 50% value sits comfortably in the higher end ranges for biodiversity protection. An argument can be made that the 20% value is inadequate from a biodiversity protection perspective, let alone allowing for conservative data and resilience. The 50% value may also be inadequate in these respects. But, as will be evident in the discussion that follows, debates over an exact allowance are in many ways distractions from the core message Footprint-Analysis offers – that the magnitude of the task humanity faces in reducing its K_{NR} use to sustainable levels is substantial regardless of what Biocapacity-for-human-use figures are used.

2.3 I=PAT

2.3.1 Overview

I=PAT (Holdren, Daily, & Ehrlich, 1995) presents human ecological impact 'I', as a function of Population, Affluence (as consumption-production per capita, usually as GDP per capita), and Technology (as the ecological impact per unit of consumption-production). By representing 'I' as the Ecological-Footprint, (Bates, 2009; York, Rosa, & Dietz, 2007), I=PAT can be used to display different formulations of a sustainable-world in terms of their approaches to the I=PAT elements (see Table 2), from which forward modelling of 'I', based on certain 'PAT' scenarios, can be conducted.

Table 2. I=PAT and the Reformist and Transformational approaches

IPAT	Reformist	Transformational
'I'	Reduce Biocapacity use to sustainable levels by focusing on 'T'.	Set limits on Biocapacity use to well within available levels. All of 'PAT' addressed to ensure limits are not breached.
'P'	Orientation to maximising the human population that can be supported within sustainable-world criteria.	Current human population is too high and unsustainable, and is an issue for all countries to address.
'A'	Continued global GDP growth is necessary to progress human wellbeing and overcome problems of poverty.	Increased consumption is needed for some where basic needs are not being met but this is achieved through more equitable distribution, not more global GDP growth. Overall, resource consumption needs to be reduced.
'T'	Technological progress to overcome the impacts of 'P+A' is the key to living sustainably and to reducing 'I' to be within ecologically sustainable limits.	Technology is important but on its own it will not achieve the needed change. Technology needs to be progressed with caution.

Source: Clifton (2010b)

2.3.2 Projecting the Ecological-Footprint

In its basic form, I=PAT gives no indication of how changes in any of the 'PAT' elements might impact on 'I'. This is a poorly researched area with no reliable I=PAT component relationship data available (Kitzes, 2007; York, 2008). Some data does however exist that can serve as a basic guide to the possible impacts of changes in 'P+A' on 'I' (with 'I' represented as Ecological-Footprint).

First, cross-nation research shows that an increase in 'P' corresponds to about the same percentage increase in 'I', and an increase in 'A' (as GDP) corresponds to a slightly greater percentage increase in 'I' (York, Rosa, & Dietz, 2003). Next, a within-nation analysis of European Union (**EU**) countries has shown that, from 1971-2008, the aggregate Ecological-Footprint for these countries grew at about 75% of 'P+A', although country specific data showed significant variance (WWF, 2007). Third, historic global population, GDP and Ecological-Footprint data show that, from 1961-2006, humanity's collective Ecological-Footprint grew by about 55% of 'P+A', although there is significant year by year variation (raw data sources: Footprint Network, 2009; WRI, 2010). Finally, is the environmental Kuznets curve (**EKC**) concept, which claims that reductions in ecological impacts arise once nations pass a certain point on their industrialisation path. Although the EKC phenomenon has been observed for some local environmental quality factors, it has been shown to not hold from a broader consumption perspective (Rothman, 1998; Stern, 2004) (for further detail on these I=PAT relationships, see Clifton (2010b)).

What these comments on the relationships between the I=PAT elements show is a lack of absolute decoupling (i,e, an absolute reduction in resource input despite increased production output) between 'P+A' upward pressures and changes in 'I' (Jackson, 2009). A degree of relative decoupling (i.e., a reduction in 'I' per unit of 'P+A') is evident in some of the above findings, but clarity of the extent of this decoupling remains elusive. For the Project, two decoupling rates between 'I' and 'P+A' were used in projecting the Ecological-Footprint using I=PAT: (a) 25% (i.e., a 1% change in 'P+A' equals a 0.75% change in 'I' – this is consistent with the EU results), and (b) 50% (i.e., a 1% change in 'P+A' equals a 0.50% change in 'I' – this takes an optimistic position beyond that evident in any of the above findings).

2.3.3 Projecting Biocapacity

The final component necessary for conducting forward-looking Footprint-Analysis modelling concerns future trends in available Biocapacity. How Biocapacity might change in the future remains uncertain and is subject to many forces. Although some attempts to model future Biocapacity changes have been attempted (e.g., see WWF (2006), and Lenzen et al. (2007)), the results are mixed and there is little to work with. The approach used for the Project was to assume that current total Biocapacity will remain about the same, with forward adjustments made only in respect to per capita Biocapacity changes resulting from projected population movements.

2.4 Socio-ecological resilience

Early work on resilience, that has since developed to form part of sustainable-world discourse, is generally dated from the early 1970's and the ecological systems research of Holling (Folke, 2006; Walker et al., 2006). Two main forms of resilience are now differentiated in the literature, namely: (a) engineering-resilience, which refers to a system's 'bounce-back' ability, and (b) ecological-resilience, which is concerned with the ability of a system to continue to maintain its core functions and processes despite exposure to disturbance (Holling, 1996; Walker & Salt, 2006).

From a sustainable-world perspective, ecological-resilience is of key importance. This, however, extends beyond application in the ecological systems context from which the concept originated, to consider resilience in the broader socio-ecological systems context (Walker & Salt, 2006). For the Project, this broader systems view of resilience is termed **socio-ecological resilience**. In the sustainable-world context, socio-ecological resilience has to do with the ability of socio-ecological systems to continue to meet the primary goal of a sustainable-world, and do so regardless of what disturbance and change might occur to these systems over time. In this sense, the concepts of a sustainable-world and socio-ecological resilience are inseparable (Handmer & Dovers, 1996; Walker & Salt, 2006).

The Project applied this strong connect between socio-ecological resilience and a sustainable-world as a means to critique the extent to which the different sustainable-world approaches identified in answering Q1(a) were likely to see a sustainable-world come about. In particular, consideration was given to what makes human society itself resilient. These social aspects of socio-ecological resilience are currently not well addressed in the literature but, as will be discussed later in this paper, are identified from the Project as being of critical importance to a successful sustainable-world transition.

3. Methodology

3.1 Overview

This section briefly reviews the methodology used to answer each of the Project's research questions and considers:

(a) The process for developing the sustainable-world typology (**SWT**) shown as Appendix 1.

(b) The process for critiquing the SWT content using Footprint-Analysis and I=PAT, and socio-ecological resilience.

(c) The case study of the South Australian Government (**SAG**).

3.2 Q1 – what is a sustainable-world?

The answers to Q1 parts (a)(b)(c), and (d) are presented as the SWT. The SWT was constructed from a review of the sustainability literature, beginning with existing sustainable-world oriented typologies including those of Gladwin, Kennelly & Krause (1995), Dobson (1996), and Diesendorf (1997). From these typologies, an initial set of sustainable-world-dimensions, that is, dimensions the typology authors considered to be key aspects of what it means for there to be a sustainable-world, were identified. These typologies were also used to consider how different approaches towards each of the sustainable-world-dimensions might be categorised. From there, a literature review, comprising approximately 400 articles and books, was undertaken. The review followed the thematic analysis approach described by Braun & Clarke (2006), and utilised both: (a) the theoretical style, by using current typologies to provide an initial set of sustainable-world-dimensions and approaches to them, and (b) the inductive style, through an exploration of the literature to identify additional sustainable-world-dimensions and approaches not evident in these existing typologies, and for exploring other issues incorporated in the SWT. For further details on the development of the SWT, see Clifton (2010a).

3.3 Footprint-Analysis and I=PAT critique

For application of Footprint-Analysis in answering Question 1(d), firstly the standard Footprint-Analysis summary data were recalculated to allow for Biocapacity not available for human use (as per section 2.2.2.). These revised data, the broader set of current and historic Footprint-Analysis data, plus consideration of the existing literature on the sustainable-world implications of what the Footprint-Analysis data reveals, were all used to critique each of the sustainable-world-dimensions to determine the implications of current human behaviour in terms of its consistency or otherwise with the sustainable-world approaches shown in the SWT.

For Question 1(e), current Footprint-Analysis data was forward-modelled, using I=PAT, based on the current dominant sustainable-world approach (i.e., Reformism). I=PAT modelling was framed around the Reformist approach as per Table 2, and utilised the assumptions shown in section 2.3.2.. and in Table 3.

Table 3. Reformist approach: Projecting the Ecological-Footprint – I=PAT inputs

Factor	**Reformist modelling inputs**
I=PAT element: 'I' **(i.e., Ecological-Footprint)**	• Current global average Ecological-Footprint = 2.6 ghpc. • Projected 2050 Biocapacity based on projected 2050 population and holding all else constant = 1.3 ghpc.
I=PAT element: 'P' **(i.e., Population)**	• Current human population = 6.5 billion. • Mid-range UN projection to 2050 = 9 billion.
I=PAT element: 'A' **(i.e., Affluence – as GDP)**	• Assume real global average per capita GDP growth of 1.5% pa. Note: The global GDP per capita growth rate from 1961-2006 = 1.9% pa.
Decoupling rates	• Decoupling rate between 'P+A' and changes in 'I' (see section 2.3.2.): Scenario-1: 25% ('I' increases at 75% of 'P+A'). Scenario-2: 50% ('I' increases at 50% of 'P+A').
Biocapacity available for human use	• Biocapacity not available for human use (see section 2.2.2.): Scenario-1: 20% (80% for human use). Scenario-2: 50% (50% for human use).

Source: Clifton (2010b)

3.4 Socio-ecological resilience critique.

The socio-ecological resilience critique of the sustainable-world approaches shown in the SWT was conducted as follows. First, various concepts considered as important in either contributing to, or detracting from, the socio-ecological resilience of complex adaptive systems (such as ecological systems and social systems) were identified from the literature. A summary of some of these concepts is shown as Table 4. Next, each of the sustainable-world-dimensions in the SWT was analysed in terms of each of these concepts to consider which

approach to the sustainable-world-dimension (shown in the SWT as either a Reformist or Transformational approach), showed greater socio-ecological resilience characteristics. From there, a general assessment of the overall findings of the SWT critique was conducted to consider which of the sustainable-world approaches was more consistent with socio-ecological resilience principles and hence, more likely, in socio-ecological resilience terms, to see a sustainable-world come about. For further details on this socio-ecological resilience critique of the SWT, see Clifton (FC-b).

Table 4. Socio-ecological resilience of complex adaptive systems (**CASs**) – some key concepts

Adaptive-capacity: The capacity of a CAS to modify or change its characteristics or behaviour to better cope with disturbance and expand the range over which it can cope. Increased adaptive-capacity increases resilience.
Diversity: The extent to which a CAS is made up of different things by way of form and function. Greater CAS diversity, especially functional diversity and response diversity, increases resilience.
Rate of change: The slower the rate of change in environmental variables a CAS undergoes, the more resilient the system.
Spare capacity: Refers to the distance from thresholds; the greater the distance, the greater the spare capacity. Greater spare capacity increases resilience.
Thresholds: Refers to boundaries which, once crossed, see a system move from one regime to another. Socio-ecological resilience is about ensuring thresholds are not crossed that, if done, would see a system move into an undesirable regime. In general, the further away from thresholds, the more resilient a CAS is.

Key data sources: Folke et al. (2002), Adger (2006) and Walker et al (2006)

*3.5 Q2 – the South Australian Government (**SAG**) case study*

The Project considered the SAG's sustainable-world approach in terms of its policies, plans, and goals – the concern was the SAG's strategy. The Project did not assess the SAG's actual performance in implementing its various policies, plan and goals.

The case study method used was based on the guidelines for case study research prescribed by Yin (2003). Data were obtained from analysis of publically available documents, including documents produced by the SAG, and by parties external to it. Over 300 documents in total were analysed. Supplementing this document analysis was a series of interviews, most of which were conducted with participants within the SAG. The interviews were conducted to expedite the document sourcing process and provide feedback on the document analysis findings. The findings reported in this paper are only those that were secured from publically available documents.

The data analysis process mostly followed a theoretical thematic approach, although some inductive analysis was also used (Braun & Clarke, 2006). The sustainable-world-dimensions shown in the SWT were entered as nodes in the NVIVO software system, with document content coded to these nodes (the theoretical element) or noted as exceptions to these nodes (the inductive element). These data were then further analysed in terms of the different approaches to a sustainable-world shown in the SWT, or noted as exceptions to the literature review findings. The document gathering and data analysis process continued in parallel to a point of saturation where no new findings of material significance to the research question were materialising.

Research question 2(b) was answered in reference to the Footprint-Analysis and socio-ecological resilience issues identified in section 2, and followed a similar process as that described in section 3.3 but using the I=PAT inputs shown in Table 5. For further details of the SAG case study methodology, see Clifton (FC-a; FC-c).

Table 5. The South Australian Government (**SAG**): Projecting the Ecological-Footprint – I=PAT inputs

Factor	**SAG modelling inputs**
I=PAT element: 'I' (Ecological-Footprint)	• Current South Australian (**SA**) Ecological-Footprint = 7 ghpc (SAG, 2006). • Projected 2050 SA Biocapacity based on the SA population target and holding all else constant = 5.7 ghpc.
I=PAT element: 'P'	• Current SA population = 1.629m (at Sept 2009) (www.abs.gov.au). • SA population target = 2m by 2050 (SAG, 2007c).
I=PAT element: 'A'	• Assume real average per capita GDP growth for SA of 1.5% pa (as per Table 3). Note: SAG's growth target "*to exceed the national economic growth rate by 2014"* (SAG, 2007c, target T1.1).
Decoupling rates	• As per Table 3.
Available biocapacity	• As per Table 3.

4. Results

In this section, a summation of the key results are shown for each of the Project's research questions.

4.1 Q1 – what is a sustainable-world?

4.1.1 Q1(a): Sustainable-world approaches

The summary findings in answer to Q1(a) are shown as the sustainable-world typology (**SWT**) (see Appendix 1). In brief, two main sustainable-world approaches are evident in the literature, namely (a) the Reformist approach, which focuses the achievement of a sustainable-world on reforming the current dominant socio-economic system through changes at the margin to make this system more environmentally responsible and socially just (**green-and-just**) (Cato, 2009; Fox, 2003), and (b) the Transformational approach, which claims that progressing to, and the maintaining of, a sustainable-world requires transformational socio-economic system change (Cato, 2009; Williams & Millington, 2004).

4.1.2 Q1(b): Current dominant approach

The literature shows Reformism as the current dominant sustainable-world approach, with this dominance based in Reformism being espoused by the key power centres of society, namely at the political level, both internationally and nationally, and in business circles (Castro, 2004; Handmer & Dovers, 1996).

4.1.3 Q1(c): Inconsistent with a sustainable-world

What is considered in the literature to be inconsistent with either the Reformist or Transformational approaches is shown in the SWT for each of the sustainable-world-dimensions presented. These claims are, however, really only statements as to what does not even meet Reformist criteria, as, for Transformational advocates, Reformism is itself mostly inconsistent with a sustainable-world (e.g., see Farley, Erickson and Daly (2005) and Kempf (2008)). The reverse also holds true where for Reformists, much of the Transformational approach is flawed, and/or utopian, and/or unbelievable as a viable pathway forward (e.g., see Hart (2007)).

4.1.4 Q1(d): Current dominant human behaviour

The consequences of current human behaviour are, at the global collective level, described in the literature as being for the most part inconsistent with either the Reformist or Transformational approaches. This does not mean that the lifestyles, values, and behaviours of some members of society are inconsistent with a sustainable-world, but, when added together, the overall outcome is inconsistent.

From a Footprint-Analysis perspective, the standard Footprint-Analysis data in Table 1 also shows that humanity is not living sustainably in the sense that the Earth's renewable natural capital ($\mathbf{K_{NR}}$) is being used at a rate beyond Biocapacity limits. Table 6 shows the results of a recalculation of the degree of overshoot based on allowances for Biocapacity not available for human use, (as per section 2.2.2). The results show a much higher overshoot value, exacerbating the extent humanity's unsustainable way of life is demonstrated using Footprint-Analysis.

Table 6. Current Footprint-Analysis data with modified Biocapacity vales

Item	**Value**
1. Ecological-Footprint – global average.	2.6 ghpc
2. Biocapacity – 20% unavailable for human use.	
Global average Biocapacity available for human use.	1.4 ghpc
Ecological-Footprint as a percentage of available Biocapacity.	181%
3. Biocapacity – 50% unavailable for human use.	
Global average Biocapacity available for human use.	0.9 ghpc
Ecological-Footprint as a percentage of available Biocapacity.	289%

Source: Clifton (2010b)

Footprint-Analysis also shows current human behaviour as being inconsistent with other sustainable-world-dimensions. A comprehensive review of this analysis is shown in Clifton (FC-c), however the following example is illustrative of how Footprint-Analysis can be used in this way.

The consequences of global overshoot as shown in Tables 1 and 6 comes at a price, and the three key parties identified in the literature as paying this price, plus the linkages to the relevant sustainable-world-dimensions (shown as a link to the SWT by the notation 'SWT item <xx>'), are shown in Table 7. The point is that the consequences of humanity's K_{NR} consumptive behaviour shows humanity is breaching both the Reformist and Transformational criteria for a number of the sustainable-world-dimensions.

Table 7. Overshoot, harmed parties, and sustainable-world dimension linkages

Party harmed by global overshoot (Andersson & Lindroth, 2001)	**Sustainable-world-dimension linkages**
The economically and politically weak who suffer a disproportionately low level of access to Biocapacity use as compared to the economically and politically powerful.	Breaches Reformist and Transformational intragenerational equity obligations (SWT item 5.2). Breaches weak anthropocentric principles by failing to meet the criteria of 'considered human preferences' (SWT item 1.2).
Future generations who will inherit a depleted K_{NR} base, threatening their wellbeing..	
Other species, in particular through continued and escalating rates of extinction.	Breaches the Transformational biodiversity requirement, and may breach the Reformist requirement (SWT item 5.6.1). Breaches Transformational ecocentric principles (SWT items 1.2, 3.1, 3.2(b), and 3.3(b)).

4.1.5 Q1(e): Dominant approach as a viable pathway

For the Footprint-Analysis critique of Reformism as the current dominant sustainable-world approach, Table 8 shows the Footprint-Analysis data projections to 2050 based on the inputs shown in section 3.3.

Based on the most reserved set of assumptions (Ecological-Footprint rises at 50% of 'Population + Affluence' (**'P+A'**) in the I=PAT formulation; 20% of Biocapacity not available for human use), the 'P+A' growth pressures captured in the Reformist view see the global level Ecological-Footprint rise to about 3.1 ghpc by 2050, as compared to available Biocapacity of about 1.1 ghpc. This means that for humanity to live sustainably in Footprint-Analysis terms, and do so by 2050, technology (**'T'**) in I=PAT needs to offset the impacts of 'P+A' so as to reduce the global average Ecological-Footprint from about 3.1 ghpc to about 1.1 ghpc, in addition to the 50% decoupling rate already allowed for. The least optimistic calculation (50% of Biocapacity unavailable for human use; decoupling rate of 25%), sees the 2050 Ecological-Footprint become about 3.9 ghpc against Biocapacity available for human use of about 0.7 ghpc. For all scenarios shown however, the reliance on 'T' to deliver absolute decoupling of ecological impact (**'I'**) from 'P+A' upward pressures, so as to reduce 'I' to be within available Biocapacity levels, far exceeds any observed results in the global context as discussed in section 2.3.2. The implications of these data are considered further in section 5.

Table 8. Reformist approach: Footprint-Analysis data projected to 2050

Item	Value
Current global average Ecological-Footprint.	2.6 ghpc
Projected Biocapacity in 2050 based on population change only.	1.3 ghpc
1. Decoupling at 25% (Ecological-Footprint increases at 75% of 'P+A')	
2050 global average Ecological-Footprint.	3.9 ghpc
Global average Biocapacity - at 80% of 2050 value.	1.1 ghpc
Ecological-Footprint as a % of available Biocapacity.	370%
Global average Biocapacity - at 50% of 2050 value.	0.7 ghpc
Ecological-Footprint as a % of available Biocapacity.	592%
2. Decoupling at 50% (Ecological-Footprint increases at 50% of 'P+A')	
2050 global average Ecological-Footprint.	3.1 ghpc
Global average Biocapacity - at 80% of 2050 value.	1.1 ghpc
Ecological-Footprint as a % of available Biocapacity.	291%
Global average Biocapacity - at 50% of 2050 value.	0.7 ghpc
Ecological-Footprint as a % of available Biocapacity.	466%

Source: Clifton (2010b)

A socio-ecological resilience critique of Reformism shows that it lacks consistency with socio-ecological resilience principles. A detailed review of a socio-ecological resilience critique of Reformism is presented in Clifton (FC-b), however Table 9 shows a summary assessment of selected sustainable-world-dimensions, which are matched to the criteria shown in Table 4. At the core of the Reformist approach is a focus on progressing human wellbeing through optimisation strategies (getting the most out of) and maximisation strategies (getting the most of). This optimisation and maximisation approach can undermine the resilience of the very ecosystems on which human wellbeing depends, for reasons including the removal of spare systems capacity, the imposition of change at too fast a rate, and unknowingly pushing ecosystems close to, or beyond, tipping points. The Transformational approach is, on the other hand, framed around humanity living in ways that are socio-ecological resilience enhancing (see SWT item 5.4) and, in this sense, can be seen to offer an approach that is more likely to see the primary sustainable-world goal achieved. This issue of socio-ecological resilience is considered further in section 5.

Table 9. Reformist approach: socio-ecological resilience critique

SWT item	Reformist approach	Socio-ecological resilience assessment
3.2. (a) and (b): Meeting human and non-human needs	Focus on maximising renewable natural capital ($\mathbf{K_{NR}}$) productivity to maximize human consumption of goods and services within green-and-just criteria.	Maximisation of K_{NR} productivity reduces ecosystem spare capacity and simplifies landscapes though the use of operational efficiency strategies. This undermines socio-ecological resilience through a reduction in: (a) the range over which landscapes can cope, (b) diversity within and across landscapes, (c) system redundancy, and (d) system spare capacity.
3.3(a) Human population	Stabilising current human population numbers. General orientation to as high a human population as can be sustained.	Historic rate of population change may not yet reflect the true consequences of current population numbers. A population maximisation orientation undermines socio-ecological resilience though reduced spare capacity and risks of threshold breach.
5.4. Risk and precaution	Aversion to social system change beyond change at the margin.	Social system change aversion reduces adaptive capacity by limiting society's response options to changing circumstances.
5.5. Growth and Development	Continued and strong global GDP growth. Technology solutions to overcome any apparent limits to growth.	Economic growth and technology change can occur faster than feedback mechanisms can provide information on the consequences of change, and at a rate faster than socio-ecological systems can adapt to changed conditions.

*4.2 Q2 – the South Australian Government (**SAG**)*

4.2.1 Q2(a): The SAG's sustainable-world approach

The SAG's sustainable-world approach is, for the most, firmly placed in the Reformist view. A detailed review of the SAG case study findings is presented in Clifton (FC-a), however the following points illustrate the SAG's Reformist stance, and highlight some areas of divergence from it.

A key document summarising the strategies on which the SAG is focused is South Australia's Strategic Plan (**SASP**) (SAG, 2007c). A strong theme in the SASP is the drive for economic growth, with the SASP's first target, listed under "*Objective 1, Growing Prosperity*", being to "*exceed the national economic growth rate by 2014*". SASP strategies to achieve this growth include increasing South Australia's attractiveness to business, increasing exports, and growing specific industry sectors including defence, mining, tourism, and education. The SASP also sets out population growth goals that link to the economic growth agenda. This focus on economic growth does not mean the SAG ignores social and ecological sustainability issues – to the contrary, a broad range of initiatives focused in these areas are evident in the SASP and other SAG documents. The point is however that these social and ecological sustainability initiatives are all conducted within a proclaimed green-and-just economic growth model, typical of the Reformist approach.

Two areas of note are evident in the SAG's sustainable-world approach that have some degree of divergence from the Reformist approach, namely (a) population, where the SASP sets out a population growth strategy for South Australia (SAG, 2007c) whereas Reformism seeks population stabilisation (SWT item 3.3(a)): the SAG nonetheless presents its population strategy as consistent with sustainable-world objectives and, in some respects, beneficial to it, and (b) defence, with the SAG actively building the defence sector as an important element of South Australia's economic base (SAG, 2007c), which raises challenging questions as to how this can be consistent with SWT item 5.7-Security.

4.2.2 Q2(b): implications of the SAG's approach

South Australia's citizens have an average Ecological-Footprint of 7.0 ghpc which, when the amount of Biocapacity unavailable for human use is factored in, exceeds local Biocapacity limits (see Table 10). As a general concept, local Ecological-Footprint exceeding local Biocapacity is not necessarily a problem (Footprint Network, 2006). However, for SA, when the local Footprint-Analysis data is viewed in the global context (see Table 11), substantial sustainable-world problems arise. The key points are these:

South Australia's citizens have an Ecological-Footprint well above the global average, and even further above global available Biocapacity. In this respect, South Australia's appropriation of Biocapacity, even more so when coupled with a population growth policy that erodes global average per-capita available Biocapacity, cannot be generalised to all of humanity. Further, South Australia's citizens can only maintain their current use of K_{NR} through one, or a combination of, depletion of the local K_{NR} base, appropriating K_{NR} from external sources, and depleting the global commons (Footprint Network, 2008). The combined effect of these issues sees South Australia's citizens as net contributors to the depletion of the Earth's K_{NR} base, breaching in particular both intra-generational and inter-generational justice principles of both the Reformist and Transformational approaches (SWT item 5.2).

The SAG appears to recognise this problem of the magnitude and inequity of the Ecological-Footprint of its citizens, and has set a target for reducing South Australia's aggregate Ecological-Footprint by 30% by the year 2050 (SASP target T3.7). However, even if this was achieved, it would still result in an Ecological-Footprint for South Australia's residents of about 3.7 ghpc as against a 2050 projected global average Biocapacity of 1.3 ghpc, with this 1.3 ghpc value yet to allow for Biocapacity not available for human use. In short, not only are the residents of SA living in a way that is unsustainable within a global context, but the current SASP Ecological-Footprint target, even if it were achieved, will not remedy this problem despite this target having a substantial time allowance – 40 more years – for its achievement. Whether this Ecological-Footprint reduction target can be achieved is another question, particularly in the light of the SAG's population and economic growth objectives. An I=PAT projection to 2050, based on the Table 5 data, is shown as Table 13. The main point to note is that the upward pressures from the SAG's 'P+A' policies make the needed reductions in 'T', to bring South Australia's Ecological-Footprint within levels generalisable to all of humanity, of a magnitude far beyond anything evident in current human experience (as per section 2.3.2.).

Table 10. South Australia (**SA**) current Footprint-Analysis data with modified Biocapacity values

Item	**Value**
Current Ecological-Footprint for SA residents.	7.0 ghpc
Current Biocapacity for SA residents.	7.5 ghpc
Ecological-Footprint as a percentage of Biocapacity.	93%
1. Biocapacity – 20% unavailable for human use	
SA Biocapacity available for human use.	6.0 ghpc
Ecological-Footprint as a percentage of available Biocapacity.	117%
2. Biocapacity – 50% unavailable for human use	
SA Biocapacity available for human use.	3.8 ghpc
Ecological-Footprint as a percentage of available Biocapacity.	186%

Table 11. South Australia (**SA**) Footprint-Analysis data in the global context

Item	**Value**
1. Ecological-Footprint comparison – SA vs global	
Current average SA Ecological-Footprint.	7.0 ghpc
Current average global Ecological-Footprint.	2.6 ghpc
SA's Ecological-Footprint as a % of current global average Ecological-Footprint	269%
2. Ecological-Footprint and Biocapacity comparison – SA's Ecological-Footprint vs global Biocapacity	
Global average Biocapacity at 80% of current value.	1.4 ghpc
SA's current Ecological-Footprint as % of current global Biocapacity.	500%
Global average Biocapacity at 50% of current value.	0.9 ghpc
SA's current Ecological-Footprint as % of current global Biocapacity.	777%

Table 12. South Australia's Strategic Plan (**SASP**) Ecological-Footprint Goal

Item	**Value**
SASP 2050 target Ecological-Footprint for SA residents.	3.7 ghpc
Global average Biocapacity at 80% of 2050 value.	1.1 ghpc
SA's target 2050 Ecological-Footprint as a % of 2050 global available Biocapacity.	336%
Global average Biocapacity at 50% of 2050 value.	0.7 ghpc
SA's target 2050 Ecological-Footprint as a % of 2050 global available Biocapacity.	528%

Table 13. South Australia's (**SA's**) Footprint-Analysis data projected to 2050

Item	**Value**
1. Decoupling at 25% (Ecological-Footprint increases at 0.75 of 'P+A')	
SA's projected 2050 Ecological-Footprint for SA residents.	10.6 ghpc
Global average Biocapacity at 80% of 2050 value.	1.1 ghpc
SA Ecological-Footprint as a % of available Global Biocapacity.	959%
Global average Biocapacity at 50% of 2050 value.	0.7 ghpc
SA Ecological-Footprint as a % of available Global Biocapacity.	1508%
2. Decoupling at 50% (Ecological-Footprint increases at 0.5 of 'P+A')	
SA's projected 2050 Ecological-Footprint for SA residents.	8.4 ghpc
Global average Biocapacity at 80% of 2050 value.	1.1 ghpc
SA Ecological-Footprint as a % of available Global Biocapacity.	766%
Global average Biocapacity at 50% of 2050 value.	0.7 ghpc
SA Ecological-Footprint as a % of available Global Biocapacity.	1204%

5. Discussion and Conclusion

5.1 Reformism's dominance

This paper has presented, as the sustainable-world typology (**SWT**), two main streams of thought as to what it means for there to be a sustainable-world: a Reformist approach and a Transformational approach. Reformism is the current dominant sustainable-world approach in the key areas of power and influence in society, namely, the political and business sectors.

Three main (non mutually exclusive) reasons are evident in the literature as to why Reformism dominates, namely: (a) Reformism is superior to alternate approaches, (b) Reformism is the only viable approach within the current political and economic space, and (c) the sustainability narrative has been captured by the politically and economically powerful elite and modelled into the Reformist mode to suit this elite's interests (Clifton, 2009). The Project has explored the merits of point (a), with Footprint-Analysis and socio-ecological resilience critiques of Reformism casting doubt on this superiority claim.

5.2 Reformism, Footprint-Analysis, and socio-ecological resilience

Footprint-Analysis, in conjunction with I=PAT, suggests that Reformism's reliance on technology (**'T'**) to counter population + affluence (**'P+A'**) pressures is substantial and well beyond any observable experience. To put the magnitude of this Reformist task into further perspective, of the 124 nations included in the current Footprint-Analysis accounts (Footprint Network, 2009), only 23 have an Ecological-Footprint of 1.1 ghpc or less and of these, only 3 have an Ecological-Footprint of 0.7 ghpc or less (the 0.7 and 1.1 ghpc values being Biocapacity limit ranges available for human use by 2050 as per Table 8). All of these 23 nations fit within a low or least-developed nation descriptive. On the other hand, the average Ecological-Footprint for the roughly 1 billion people living in the world's high-income countries is currently about 6.1 ghpc and, in the SA case, 7.0 ghpc. For the Reformist approach, somehow a strategy of continued global GDP growth for all needs to be matched with a reduction in global average Biocapacity use to levels of those of some of the least developed nations on Earth.

But, despite the magnitude of the task Reformism assigns to 'T' strategies, can a determined focus on these strategies achieve the needed ecological impact (**'I'**) reductions? The impacts of 'T' initiatives on 'I' are not well developed in the literature, however some general implications are evident, and an examination of four 'T' strategies that figure prominently in the sustainable-world literature can provide some insights. First, a 'T' strategy to increase the productivity of renewable natural capital (**K_{NR}**) presents challenges from a socio-ecological resilience perspective. The reason, as per sections 3.4 and 4.1.5, is that K_{NR} productivity optimisation and maximisation strategies can undermine the resilience of ecosystems on which human wellbeing depends, with a likely outcome of increasing rather than reducing 'I'.

Second, the 'T' strategy of pursuing efficiency gains in the production process is well recognised as a means by

which firms improve productivity, reduce costs, and increase wealth (Princen, 2005). These efficiency gains have, however, been shown to often result in an overall increase in production and resulting consumption that negates some or all of the resource reduction gains that were otherwise expected.

Third, less harmful primary resource extraction, and fourth, less harmful production and consumption behaviours, are both 'T' strategies that may similarly increase overall production and consumption. An example is 'green consumerism' where a belief in the claimed environmentally-friendly nature of goods can drive further consumption (Beder 2002). A second aspect of this less-harmful-practices theme is the claimed shift that occurs in the structure of national economies as they continue to industrialise, where the economic mix supposedly shifts to less resource intensive service based industries. Footprint-Analysis data however show that the most industrialised countries are the ones with the highest per capita Ecological-Footprint (see Table 14). In this sense, the economic transition argument is unconvincing as a reliable strategy for reducing 'I'. (For a detailed discussion on the four 'T' strategies, see Clifton (2010b)).

Table 14. Ecological-Footprint by national income

	Population (millions)	**Ecological-Footprint (ghpc)**
World	6,593	2.6
High-income Countries	1,022	6.1
Middle-income Countries	4,281	1.8
Low-income Countries	1,277	1.0

Source: Footprint Network (2009)

None of this is to say that these 'T' strategies should not be pursued, but without some mechanism in place to prevent flow-on impacts that drive further consumption, the very act of pursuing them can drive the K_{NR} depletion problems they otherwise seek to address. Transformational advocates claim that their approach addresses this problem by setting limits on K_{NR} use, and human consumption must be constrained within these limits (see Table 2).

Similarly, the socio-ecological resilience critique of Reformism suggests that some of the principles on which Reformism is based – those framed around optimisation and maximisation objectives – are resilience eroding. In this respect, the more aggressively Reformism is pursued, the more it erodes socio-ecological system resilience and undermines the sustainable-world objectives it otherwise seeks.

But criticisms of Reformism are not new, with a number of other critiques well rehearsed in the literature, including claims of the physical impossibility of continued consumptive-based economic growth (Daly, 2005), and that continued economic growth fails to further human wellbeing beyond a level of growth which the highly industrialised nations have long passed (Cato, 2009). Arguments that various 'T' strategies, especially in resource use efficiency, cannot sufficiently counter 'P+A' pressures but instead can, and do, add to those pressures, also have a strong literature grounding (Jackson, 2009). In this respect, the Footprint-Analysis and socio-ecological resilience critiques presented in this paper add weight to existing arguments calling into question Reformism's merits.

*5.3 The South Australian Government (**SAG**) setting*

The SAG's sustainable-world approach follows the Reformist view, showing consistency with the literature claims of Reformism's dominance in the political realm although two areas of divergence – population and defence – are evident in the SAG setting that do not show a fit to either the Reformist or Transformational approaches. The SAG's sustainable-world approach carries with it the general concerns with Reformism as identified in this paper. In this respect, although the SAG's approach is mostly consistent with the dominant approach in political circles, it does not follow that this approach is necessarily one which presents the South Australian community with a viable sustainable-world pathway.

5.4 Reformism and social-resilience

In addition to Reformism's dominance, some authors suggest that this dominance is to the exclusion of alternate narratives – to be heard politically and by business, any proposals to progress a sustainable-world must fit the Reformist view (Gould, Pellow, & Schnaiberg, 2008; Handmer & Dovers, 1996). From a socio-ecological resilience perspective however, and particularly in respect of the social resilience limb, this dominance of Reformism to the exclusion of alternates is problematic. Robinson (2004), discusses the need for a society that is

facing fundamental change to have "*an alternative to the existing order that is viable and that is seen as viable and preferable by a majority of society*" (p. 172). But if pursuing the Reformist approach fails to deliver needed sustainable-world outcomes, the dominance of Reformism to the exclusion of alternate narratives creates the very problem to which Robinson alludes. In effect, the continued pursuit of the Reformist approach, to the exclusion of alternates, undermines society's resilience. It reduces global socio-economic system diversity, and narrows the range of socio-economic system states over which society can effectively function by removing from social experience alternates to the one globally dominant core model.

These social resilience problems are compounded in at least two ways. The first is that, as discussed in this paper, genuine doubts exist as to whether Reformism can even deliver on its sustainable-world promises. In this respect, society may simply be pursuing a sustainability illusion and setting itself up for failure with no adequately developed viable alternative available. The second is a concern that Reformism creates a false sense of security – it gives an illusion of progress that acts as a block to the more substantial changes society needs to make (Handmer & Dovers, 1996, pp. 505-506).

So what can be done about this? One answer may be to continue the process of review of various sustainable-world approaches through more research, and build the weight of evidence in favour of viable pathways forward for humanity. With this increased evidence, needed change may come about. But if the sustainability agenda has been captured by the politically and economically elite (point (c) referred to above) then, even if mounting evidence shows Reformism is not a viable sustainable-world approach, the hurdles in progressing to a sustainable-world cannot be overcome simply by presenting a convincing argument. The current wrestle over global warming, and embarking on a path of needed action, is an example of this dilemma (Hamilton, 2007; Hoggan, 2009).

These issues of Reformism's dominance, the exclusion of alternate narratives from the political and business realms, the resulting undermining of social resilience, and the challenges of Reformism in progressing a sustainable-world outcome regardless of how aggressively it is pursued, are critical issues for society to confront. The implications flow through the full spectrum of social actors, from government in its policy decision making, to business in its strategy formulation and conduct, through to the decisions made at local community and individual levels. It has not been the purpose of the Project to explore how society might go about addressing the important and pressing issues it has identified. However, with the current dominant Reformist approach advocated by the politically and economically powerful actors in society – government and business – and, as alluded to above, it is these parties that currently determine which sustainable-world narratives are deemed legitimate, then change ultimately needs to occur within these spheres of power. Whether a government such as the SAG is willing and able to begin a process of such change in its own policy processes, and if it is willing, how it might do so, remains an open issue and something the SAG may be able to take from the Project's findings for its further consideration.

Failing a collective self-extinction decision, humans have no choice but to live sustainably. An anything-is-better-than nothing sustainable-world approach will not do. We need to ensure humanity takes the road that will be most likely to succeed even if this does not sit comfortably with current dominant ideologies or power bases. Reinvigorating public discussion on a broader set of sustainable-world pathways for humanity than mere adherence to Reformism is an important step forward, a cause to which the Project hopefully makes a contribution

6. Contribution to knowledge, future research, and limitations

The Project's contribution to knowledge covers a number of issues including: (a) development of the SWT, (b) the use of Footprint-Analysis and socio-ecological resilience in a critique of the Reformist approach, and (c) the findings of the SAG case study and consideration of the SAG's sustainable-world approach within a broader global context.

The Project has also identified many areas suited to further research, including: (a) the use of Footprint-Analysis for current-time and forward-looking analysis of humanity's use of Biocapacity, (b) the application of socio-ecological resilience in the broader sustainable-world context, (c) the possible implications and challenges for society that arise as a result of the current focus on the Reformist approach, and (d) the merits of the Transformational approach.

A number of Project limitations are also evident including: (a) the SWT, which limits the sustainable-world approaches to only the Reformist and Transformation classifications, (b) the data uncertainties and calculation assumptions used in the Footprint-Analysis work, (c) the limitations of knowledge in the application of

socio-ecological resilience within the broader sustainable-world context, and (d) the practical testing of the SWT has been limited to a single case study of the SAG.

For a more detailed review of these three items of knowledge contribution, areas for future research, and Project limitations, see Clifton (2010a; 2010b; FC-b; FC-c).

References

Adger, W. N. (2006). Vulnerability. *Global Environmental Change, 16*(3), 268-281.

Andersson, J. O., & Lindroth, M. (2001). Ecologically Unsustainable Trade. *Ecological Economics, 37*(1), 113-122.

Bates, D. C. (2009). Population, Demography, and the Environment. In K. A. Gould & T. L. Lewis (Eds.), *Twenty Lessons in Environmental Sociology* (pp. 107-124). New York: Oxford University Press.

Bell, M. M. (2009). *An Invitation to Environmental Sociology*. California, USA: Pine Forage Press.

Braun, V., & Clarke, V. (2006). Using Thematic Analysis in Psychology. *Qualitative Research in Psychology, 3*, 77-101.

Brown, L. (2008). *Plan B 3.0*. New York: W. W. Norton & Company Inc.

CABS. (2003). *Global Gap Analysis: Towards a Representative Network of Protected Areas*. Washington, DC: Conservation International, Center for Applied Biodiversity Science; Advances in Applied Biodiversity Science Number 5.

Castro, C. J. (2004). Sustainable Development. *Organization & Environment, 17*(2), 195-225.

Cato, M. S. (2009). *Green Economics*. London: Earthscan.

Clifton, D. (2009). Security and a Sustainable World. *Journal of Sustainable Development, 2*(3), 3-17.

Clifton, D. (2010a). Representing a Sustainable World - A Typology Approach. *Journal of Sustainable Development, 3*(2), 40-57.

Clifton, D. (2010b). A Sustainable World - an Ecological Footprint and I=PAT Perspective. *Journal of the Asia-Pacific Centre for Environmental Accountability, 15*(2), in press.

Clifton, D. (FC-a). Progressing a Sustainable World - a Case Study of the South Australian Government. *Forthcoming*.

Clifton, D. (FC-b). Progressing a Sustainable World - a Socio-ecological Resilience Critique. *Forthcoming*.

Clifton, D. (FC-c). A Sustainable World - An Ecological Footprint Analysis Assessment of the Local in Terms of the Global: A Case Study of South Australia. *Forthcoming*.

Daly, H. E. (2005). Economics in a Full World. *Scientific American, 293*(3), 78-85.

Diesendorf, M. (1997). Principles of Ecological Sustainability. In M. Diesendorf & C. Hamilton (Eds.), *Human Ecology, Human Economy* (pp. 64-97). Sydney: Allen & Unwin.

Dobson, A. (1996). Environmental Sustainabilities: An Analysis and a Typology. *Environmental Politics, 5*(3), 401-428.

Farley, J., Erickson, J. D., & Daly, H. (2005). *Ecological Economics: A Workbook for Problem Based Learning*. Washington DC: Island Press.

Folke, C. (2006). Resilience: The Emergence of a Perspective for Social-Ecological Systems Analyses. *Global Environmental Change, 16*, 253-267.

Folke, C., Carpenter, S., Elmqvist, T., Gunderson, L., Holling, C. S., Walker, B., et al. (2002). *Resilience and Sustainable Development: Building Adaptive Capacity in a World of Transformations*. Stockholm, Sweden: The Environmental Advisory Council to the Swedish Government: Scientific Background Paper on Resilience for the process of The World Summit on Sustainable Development.

Footprint Network. (2006). *Ecological Footprint Standards 2006*: The Footprint Network: Global Footprint Network Standards Committees.

Footprint Network. (2008). *The Ecological Footprint - Questions and Answers*. Retrieved 29 July, 2008, from http://www.footprintnetwork.org/gfn_sub.php?content=faq#rp

Footprint Network. (2009). *Ecological Footprint and Biocapacity 2006 data release (based on National*

Footprint Accounts 2009 edition). Footprint Network.

Footprint Network. (2010). *Ecological Footprint*: Footprint Network web site at http://www.footprintnetwork.org/.

Fox, W. (2003). Deep Ecology: A New Philosophy of Our Time (reproduced from "The Ecologist" 1984). In A. Light & H. Rolston (Eds.), *Environmental Ethics* (pp. 252-261). Oxford, UK.: Blackwell Publishers Ltd.

Gladwin, T. N., Kennelly, J. J., & Krause, T.-S. (1995). Shifting Paradigms for Sustainable Development: Implications for Management Theory and Research. *Academy of Management Review, 20*(4), 874-907.

Gould, K. A., Pellow, D. N., & Schnaiberg, A. (2008). *The Treadmill of Production*. Boulder, Colorado USA: Paradigm Publishers.

Hamilton, C. (2007). *Scorcher: The Dirty Politics of Climate Change*. Melbourne: Black Inc.

Handmer, J. W., & Dovers, S. R. (1996). A Typology of Resilience: Rethinking Institutions for Sustainable Development. *Industrial and Environmental Crisis Quarterly, 9*(4), 482-511.

Hart, S. L. (2007). *Capitalism at the Crossroads* (2nd ed.). New Jersey: Pearson Education.

Hoggan, J. (2009). *Climate Cover-Up*. Vancouver: Greystone Books.

Holdren, J. P., Daily, G. C., & Ehrlich, P. R. (1995). *The Meaning of Sustainability: Biogeophysical Aspects*. Washington DC: United Nations University and The World Bank.

Holling, C. S. (1996). Engineering Resilience versus Ecological Resilience. In P. C. Schulze (Ed.), *Engineering Within Ecological Constraints* (pp. 31-44). Washington, D.C.: National Academy Press.

Hughes, J. D. (2001). *An Environmental History of the World*. New York: Routledge.

Jackson, T. (2009). *Prosperity Without Growth*. London: Earthscan.

Kempf, H. (2008). *How the Rich are Destroying the Earth*. Devon, UK: Green Books.

Kitzes, J. (2007, 8-10 May 2007). *A Research Agenda for Improving National Ecological Footprint Accounts.* Paper presented at the International Ecological Footprint Conference: Stepping Up the Pace - New Developments in Ecological Footprint Methodology, Policy and Practice, Cardiff.

Lenzen, M., Wiedmann, T., Foran, B., Dey, C., Widmer-Cooper, A., Williams, M., et al. (2007). *Forecasting the Ecological Footprint of Nations: a Blueprint for a Dynamic Approach*: ISA Research Report 07-01: ISA, Centre for Integrated Sustainability Analysis at the University of Sydney; Australia Schools of Biology and Chemistry at the University of Sydney, Australia; Stockholm Environment Institute at the University of York, UK; Department of Biology at the University of York, UK.

Manderson, A. K. (2006). A Systems Based Framework to Examine The Multi-Contextual Application of the Sustainability Concept. *Environment, Development and Sustainability, 8*, 85-97.

Norton, B. G. (2003). Environmental Ethics and Weak Anthropocentrism (reproduced from "Environmental Ethics", 1984). In A. Light & H. Rolston (Eds.), *Environmental Ethics* (pp. 163-174). Oxford, UK.: Blackwell Publishers Ltd.

Parkin, A. (2006). Understanding Liberal-Democratic Politics. In A. Parkin, J. Summers & D. Woodward (Eds.), *Government, Politics, Power and Policy in Australia* (6 ed., pp. 3-24). New South Wales: Pearson Education Australia.

Porritt, J. (2005). *Capitalism As If The World Matters*. London: Earthscan.

Princen, T. (2005). *The Logic of Sufficiency*. Cambridge MA, USA: MIT Press.

Robinson, W. I. (2004). *A Theory of Global Capitalism*. Baltimore, US: The John Hopkins University Press.

Rothman, D. S. (1998). Environmental Kuznets Curves--Real Progress or Passing the Buck?: A Case for Consumption-Based Approaches. *Ecological Economics, 25*(2), 177-194.

South Australia Constitution Act 1934, Version 24 November 2003, (2003).

SAG. (2006). *South Australia's Ecological Footprint*: SA Government: Sustainability and Climate Change Division of the Department of the Premier and Cabinet, May 2006.

SAG. (2007a). *Climate Change*. Adelaide: Premier Rann Speech to the Business SA Climate Change Presentation, 5 September 2007.

SAG. (2007b). *Fact Sheet: A Summary of Government of South Australia Sustainability and Climate Change Initiatives*: South Australian Government, October 2007.

SAG. (2007c). *South Australia's Strategic Plan 2007*: SA Government, January 2007.

Soulé, M. E., & Sanjayan, M. A. (1998). Conservation Targets: Do They Help? *Science, 279*(5359), 2060-2061.

Speth, J. G. (2008). *The Bridge at the End of the World*. London: Yale University Press.

Stern, D. I. (2004). The Rise and Fall of the Environmental Kuznets Curve. *World Development, 32*(8), 1419-1439.

UNEP. (2007). *Global Environmental Outlook 4*. Nairobi, Kenya.: United Nations Environmental Programme.

UNEP. (2009). *Climate Change Science Compendium*. Nairobi: United Nations Environment Programme.

Venetoulis, J., & Talberth, J. (2005). *Ecological Footprint of Nations 2005 Update*. Oakland, California: Redefining Progress.

Wackernagel, M. (2009). Methodological Advancements in Footprint Analysis. *Ecological Economics, 68*(7), 1925-1927.

Wackernagel, M., & Yount, D. (1998). The Ecological Footprint: an Indicator of Progress Toward Regional Sustainability. *Environmental Monitoring and Assessment, 51*(1-2), June.

Walker, B., Gunderson, L., Kinzig, A., Folke, C., Carpenter, S., & Schultz, L. (2006). A Handful of Heuristics and Some Propositions for Understanding Resilience in Social-Ecological Systems. In B. H. Walker, J. M. Anderies, K. A. P. & P. Ryan (Eds.), *Exploring Resilience in Socio-Ecological Systems, Chapter 2*. Collingwood, Australia: CSIRO Publishing.

Walker, B., & Salt, D. (2006). *Resilience Thinking: Sustaining Ecosystems and People in a Changing World*. Washington DC: Island Press.

WCED. (1987). *Our Common Future: World Commission on Environment and Development*. Oxford: Oxford University Press.

Williams, C. C., & Millington, A. C. (2004). The Diverse and Contested Meanings of Sustainable Development. *Geographical Journal, 170*(2), 99-104.

WRI. (2010). *Earth Trends - Economics, Business and the Environment.*: World Resources Institute, at http://earthtrends.wri.org/searchable_db/index.php?theme=5, accessed 9 March 2010.

WWF. (2006). *Living Planet Report 2006*. Gland, Switzerland: World Wide Fund For Nature.

WWF. (2007). *Europe 2007: Gross Domestic Product and Ecological Footprint*: World Wide Fund for Nature.

Yin, R. K. (2003). *Case Study Research: Design and Methods* (3rd ed.). California: Sage Publications.

York, R. (2008). Personal communication between R. York and D. Clifton, 23 July 2008, re: Ecological Footprint and I=PAT. In D. Clifton (Ed.).

York, R., Rosa, E. A., & Dietz, T. (2003). Footprints in the Earth: The Environmental Consequences of Modernity. *American Sociological Review, 68*(2), 279-300.

York, R., Rosa, E. A., & Dietz, T. (2007). Driving the Human Ecological Footprint. *Frontiers in Ecology and the Environment, 5*(1), 13-18.

Appendix 1 - Sustainable-world Typology (SWT) (Source: Clifton (2010a))

1. Dimensions: Sustainable-world (**SW**) Dimensions represented in the SWT are:

Reference	SWT Dimension description
1.	**Primary goal of a Sustainable-world**
1.1.	Primary Goal
1.2.	Primary Goal area of focus
2.	**Space and time**
3.	**Satisfaction of interests**
3.1.	Interests: Scope
3.2(a).	Interests: Mechanism (human)
3.2(b).	Interests: Mechanism (non-human)
3.3(a).	Interests: Population (human)
3.3(b).	Interests: Population (non-human)
4.	**Responsibility**
4.1.	Cause
4.2.	Remedy

Reference	SWT Dimension description
5.	**General principles and concepts**
5.1.	Modelling a SW – the 3-Elements
5.2.	Justice
5.3.	Human Interests - Resources
5.4.	Risk and Precaution
5.5.	Growth and Development
5.6.	Diversity
5.6.1.	Biodiversity
5.6.2.	Cultural diversity
5.7.	Security

2. The Sustainable-world Typology

1. Primary goal of a Sustainable-world:		
1.1. Primary Goal	**Definitional:** The primary goal of a Sustainable-world is the Flourishing of life on Earth over an indefinite time frame.	
1.2. Primary Goal area of focus	**Reformist**	**Weak anthropocentrism** The focus of what is to be sustained is the flourishing of human life through the satisfaction of human Fulfilment Interests[#1] based on Considered Human Preferences [#2]. The non-human world is only (or mostly) of instrumental value to humans in meeting Considered Human Preferences.
	Transformational	**Ecocentrism** The focus of what is to be sustained is the flourishing of human and non-human life through the satisfaction of Fulfilment Interests. Both human and non-human interests given consideration – humans interests do not take automatic preference.
	Inconsistent with Reformist and Transformational	**Strong anthropocentrism** The satisfaction of human interests, based on Felt Human Preferences[#3], dominates.

Notes:

#1: Fulfilment Interests: are those things that are conducive to the flourishing of something (a person, a society, an animal, a plant, an ecosystem, etc.).
These are high-order things which in the human context might include physical health, a sound mind, a sense of meaning and purpose in life and so on.
Fulfilment interests have some common characteristics across any one species (it is in the interests for all humans to be of good health and sound mind) and in some respects, across species boundaries (physical health is just as relevant for a human as it is for an ape or an elephant).
But there are also clear species specific fulfilment interests (a healthy cheetah is a fast cheetah, which need not

be the case for a human) and at least within the human domain, there are individual differences as to how a flourishing life might be lived.

#2: Considered Human Preferences: are "*any desire or need that a human individual would express after careful deliberation, including a judgment that the desire or need is consistent with a rationally adopted world view*" (Norton, 2003, p. 164). In the sustainable-world context, these are preferences consistent with a rationally adopted sustainable-world view.

#3: Felt Human Preferences: are "*any desire or need of a human individual that can at least temporarily be sated by some specifiable experience of that individual"* (Norton, 2003, p. 164)

2. Space and time:
Definitional: A Sustainable-world is ultimately concerned with humans living sustainably at the global level over an indefinite time frame.

3. Satisfaction of interests: If a SW has to do with the flourishing of life through the satisfaction of interests: • Which needs (human and non-human) are to be met, and to what extent are they to be met, to satisfy these interests? (the Scope question). • How are these interests to be satisfied? (the Mechanism question). • For how many are these interests to be satisfied? (the Population question).		
3.1. Interests: Scope	**Reformist**	**Justice in meeting human needs and wants** Justice in meeting human Fulfilment Needs[#4], then justice in meeting human wants[#5]. Non-human species interest satisfaction based mostly, but not always, on the usefulness of non-human species in satisfying human interests.
	Transformational	**Justice in meeting needs for all life** First, justice in meeting Fulfilment Needs for humans and non-human species. Then when achieved, justice in meeting human wants.
	Inconsistent with Reformist and Transformational	**Unjust human need and want satisfaction** Human Felt Preferences dominate, and/or only vital human needs met, and/or unjust human interest satisfaction.

Notes:

#4: Fulfilment needs: are those things that must be satisfied in order for fulfilment interests to be met - wholesome and adequate food for physical health, strong social relationships and family bonds for psychological health, and so on.

#5: Human wants: are those things that go beyond fulfilment needs and are 'like to haves' but are not conditional for a flourishing life to be lived. I might like to trek through the Himalayas, but I can still live a flourishing life without it. Wants are mostly seen as applicable only to humans and although not dismissing the possibility that wants might also apply to non-human species, the limitation to humans is followed in this SWT.

3.2(a). Interests: Mechanism (human)	**Reformist**	**Green and equitable consumerism** Focus on consumerism with goods and services produced and consumed in environmentally responsible and socially just (green-and-just) ways. Consumption that increases GDP for all of humanity is a fundamental social good.
	Transformational	**Sufficiency and life experiences** Focus on non-material life experiences. Consumption of goods and services based on sufficiency criteria. Increased consumption needs of the poor are important and achieved through redistribution not more growth. Human wellbeing from a close connection to Nature.
	Inconsistent with Reformist and Transformational	**Unconstrained materialism** Consumption of goods and services with little regard for broad-scale and long-term environmental or social consequences.

3.2(b). Interests: Mechanism (non-human)	**Reformist**	**Constrained to human parameters – Weak Anthropocentrism orientation** Non-human life managed by humans mostly as natural resources for satisfaction of human Considered Preferences. Supportive of technology-focused agricultural practices, including the use of GMOs and other intensive technology based crop and animal production practices, if done in ways consistent with the 'green and just' Reformist criteria.
	Transformational	**Unconstrained flourishing – Ecocentrism orientation** Humans manage themselves rather than managing Nature, with a guiding principle of minimal interference with Nature to allow it to evolve and flourish in its own way. Preference for organic agricultural practices, and an aversion to GMO technology and other intensive technology based crop and animal production practices.
	Inconsistent with Reformist and Transformational	**Strong anthropocentrism orientation** Interests of non-human life are only relevant to the extent to which their satisfaction contributes to the meeting of human Felt Preferences. Use of technology focused agricultural practices including GMOs and other intensive technology based crop and animal production practices even if negative ecological and social consequences arise.

3.3(a). Interests: Population (human)	**Reformist**	**Manage a SW to Population** Population settles to a 'natural limit'. Reduce very high rates of growth in some (mostly developing) countries. Prevent reductions in some (mostly developed) countries. Orientation to maximizing human population that can be sustained within SW criteria.
	Transformational	**Manage Population to a SW** Current human population seen as too high and unsustainable, and is an issue for all countries to address. Long term reduction strategy required through collective non-coercive and non-discriminatory choice. Reduction will benefit both humans and other species.
	Inconsistent with Reformist and Transformational	**Growth beyond capacity** Population-impact mix that exceeds the Earth's ecosystem capacity and/or exceeds society's economic capacity to meet Fulfilment Needs for all. Indefinite population growth. Coercive or discriminatory methods to limit growth.

3.3(b). Interests: Population (non-human)	**Reformist**	**Constrained to human interests – Weak Anthropocentrism** Non-human species diversity and population numbers mostly constrained to the extent needed to satisfy human instrumental objectives and self-interest pursuit. Consistent with a weak anthropocentric world view including maintaining critical levels of natural capital (K_N) and satisfying Human Considered Preferences.
	Transformational	**Flourishing – Ecocentrism** Non-human species flourish in their own right independently of human instrumental purposes or self-interest pursuit, characterised by abundance in biodiversity and in species population sizes. Requires ceasing of human caused extinctions and significant increases in population numbers for most species.
	Inconsistent with Reformist and Transformational	**Critical Natural Capital and Considered Preference erosion** Loss of species and species populations so as to erode critical levels of K_N and erode the satisfaction of Considered Human Preferences in ways consistent with other SW criteria.

4. Responsibility:		
4.1. Cause	**Humans**: Current SW problems are solely human caused, that is, they are human society created problems. Within this human context, various social actors are claimed to have contributed in different ways that can be considered within the Reformist and Transformational framework.	
	Reformist	**Wealth and Poverty, North and South** Production and consumption patterns of the wealthy – especially in the North, poverty in the South, and a lack of development in the South, are key causes of ecological harm and SW problems generally.
	Transformational	**Wealth and North** Production and consumption in the North, exploitation of the South by the North by both business and government, and efforts by the South to replicate Northern consumptive lifestyles, are the dominant causes of SW problems.
	Inconsistent with Reformist and Transformational	**Responsibility Denial** A general failure of social actors (nations, governments, business, society generally etc), especially by those having greatest influence over impacts, to acknowledge their contribution to SW problems.

4.2. Remedy	**Humans**: • Humans are the only entity able to think about SW issues and to do something about them. • Within this human context, various social actors are claimed to have different remedial roles to play that can be considered within the Reformist and Transformational framework.	
	Reformist	**North and business led global green-and-just growth** North to make its production and consumption more green-and-just and help the South develop sustainably through institutional reform and application of capital and technology. South to embrace Northern economic ideals in green-and-just ways consistent with a Reformist SW view. Business has a key role in promoting global growth in partnership with government, based on a Reformist SW view. Individual responsibility to make green-and-just consumer choices.
	Transformational	**North restraint and sufficiency, South self determinism** North to bring its production and consumption within fair Earth-share limits and to stop exploiting the South. South to find its own way of living sustainably and without replicating the unsustainable ways of the North. Business size and power constrained by government with a preference for the small and local. Government policies to limit scale of resource consumption and of distributional inequality, and support wellbeing within these constraints based on Transformational principles. Individual responsibility to adopt sufficiency lifestyles.
	Inconsistent with Reformist and Transformational	**Responsibility Avoidance** A general failure of social actors (nations, governments, business, society generally etc), especially by those having greatest ability to bring about change, to take needed action to progress a SW outcome.

<table>
<tr><th colspan="4">5. General principles and concepts</th></tr>
<tr><td rowspan="5">5.1. Modelling a SW – the 3-Element Model</td><td>Reformist</td><td colspan="2">Interlocking circles / 3—legged-stool / 3-pillars
Ecological, Social and Economic as separate but equally important and interrelated aspects of a SW.
No absolute limits.
Allows trade-offs consistent with Weak Sustainability (see SWT item 5.3).</td></tr>
<tr><td rowspan="3">Transformational (increasingly so moving downwards from 'clear system boundaries' to 'single human activity field')</td><td rowspan="3">Concentric circles
Economy dependent on and constrained by Social, which is dependent on and constrained by Ecological.</td><td>Clear system boundaries
Boundaries of the 3 systems are clear and easily definable.</td></tr>
<tr><td>Diffuse and permeable boundaries
Boundaries of the 3 systems are diffuse and permeable.</td></tr>
<tr><td>Single human 'activity and wellbeing' field within surrounding Ecological
Human wellbeing focus with no Economic distinction.
Human 'activity and wellbeing' field boundary diffuse and permeable.</td></tr>
<tr><td>Inconsistent with Reformist and Transformational</td><td colspan="2">Ecological and social subservience
Ecological not at least on equal terms with Social and Economic.
Social not on at least equal terms with Economic.</td></tr>
</table>

<table>
<tr><td rowspan="4">5.2. Justice</td><td colspan="2">For all formulations of a SW
Achieving both Intra-generational (IntraG) and Inter-generational (InterG) justice is a necessary condition for a SW.
Ultimately it is justice in outcomes that matter (i.e., consequentialist based) that is, any process approach to justice (i.e. deontological based) is only as good as the SW outcomes it produces.
Justice is considered in multi-dimensional terms including distribution (i.e. equity), recognition, capabilities, and participation.</td></tr>
<tr><td>Reformist</td><td>Human focused and growth based
IntraG and InterG justice are relevant to humans only.
Overcoming poverty and achieving a more equitable distribution of wealth requires continued economic growth with the benefits of growth equitably shared.
InterG justice requires the passing on to future generations of an undiminished aggregate resource capital base (i.e., a weak sustainability approach – see item 5.3).</td></tr>
<tr><td>Transformational</td><td>Humans and Nature focused and redistribution based
IntraG and InterG justice are relevant to humans and to human acts towards Nature.
Human resource consumption based on an equal 'fair-Earth share' entitlement through redistribution of wealth and resource use, especially from the North to the South and from humans to Nature, not through more economic growth.
InterG justice requires the passing on to future generations of independently undiminished natural (K_N) and human made (K_{HM}) capital bases (i.e., a strong sustainability approach – see item 5.3) based on ecocentric principles.</td></tr>
<tr><td>Inconsistent with Reformist and Transformational</td><td>IntraG and/or InterG injustice
Members of the current generation not having basic needs physically met and/or not having the opportunity to lead flourishing lives.
Future generations being unable to meet their basic needs or otherwise lead flourishing lives as a consequence of harmful actions taken by the current generation.</td></tr>
</table>

5.3. Human Interests – Resources	**Reformist**	**Weak Sustainability (WS)** Sustainability of human interests satisfaction requires that the aggregate value of natural (K_N) and human forms (K_{HF}) of capital is sustained. Capital types are substitutable beyond minimum critical values.
	Reformist and Transformational features	**Strong Sustainability (SS) – Weak Anthropocentrism orientation** Sustainability of human interests satisfaction requires K_N and K_{HF} to be maintained separately. K_N and K_{HF} are mostly complements and only marginally substitutable.
	Transformational	**Strong Sustainability (SS) – Ecocentrism orientation** SS reconstructed to incorporate ecocentric principles. K_N as Nature rather than as merely aspects of Nature useful to humans. K_{HF} incorporates values beyond it being a form of capital.
	Inconsistent with Reformist and Transformational	**Aggregate capital depletion** The depletion of the aggregate of K_N and K_{HF}. **Very Weak Sustainability** The proposition that K_{HF} is perfectly and indefinitely substitutable for K_N.

5.4. Risk and Precaution	**Reformist**	**Risk Management** Maximisation and optimisation of human activity. Ignorance and uncertainty are acknowledged, and risks from human activity are managed mostly through application of science and weaker forms of Precautionary Principle (PP). Risk aversion to change in social systems and institutions beyond marginal change consistent with Reformism principles.
	Transformational	**Resilience Living** Socio-ecological Resilience Living pursued instead of human activity strategies oriented to maximisation and optimisation. Ignorance and uncertainty strongly recognised. Stronger forms of the PP, and use of broad forms of knowledge in addition to scientific, are also utilised to address risk. Risk tolerant of fundamental change to social systems and institutions to see primary SW goals achieved.
	Inconsistent with Reformist and Transformational	**Restrained risk management or Risk Indifference** Ignoring or attempting to factor-out issues of uncertainty and ignorance in decision making processes, include a failure to utilise, in a broad way, the PP in either a weak or strong form. Failure to make meaningful changes, even at the margin, to social and institutional systems to address SW risks arising from human activity.

5.5. Growth and Development	**Reformist**	**Sustainable Growth** Human wellbeing, including elimination of poverty and resolution of ecological problems, achieved through green-and-just, unlimited, and global GDP growth supported by free-trade, market based SW incentives, and a key role for the business sector. Technology and human ingenuity as keys to resolving problems caused by growth and to overcome limits to growth
	Transformational	**Qualitative Development and Sufficiency** Human wellbeing progressed through green-and-just qualitative development and consumptive sufficiency, achieved through a steady-state economy, internationalisation not globalization, and a preference for consumption from local production. Continued consumptive growth not sustainable or possible, and is a cause of ecological problems and of poverty.
	Inconsistent with Reformist and Transformational	**Ecologically unsustainable and/or socially unjust economic growth** Economic growth that breaches green-and-just principles.

5.6. Diversity	**For all formulations of a SW** Both biodiversity and cultural diversity are seen under all SW Diversity Perspectives as being interdependent, mutually supportive, and necessary and equally important for there to be a SW.

5.6.1. Biodiversity	**Reformist**	**Constrained to human (weak anthropocentric) interests** Biodiversity loss inevitable and acceptable but not below levels consistent with weak anthropocentrism and not below either of: (a) Critical K_N levels for a WS approach, or (b) More significant than critical K_N levels for a SS approach. Consistent with mono-culture industrial agricultural practices including the precautionary use of GMO technology.
	Transformational	**Flourishing** Biodiversity as a fundamental good and considered in ways consistent with ecocentric principles. Humans need to live in ways that are biodiversity enhancing. Sceptical of mono-culture industrial agricultural practices and the use of GMO technology. Advocates a return to high diversity organic agricultural practices.
	Inconsistent with Reformist and Transformational	**Persistent human caused biodiversity loss** The persistent human caused loss of biodiversity especially where it breaches critical K_N levels.
5.6.2. Cultural diversity	**Reformist**	**Constrained within dominant socio-economic system** Cultural diversity encouraged but exists within a dominant Reformist SW approach based on globalization, free trade, GDP growth, and a green-and-just consumer culture. Incorporates concepts of multiculturalism, protection of indigenous rights, protection of items of cultural heritage and language, and the commodification of cultural goods and services.
	Transformational	**Flourishing** Cultural diversity as a fundamental good incorporating all aspects of human society including economic systems. Humans need to live in ways that are cultural diversity enhancing.
	Inconsistent with Reformist and Transformational	**Persistent human caused cultural diversity loss**. The persistent human caused loss of human cultural diversity such that it undermines human Considered Preferences that are satisfied though such diversity.

<table>
<tr><td rowspan="4">5.7. Security</td><td>Reformist</td><td rowspan="2">Human Security focus
Focus on broad issues of Human Security and root causes of insecurity.
Peace Dividend applied to progressing human and ecological wellbeing objectives.</td><td>Targeted disarmament
General reductions in military spending.
Non-proliferation of, and elimination of, some types of weapons, especially weapons of mass destruction (WMD).</td></tr>
<tr><td>Reformist and Transformational features</td><td>Broad scale disarmament
Disarmament to minimal non-provocative defence capability.
Stronger peace keeping capacity under international control.
No WMD.</td></tr>
<tr><td>Transformational</td><td colspan="2">Life Security focus
Focus on broad issues of security for humans and non-human species, and addressing root causes of insecurity.
Peace Dividend applied to progressing SW objectives consistent with ecocentric principles.
Broad scale disarmament approach.</td></tr>
<tr><td>Inconsistent with Reformist and Transformational</td><td colspan="2">National Security focus
Focus on military based National Security.
High levels of, and/or escalating, military spending and capability.
Failure to progress disarmament objectives.
Failure to apply any Peace Dividend to human and ecological wellbeing initiatives.
Greening the military as a cover for militarism legitimisation.</td></tr>
</table>