Integrating Metrics, Models and Visions to Transition Toward Sustainability

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Human influence on the earth system is now so large, that a new geologic epoch (the Anthropocene) has begun. We now live in a “Full World”. Business as usual is not an option. We need a new system.
PLANETARY BOUNDARIES: THERE ARE FUNDAMENTAL ECOLOGICAL CONSTRAINTS


Vision
How the world is
How we would like it to be

Tools & Analysis
Systems thinking

Implementation
Including societal therapy

Practical Problem Solving
The Sustainable and Desirable “doughnut”

(Elements of well-being & quality of life)

(Source: K. Raworth, 2012. A safe and just space for humanity: can we live within the doughnut? Oxfam International)
UN Sustainable Development Goals (SDGs)
TRANSFORMING OUR WORLD:
THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT

Figure 1. A hierarchy of goals along the Ends-Means spectrum³
Integrated Questions/Goals:

• Ecologically Sustainable Scale

• Socially Fair Distribution

• Economically Efficient Allocation
Natural Capital is everything in the world that humans do not have to produce or maintain – the “gifts of nature”.

Valuation of natural capital is about assessing the relative contributions of natural capital to sustainable human well-being.

Recognition of this is different from conventional approaches that do not adequately capture the contributions of natural and social capital.

Taxonomies of Capital Assets

- Natural Capital
- Human-made Capital
  - Built or Manufactured
  - Human (characteristics of individual people)
  - Social (characteristics of groups, societies, and cultures)
- Financial
  - Intellectual
  - Social

Lumpers

Splitters
Positive Psychology

**PERMA:** Well-being has five measurable elements that count toward it

- **P**ositive Emotion (of which happiness and life satisfaction are aspects)
- **E**ngagement (being in flow, being one with the music)
- **G**ood **R**elationships (social capital)
- **M**eaning and Purpose (belonging to and serving something you believe is bigger than you are)
- **A**ccomplishment, Achievement, and Mastery

Martin Seligman
Zellerbach Family Professor of Psychology,
University of Pennsylvania
Time to leave GDP behind

Gross domestic product is a misleading measure of national success. Countries should act now to embrace new metrics, urge Robert Costanza and colleagues.
<table>
<thead>
<tr>
<th>Indicator</th>
<th>Type</th>
<th>Units</th>
<th>Domains</th>
<th>Indicators</th>
<th>Explanation</th>
<th>Area coverage</th>
<th>Temporal Coverage</th>
<th>References</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index of Sustainable Economic Welfare (ISEW) and Genuine Progress Indicator (GPI)</td>
<td>GDP modification</td>
<td>$</td>
<td>4</td>
<td>26</td>
<td>Personal Consumption Expenditures weighted by income distribution, with volunteer and household work added and environmental and social costs subtracted.</td>
<td>17 countries, several states and regions</td>
<td>1950-variou</td>
<td>1-3</td>
<td><a href="http://genuineprogress.net/">http://genuineprogress.net/</a></td>
</tr>
<tr>
<td>World Values Survey</td>
<td>Survey-based index</td>
<td>Index #</td>
<td>10</td>
<td>100's</td>
<td>Periodic (5 “waves” so far) survey of a broad range of variables. Most used for international comparisons is ranking of “how satisfied are you with your life?” question.</td>
<td>73 countries</td>
<td>1981-2008 intermittent</td>
<td>8,9</td>
<td><a href="http://www.wvsevsdb.com">http://www.wvsevsdb.com</a></td>
</tr>
<tr>
<td>Gallup-Healthways Well-Being Index</td>
<td>Survey-based index</td>
<td>Index #</td>
<td>6</td>
<td>39</td>
<td>Annual survey in six domains: live evaluation, physical health, emotional health, healthy behavior, work environment, and basic assets</td>
<td>50 states in US</td>
<td>2008-present</td>
<td>10</td>
<td><a href="http://www.well-beingindex.com/">http://www.well-beingindex.com/</a></td>
</tr>
<tr>
<td>Gross National Happiness</td>
<td>Survey-based index</td>
<td>Index #</td>
<td>9</td>
<td>33</td>
<td>Detailed in-person survey around nine domains: psychological well-being, standard of living, governance, health, education, community vitality, cultural diversity, time use, and ecological diversity</td>
<td>Bhutan</td>
<td>2010</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Happy Planet Index</td>
<td>Composit Index</td>
<td>Index #</td>
<td>3</td>
<td>3</td>
<td>HPI = subjective well being * life expectancy / ecological footprint</td>
<td>153 countries</td>
<td>3 yrs</td>
<td>13,14</td>
<td><a href="http://www.happyplanetindex.org/">http://www.happyplanetindex.org/</a></td>
</tr>
<tr>
<td>Canadian Index of Well-Being</td>
<td>Composit Index</td>
<td>Index #</td>
<td>8</td>
<td>80</td>
<td>Includes community vitality, democratic engagement, education, environment, population, leisure, living standards, and time use</td>
<td>Canada</td>
<td>1994-present</td>
<td>15</td>
<td><a href="https://waterloo.ca/canadian-index-wellbeing/">https://waterloo.ca/canadian-index-wellbeing/</a></td>
</tr>
<tr>
<td>National Well-Being Index</td>
<td>Composit Index</td>
<td>Index #</td>
<td>5</td>
<td>5</td>
<td>proxies for built, human, natural and social capital with weights based on regression with subjective well-being</td>
<td>56 countries</td>
<td>1 yr</td>
<td>16,17</td>
<td></td>
</tr>
<tr>
<td>OECD Better Life Index</td>
<td>Composit Index</td>
<td>Index #</td>
<td>11</td>
<td>25</td>
<td>Includes housing, income, jobs community education, environment, civic engagement, health, life satisfaction, safety, and work-life balance</td>
<td>36 OECD countries</td>
<td>1 yr</td>
<td>18,19</td>
<td><a href="http://www.oecdbetterlifeindex.org">http://www.oecdbetterlifeindex.org</a></td>
</tr>
<tr>
<td>Sustainable Society Index</td>
<td>Composit Index</td>
<td>Index #</td>
<td>5</td>
<td>22</td>
<td>22 indicators in 5 domains ranked with various weightings</td>
<td>150 countries</td>
<td>2 yrs</td>
<td>21</td>
<td><a href="http://www.ssfindex.com/">http://www.ssfindex.com/</a></td>
</tr>
</tbody>
</table>
How’s life?

There is more to life than the cold numbers of GDP and economic statistics – This Index allows you to compare well-being across countries, based on 11 topics the OECD has identified as essential, in the areas of material living conditions and quality of life.
GPI/capita for the 17 countries for which it has been estimated

When GDP/capita is adjusted for income distribution and the costs of environmental and social problems using the Genuine Progress Indicator (GPI) there has been no real growth in societal well-being since 1980.

Wealth vs. Well-Being: How Do We Measure Prosperity?

Maryland developed its Genuine Progress Indicator to measure how development activities impact long-term prosperity, both positively and negatively. Here in Maryland and across the globe, people are continually challenged by the need to find a balance between advancing economic gain and ensuring social well-being.

Traditional indicators like the Gross Domestic/State Products address only economic transactions. They do not include the environmental and social costs of what we buy, the quality of life impacts of how we live, or fully appreciate the significant contributions of our natural systems.

We invite you to learn how we developed our GPI, find out how Maryland is doing in 26 different indicators, and explore a model to see how policy decisions made today may affect future generations.
We need a new Bretton Woods
Can humanity make the transition to a sustainable and desirable future without a major collapse?
When the Sea Saved Humanity
CURTIS W. MAREAN

Shortly after Homo sapiens arose, harsh climate conditions nearly extinguished our species. Recent finds suggest that the small population that gave rise to all humans alive today survived by exploiting a unique combination of resources along the southern coast of Africa.

November 1, 2012

Pinnacle Point
Figure 6: Real income of all simulated settlements over time by contributions from agriculture, ecosystem services, and trade value. Ecosystem services is eventually superceded by agriculture, and both by trade around time step 350.
GUMBO (Global Unified Model of the BiOsphere)

Underlying Landscape Model

Game Interface

Players

Conceptual Diagram: Using Human Interactions with Games to Value Ecosystem Services

Research Results

- Better Model-Game linkages
- Insights into Human Decision-Making
- Ecosystem Services Values of Communities and Individuals
- Knowledge Transfer via Gaming
Uses of Games

Entertainment
(3 billion hours per week spent playing computer games)

Education
(learning while playing)

Research
(game theory, experimental economics, resource games, etc.)

Integrated Games

Simulation games that integrate research, entertainment, and learning around ecosystem services. Ecosystem Services 10: 195-201.
CLIMATE SUMMIT

What if it's a big hoax and we create a better world for nothing?

- Energy independence
- Preserve rainforests
- Sustainability
- Green jobs
- Livable cities
- Renewables
- Clean water, air
- Healthy children
- Etc. etc.

[Image: Cartoon by D. Rocc, USA Today, 12/7/19]
Overcoming Societal Addictions: What Can We Learn From Individual Therapies?

Robert Costanza¹*, Paul Atkins² Mitzi Bolton¹, Steve Cork¹, Nicky Grigg³, Tim Kasser⁴, and Ida Kubiszewski¹

1. Crawford School of Public Policy, the Australian National University, Canberra
2. Australian Catholic University, Sydney
3. CSIRO Land and Water, Canberra
4. Knox College, Galesburg, Illinois, USA
Motivational Interviewing (MI) is one of the most effective therapies for treatment of substance addictions.

Based on engaging addicts in a positive discussion of their goals, motives, and futures.

MI suggests that there are four basic principles that underlie successful therapies.

In a societal context, these basic MI principles can be summarized as:

1. Engaging: building relationships with diverse stakeholders to enable change talk
2. Focusing: developing shared goals among those stakeholders
3. Evoking: helping stakeholders identify motivations for positive change
4. Planning: helping stakeholders move from goals to actual change
Scenario planning (SP) extended to include the entire community using public opinion surveys of the scenarios (CSP) is an analog at the societal scale of Motivational Interviewing (MI) at the individual scale.

Can CSP therapy help to break our societal addiction to “growth at all costs”? 
<table>
<thead>
<tr>
<th>Scenario exercise</th>
<th>Most desirable (highest quality of life)</th>
<th>Intermediate (based on cooperation)</th>
<th>Intermediate (based on individuals and markets)</th>
<th>Least Desirable (lowest quality of life)</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa (Mont Fleur) 1992</td>
<td>Flight of the Flamingos</td>
<td>Icarus</td>
<td>Lame Duck</td>
<td>Ostrich</td>
</tr>
<tr>
<td>Costanza, 2000</td>
<td>Ecotopia</td>
<td>Big Government</td>
<td>Star Trek</td>
<td>Mad Max</td>
</tr>
<tr>
<td>Millennium Assessment</td>
<td>Adapting Mosaic</td>
<td>Global Orchestration</td>
<td>TechnoGarden</td>
<td>Order from Strength</td>
</tr>
<tr>
<td>Great Transition Initiative</td>
<td>Great Transition</td>
<td>Policy Reform</td>
<td>Market Forces</td>
<td>Fortress World</td>
</tr>
<tr>
<td>New Zealand</td>
<td>Independent Aotearoa</td>
<td>Living on No. 8 Wire</td>
<td>New Frontiers</td>
<td>Fruits for a Few</td>
</tr>
<tr>
<td>Future of Iowa Agriculture</td>
<td>4 Steady State</td>
<td>1. Business as Usual</td>
<td>3. Technology will save us</td>
<td>2. Overreach</td>
</tr>
<tr>
<td>Great Barrier Reef</td>
<td>Best of Both Worlds</td>
<td>Treading Water</td>
<td>Free Riding</td>
<td>Trashing the Commons</td>
</tr>
</tbody>
</table>
## Real State of the World

<table>
<thead>
<tr>
<th>World View &amp; Policy</th>
<th>Optimists Are Right (Resources are unlimited)</th>
<th>Skeptics Are Right (Resources are limited)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Technological Optimism</strong></td>
<td>Star Trek: Fusion energy becomes practical, solving many economic and environmental problems. Humans journey to the inner solar system, where population continues to expand (mean rank 2.3)</td>
<td>Mad Max: Oil production declines and no affordable alternative emerges. Financial markets collapse and governments weaken, too broke to maintain order and control over desperate, impoverished populations. The world is run by transnational corporations. (mean rank -7.7)</td>
</tr>
<tr>
<td><strong>Technological Skepticism</strong></td>
<td>Big Government: Governments sanction companies that fail to pursue the public interest. Fusion energy is slow to develop due to strict safety standards. Family-planning programs stabilize population growth. Incomes become more equal. (mean rank 0.8)</td>
<td>EcoTopia: Tax reforms favor ecologically beneficent industries and punish polluters and resource depleters. Habitat patterns reduce need for transportation and energy. A shift away from consumerism increases quality of life and reduces waste. (mean rank 5.1)</td>
</tr>
</tbody>
</table>

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URL: [http://www.consecol.org/vol4/iss1/art5](http://www.consecol.org/vol4/iss1/art5)

**FIGURE 4** Game Participants’ Perceptions of where NZ is in 2006-7

**FIGURE 5** Game Participants’ Desired Location for NZ in 2055

**FIGURE 6** Current Trend Direction from 2006 (starting near the centre)

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**LEGEND**
- Perceived location of NZ in 2005/6
  - More than 1, but less than 5 points in the same position
  - More than 4, but less than 10 points in the same position
  - More than 9 points in the same position

- Desired location of NZ in 2055
  - More than 1, but less than 5 points in the same position
  - More than 4, but less than 10 points in the same position

- The perceived direction NZ is currently heading
  - More than 1, but less than 5 points in the same position
Scenarios for Australia in 2050: A synthesis and proposed survey

Policy focus on GDP growth

**Free Enterprise**
The market knows best
Inequity not addressed

**Coordinated Action**
We need planning and government
Equity maintained

**Individuals**

**Strong Individualism**
Everyone for themselves
Limited Governance

**Community Well-Being**
We’re all in this together
Governance at many levels
Stewardship and sharing

Policy focus on well-being

http://www.anuscenarioplanning.com/
Comparison between (a) the individual choices for scenarios and (b) perceptions on most Australians preferences on future scenarios. n=67
EMDV 8126 Sustainable Solutions Workshop
Surveying Alternative Future Scenarios for Australia

This course will engage students, faculty, and stakeholders in a unique application of scenario planning in Australia. We will use previously developed scenarios to create a public opinion survey of Australians about the futures they prefer. We will design and implement the survey, interpret the results, and publish the findings.

The course will use an interactive, solutions-focused format to:
• Review the literature on scenario planning in Australia and the world
• Review a set of plausible future scenarios that have been developed for Australia
• Describe those futures in a number of ways, that communicate with a broad audience, including narratives, graphics, and video
• Design, implement, and interpret public opinion surveys about the scenarios
• Prepare publishable articles about the results
NATURE’S TRUST
Environmental Law for a New Ecological Age

Mary Christina Wood
Claim the Sky!

By asserting that we all own the sky, under the Public Trust Doctrine we can use the legal institutions surrounding property rights to create an Earth Atmospheric Trust to protect our common property, charge for damages, and provide rewards to those that improve this shared asset.


Online and Print; Hybrid peer-reviewed academic journal and popular magazine; Uses a more participatory and transdisciplinary review process; Focuses on seriously creative dialog rather than debate

**Editor in Chief:** Robert Costanza  
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**Managing Editor:** Ida Kubiszewski

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Purpose

ASAP was created by several members of the International Expert Working Group (IEWG), convened by the King of Bhutan with the objective of designing a New Development Paradigm (NDP), to invite wider participation by a cross-section of society and facilitate the global movement to craft a sustainable future by

1. Bringing together parties interested in redefining the relationship between humans, economic life and nature, and

2. Serving as a collective forum for information, debate and exchange.

ASAP content will represent the best of the collective knowledge of its contributors, and will be disseminated in multiple fora and in various formats, for multiple audiences.

All submissions will be accepted provided they fulfill the General Guidelines, and ASAP’s steering committee, initially drawn from the IEWG, will evaluate and select submissions that add real value to the best practice information already on hand. Moderated debate will allow a productive exchange of views.
Thank You