Computing for Sustainability
Saving the earth one byte at a time

Visualising sustainability

Posted on March 15, 2009

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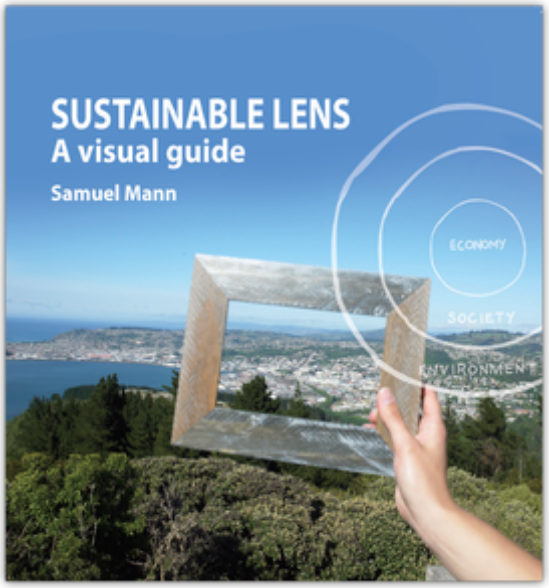
New (Dec 2011): "Sustainable Lens: A visual guide (https://computingforsustainability.wordpress.com/2011/12/23/sustainable-lens-a-visual-guide/)" published by NewSplash available through Amazon (http://www.amazon.com/Sustainable-Lens-Visual-Guide-1/dp/1468112775/ref=ntt_at_ep_dpt_2).



(https://computingforsustainability.files.wordpress.com/2009/03/sustainablelens_cover.png)

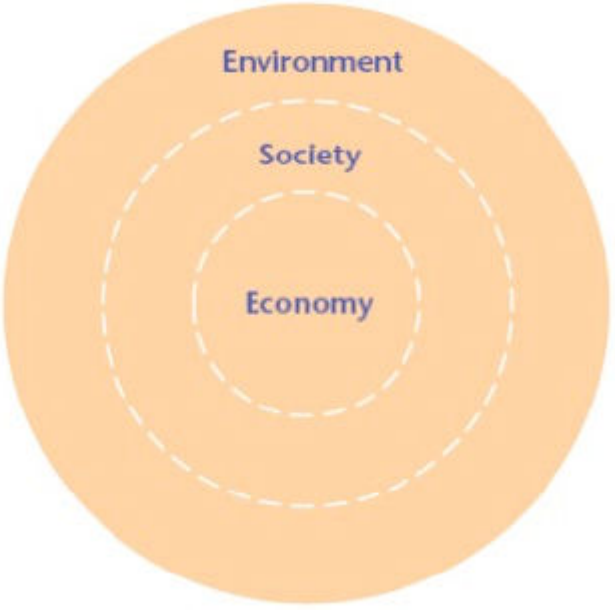
How to convey the essence of sustainability in a few sketched lines? I'm wading through the net and my bookshelves to find examples of the genre. I'm looking for schematics of the notion of sustainability itself rather than the underlying science – greenhouse, (http://www.theunlikelyactivist.com/images/global_warming_diagram.jpg) carbon, (http://larrygrob.typepad.com/.shared/image.html?/photos/uncategorized/octane03_2.jpg) meso climate process (http://www.cnsm.csulb.edu/departments/geology/people/bperry/geology303/_derived/geol303text.html ground water (http://groundwater.sdsu.edu/), (http://www.theunlikelyactivist.com/images/global_warming_diagram.jpg)etc for which there are a zillion diagrams.

The list is not meant to be exhaustive, but if I've missed your favourite diagram, leave a link and I'll add it to the list. Many of these images are duplicated all over the web, I've tried to find original sources (try tineye (http://tineye.com/), is really cool), but again, let me know if I've missed something.

In no particular order, here's ~~100 125~~ ~~137 158 179 188 218~~ 255 of what I've found.

1. Strong Sustainability

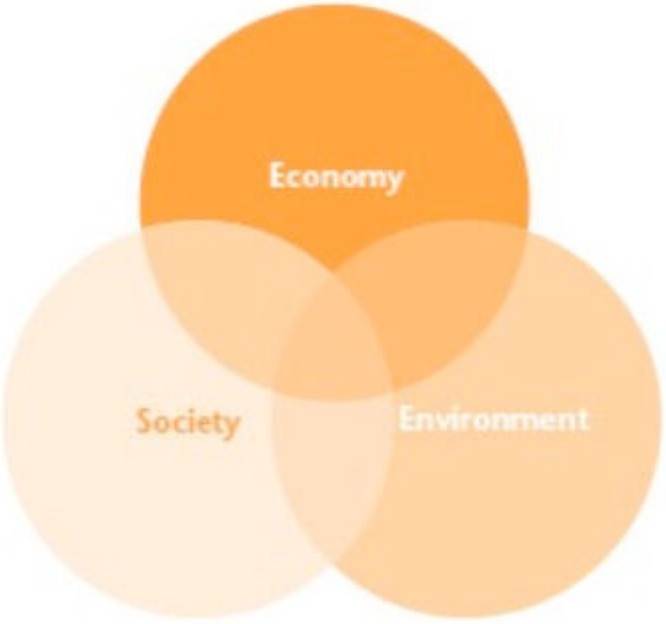
> *"This model recognises that the economy is a subset of society (i.e. it only exists in the context of a society), and that many important aspects of society do not involve economic activity. Similarly, human society and the economic activity with it are totally constrained by the natural systems of our planet" (NZ PCE quoted by Pam Willams (PhD (http://www.futuresteps.co.nz/PhD_University_Leadership_for_Sustainability.pdf))*



2. OK, so there was a particular order, the strong sustainability circles had to go before the weaker (but much more common) **Venn diagram, 3 circles (or triangles)**

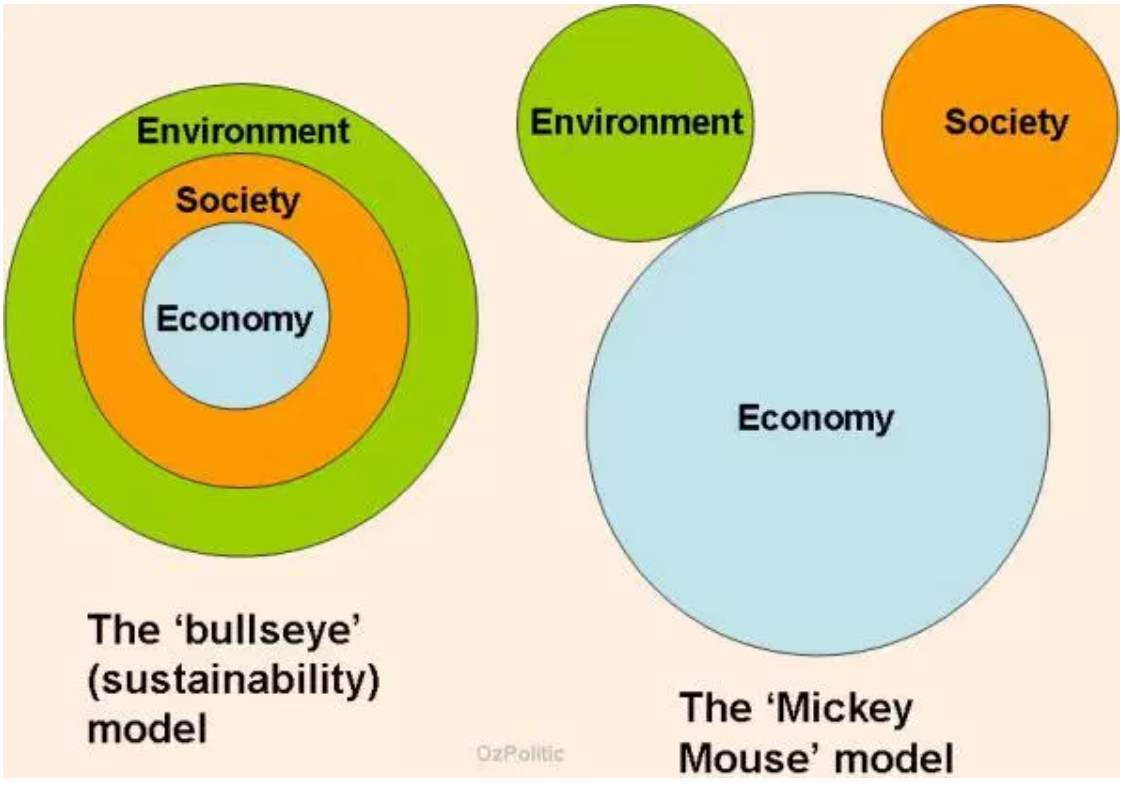
This model is very very common (google search sustainability Venn (http://images.google.co.nz/images?rlz=1C1GGLS_enNZ291NZ303&sourceid=chrome&q=sustainability%20venn&um=1&ie=UTF-8&sa=N&hl=en&tab=wi)).

> *"There is some common ground where each of the circles converge, but the main priority in this model is the health of the economy. Economists sometimes refer to this as the weak sustainability model ….. it assumes that the degradation of one group of assets, (environmental, social or economic) can be compensated for by improvement in another and that externalities can be externalised (PRISM and Knight, 2000, cited in PCE, 2002). This weak sustainability model fails to acknowledge the ecological constraints that humans, other species, markets, policies and developments must operate within" (NZ PCE quoted by Pam Willams (PhD (http://www.futuresteps.co.nz/PhD_University_Leadership_for_Sustainability.pdf))*



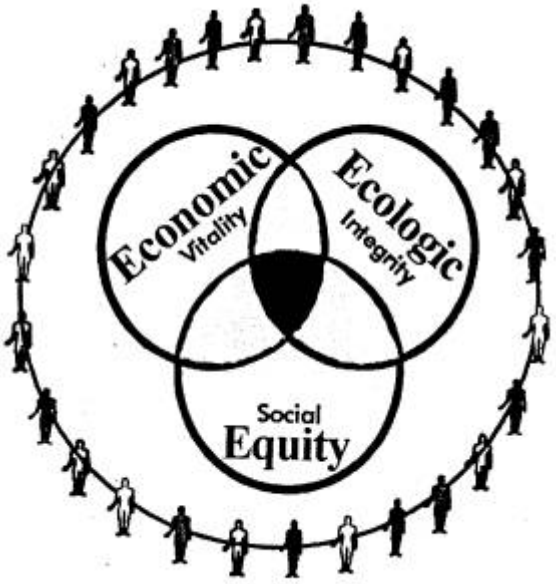
Venn diagrams coming together (http://www.unep.org/geo/geo4/media/graphics/Zoom/10.04.jpg) and showing changing dominance of sectors in a static animation.

3. Mickey Mouse (OzPolitic (http://www.ozpolitic.com/articles/sustainability-bullseye-vs-mickey-mouse.jpg))



(http://www.ozpolitic.com/articles/sustainability-bullseye-vs-mickey-mouse.jpg)

4. Venn circle with people, The circle of people give a context (Gerber) (http://www.umass.edu/umext/jgerber/bdicrecommends.htm)



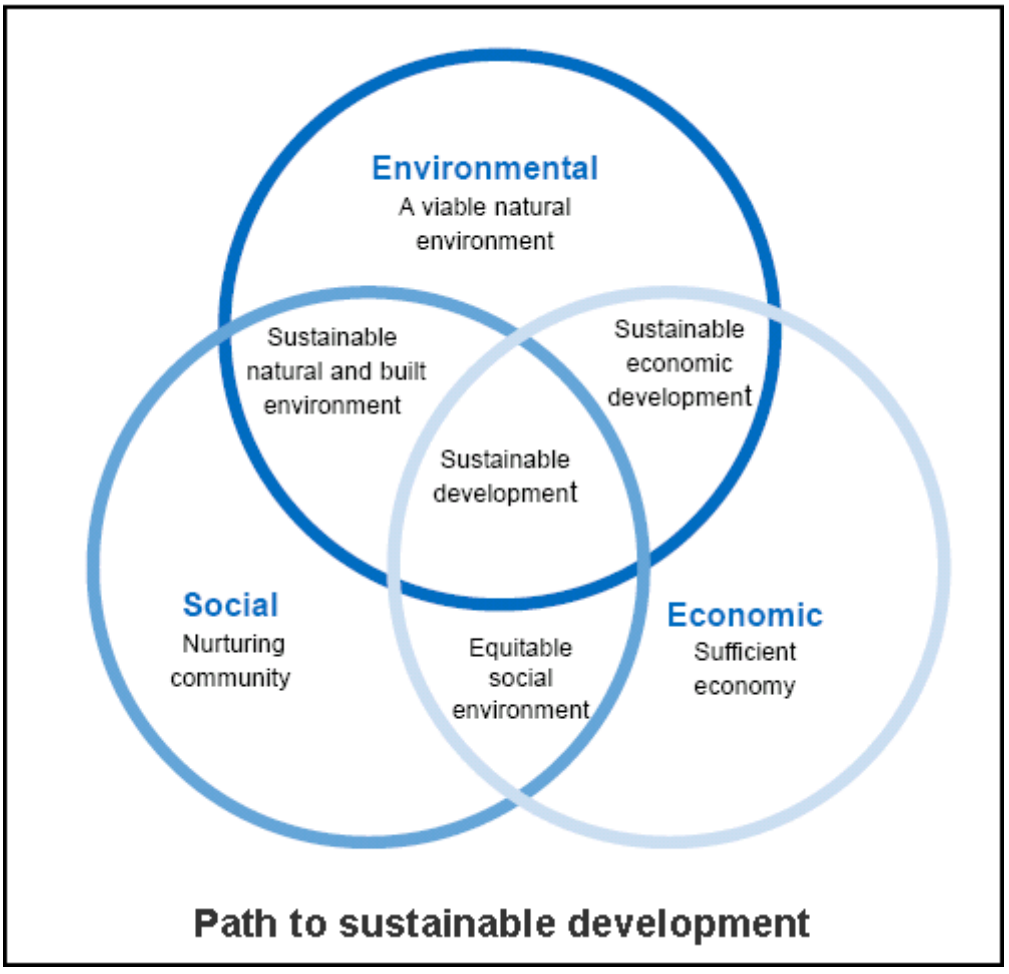
5. Venn circles with each circle labelled (US National Botanic Gardens (http://www.usbg.gov/sustainability/))

(http://www.usbg.gov/sustainability/)

6. Four Venn circles (Halton Hills (http://www.haltonhills.ca/Sustainability/what-is-sustainability.php))

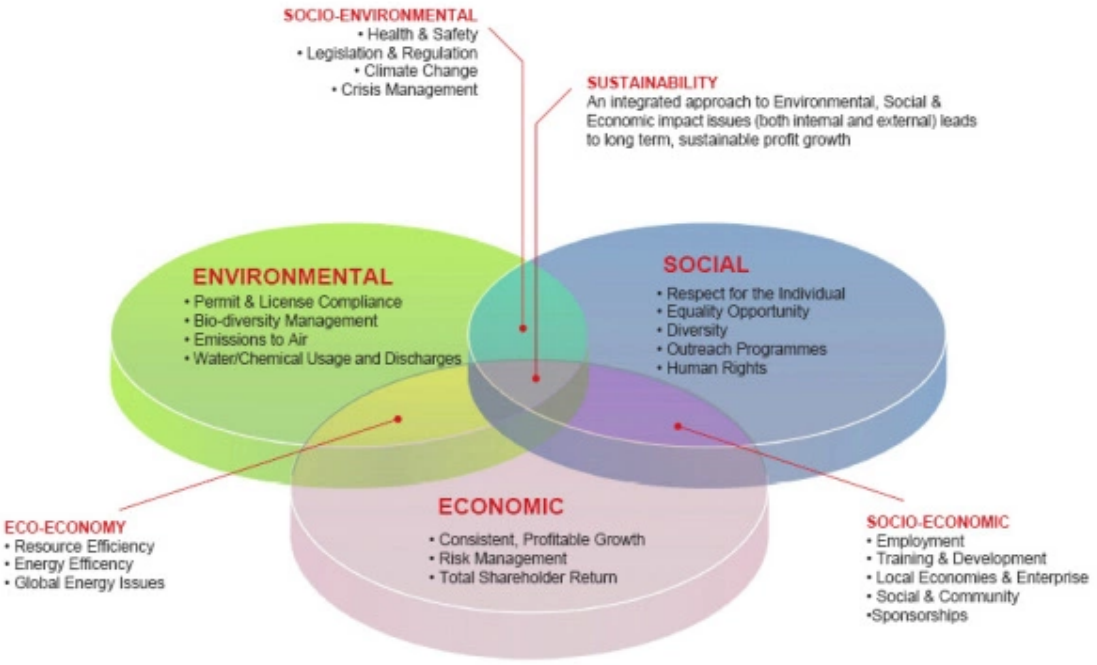
(http://www.haltonhills.ca/Sustainability/img/sustainability.jpg)

7 Venn 3 with overlaps named (see also WKU (http://www.wku.edu/sustainability/whatissustainability.html))



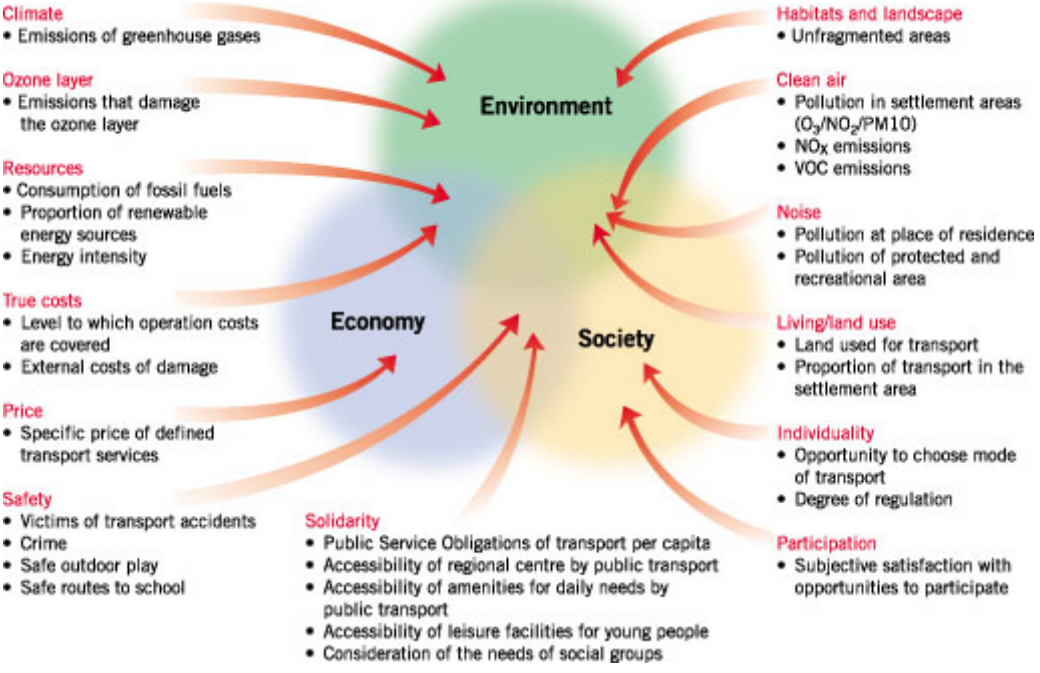
(http://knol.google.com/k/-/-/oml631csgjs7/xhrhmn/sustainability1.gif)

8. Venn with examples on each sector (Verify (http://www.verifysustainability.com/Pie%20Diagram/PieDiagram_Open_Page.aspx)). (see also Environmental Planning (http://www.envplanning.com/professionalservices/sustainability.html), Omaha (http://projects.ch2m.com/Omaha_CSO/images/sustainability.jpg),



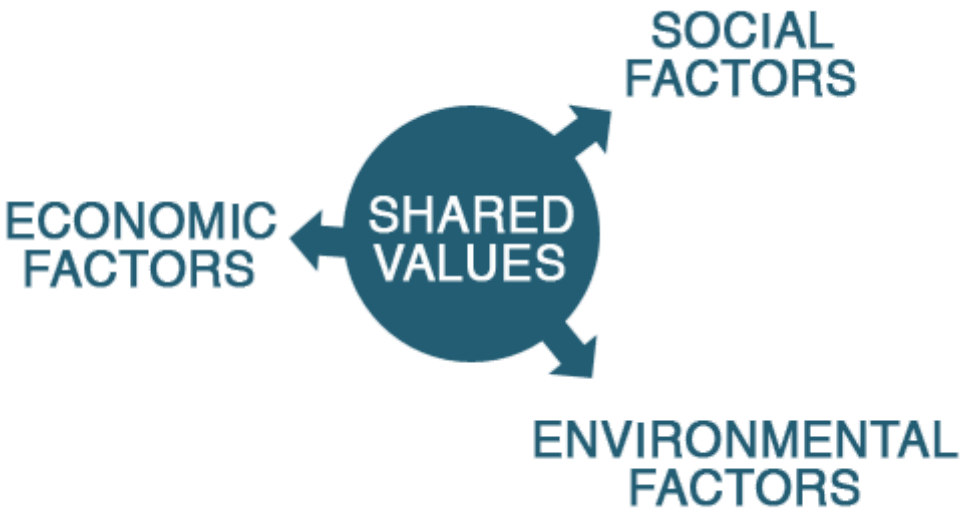
(http://www.verifysustainability.com/App_Themes/VS_Web/Images/Sustainability%20PIE%20graph%20

9. Venn 3 with callouts Swiss Transport Research Project (http://www.nfp41.ch/)



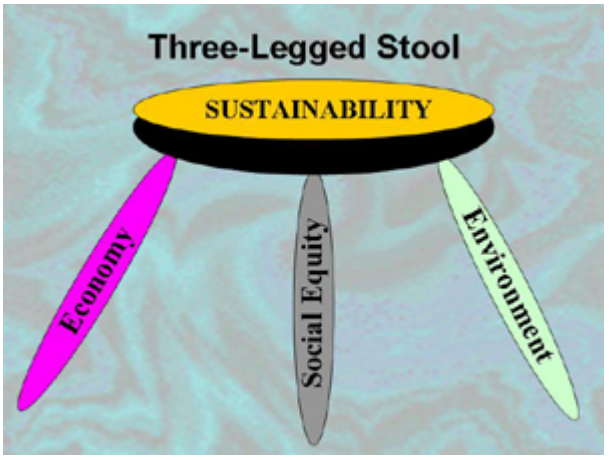
(http://www.nfp41.ch/popular/e/images/sustainability.jpg)

10. 3 aspects held together by shared values (Active Citizenship Toolkit (http://citizenship.ascskills.org.uk/sustain.php))



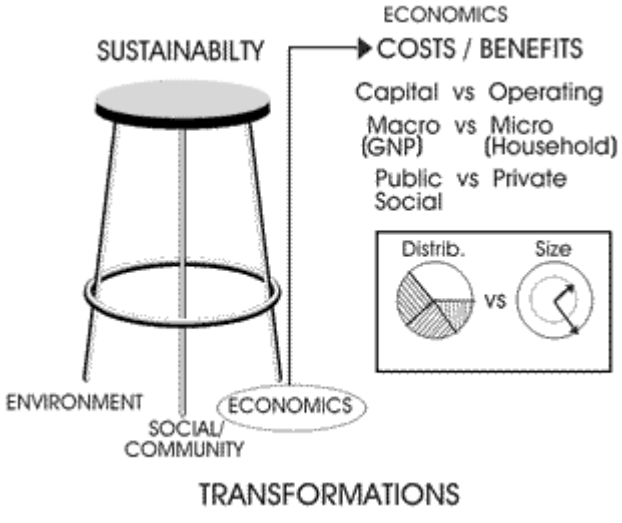
(http://citizenship.ascskills.org.uk/web_images/asc_diagram.gif)

11. 3 aspects as a stool (David Lock (http://www.davidlock.com/#)) "three legged stool"

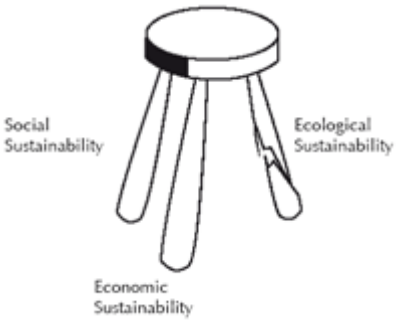


(http://www.sustainability-now.org/three_legged_stool.jpg)

12. More complex 3 legged stool (Italian Architecture (http://www.iaim.ro/evenimente_anunturi/arhitecturiada/cost_and_profit))

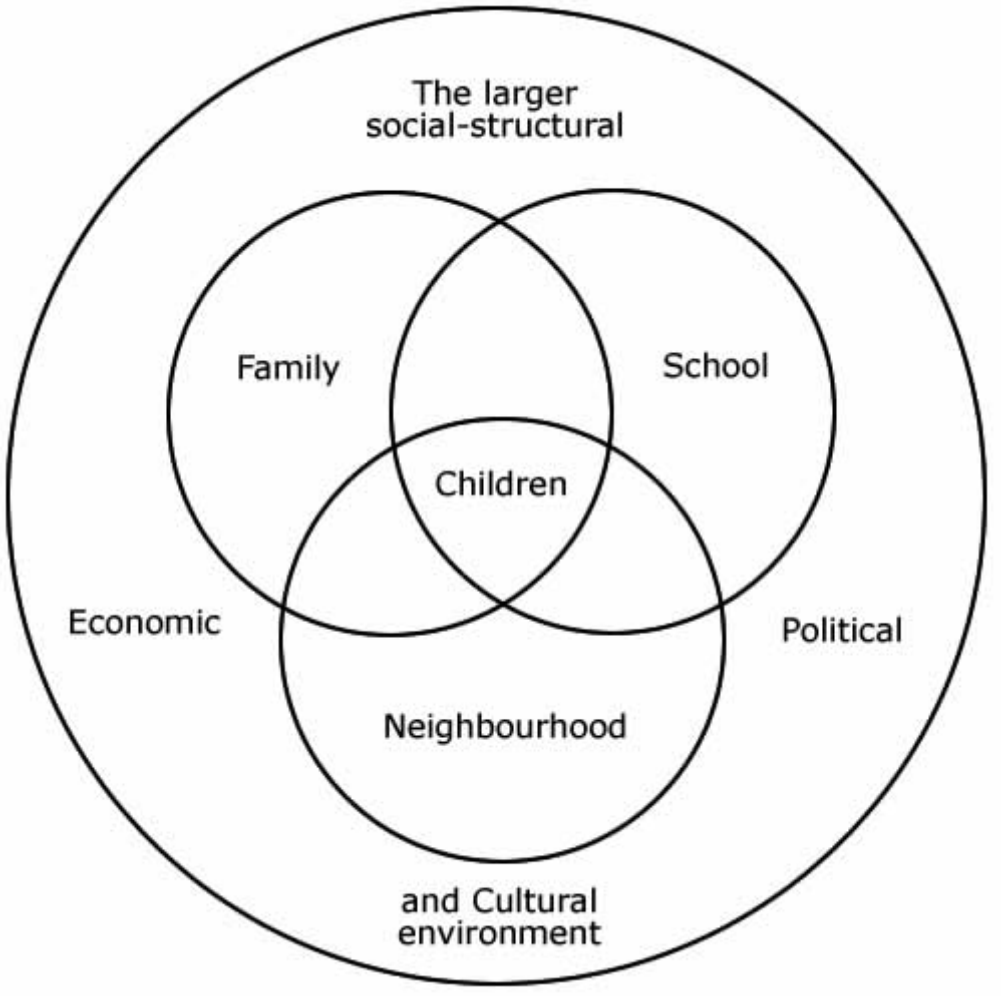


(http://www.iaim.ro/img/ev/arhitecturiada/cost_02m.gif)**13. Stool with a broken leg** (perhaps intentional?) from Willoughby City Council (http://www.willoughby.nsw.gov.au/Sustainability.html)



(http://www.willoughby.nsw.gov.au/IgnitionSuite/uploads/images/IgnitionSuite_Image(1656).gif)

14. Venn 3 within a context (Curtin Centre for Developmental Health (http://cdh.curtin.edu.au/about/))



(http://cdh.curtin.edu.au/about/vital.jpg)

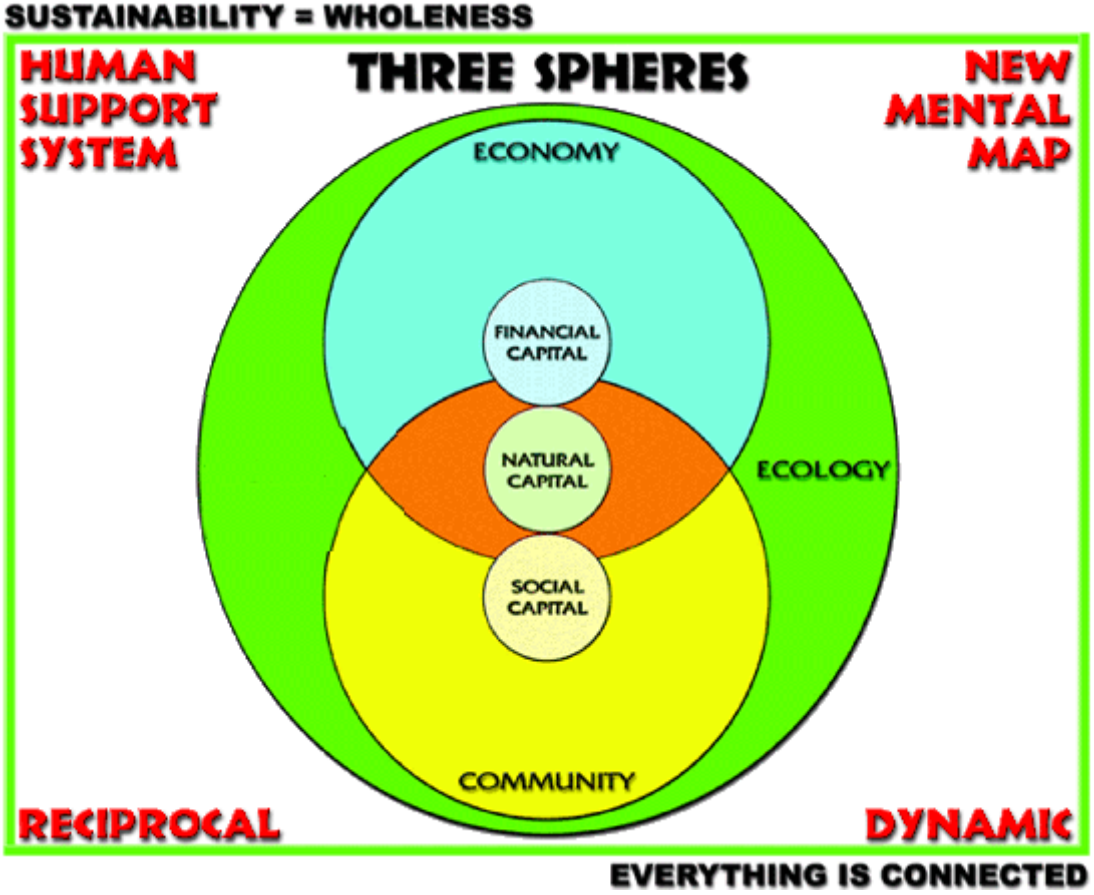
15. 3 aspects making whole "globe" (ProLogis (http://www.prologis.com/en/sustainability/default.aspx))

(http://www.prologis.com/en/images/3D_globe.gif)

16. Four Pillar (Jon Hawkes incorporates four interlinked dimensions: environmental responsibility, economic health, social equity, and cultural vitality >> (http://www.creativecity.ca/news/special-edition-4/models-sustainability.html))

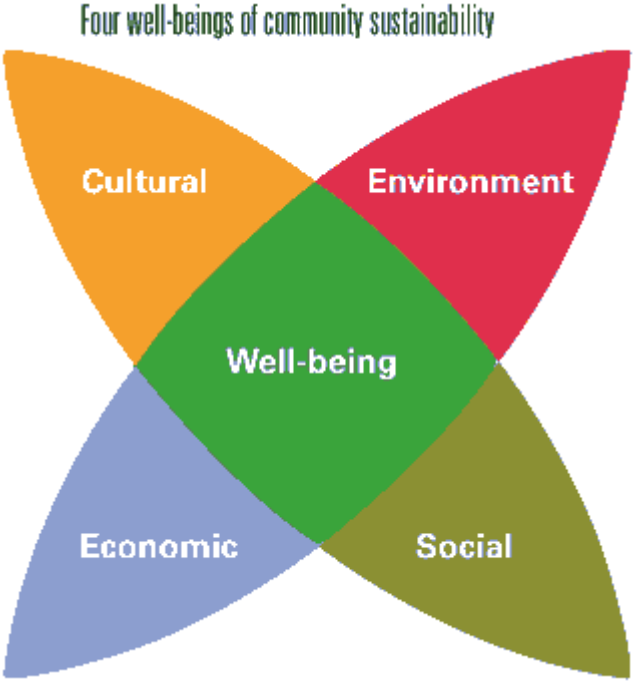
(http://www.creativecity.ca/news/special-edition-4/images/diagram-cultural-dimensions.gif)

17. Ken Stoke's mindmap (http://kauaian.net/blog/?p=1162) – Cross between 3 circles and concentric circles (animated)

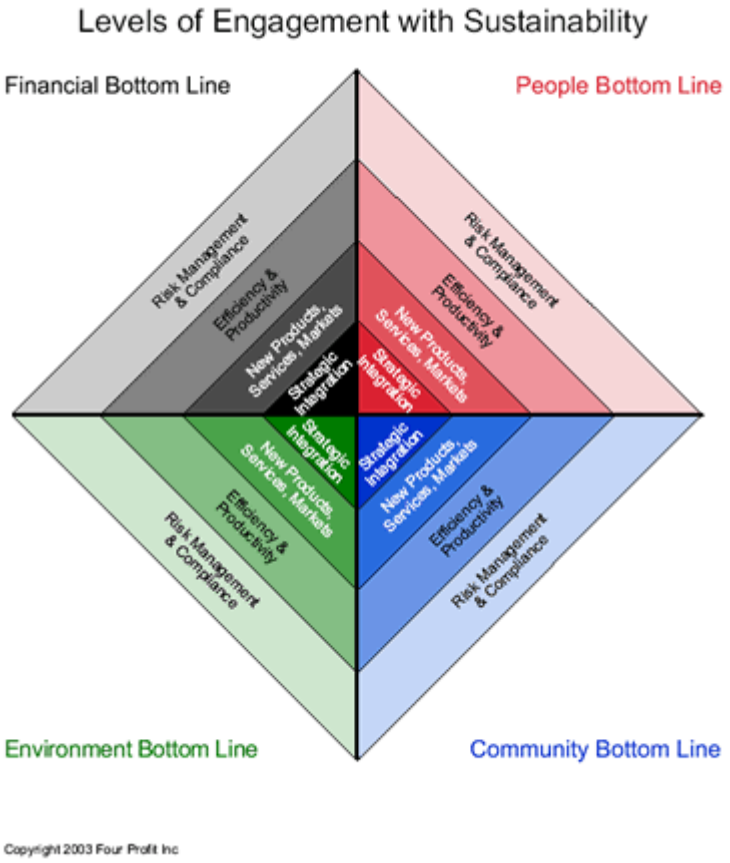


(http://kauaian.net/blog/wp-content/themes/default/images/sushi/3spheres.gif)

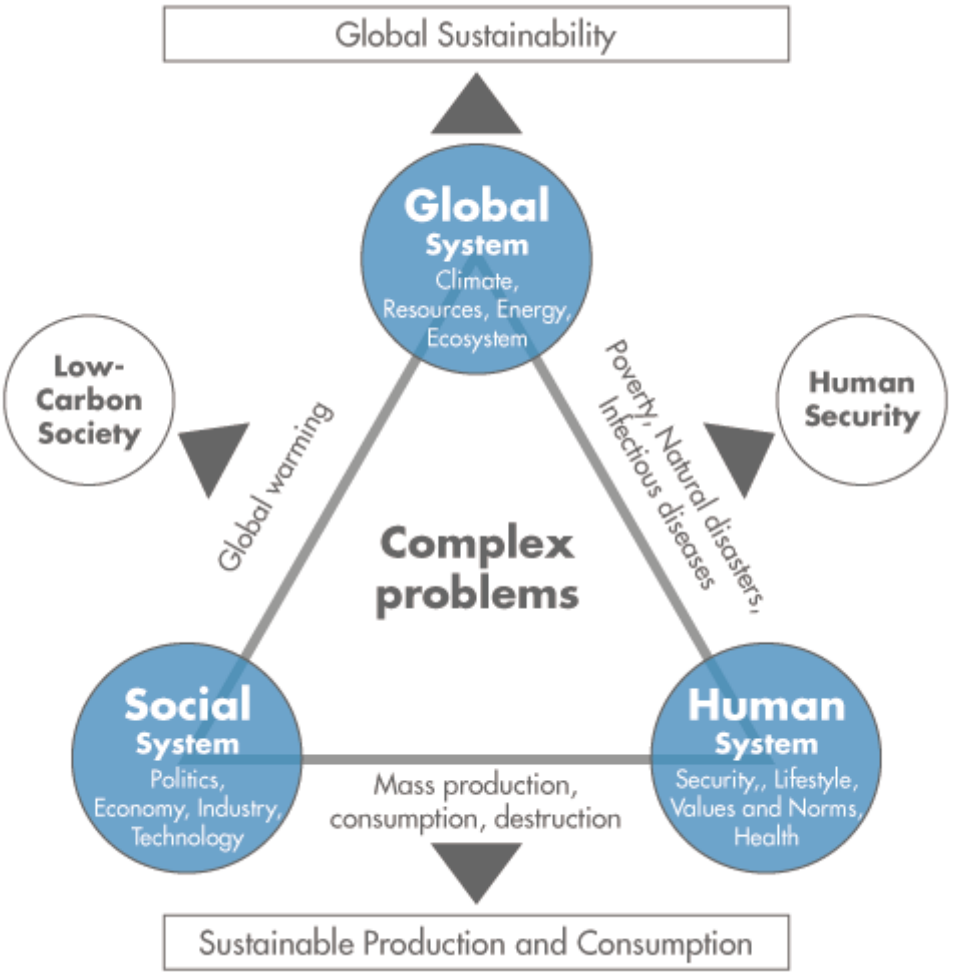
18. Four well beings. The different forms of well-being as interconnected. Overall well-being, which it places at the centre, is enhanced when all four areas are given equal weight, are interdependent, and are able to move efficiently around the centre (NZ Cutural Well-Being (http://www.culturalwellbeing.govt.nz/)).



19. Four factors integrated with level of engagement (Pegasus (http://www.pegasuscom.com/images/framework.gif))

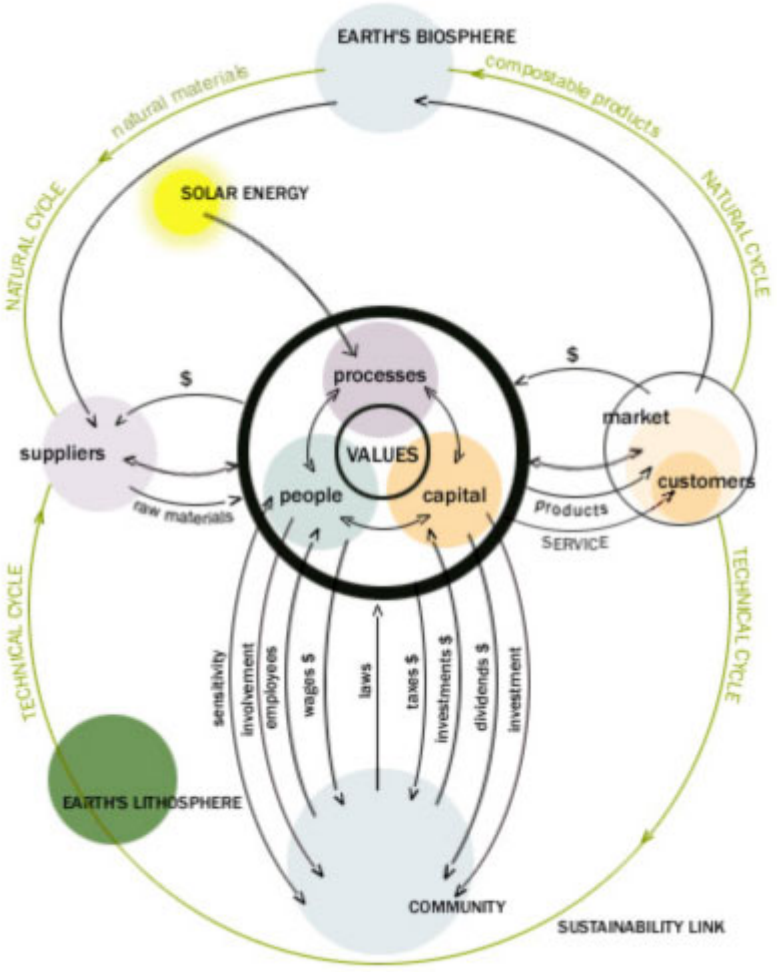


20. 3 circles in system (IR3S) (http://www.ir3s.u-tokyo.ac.jp/en/outline/howto_sus.html)



(http://www.ir3s.u-tokyo.ac.jp/en/outline/img/howto.gif)

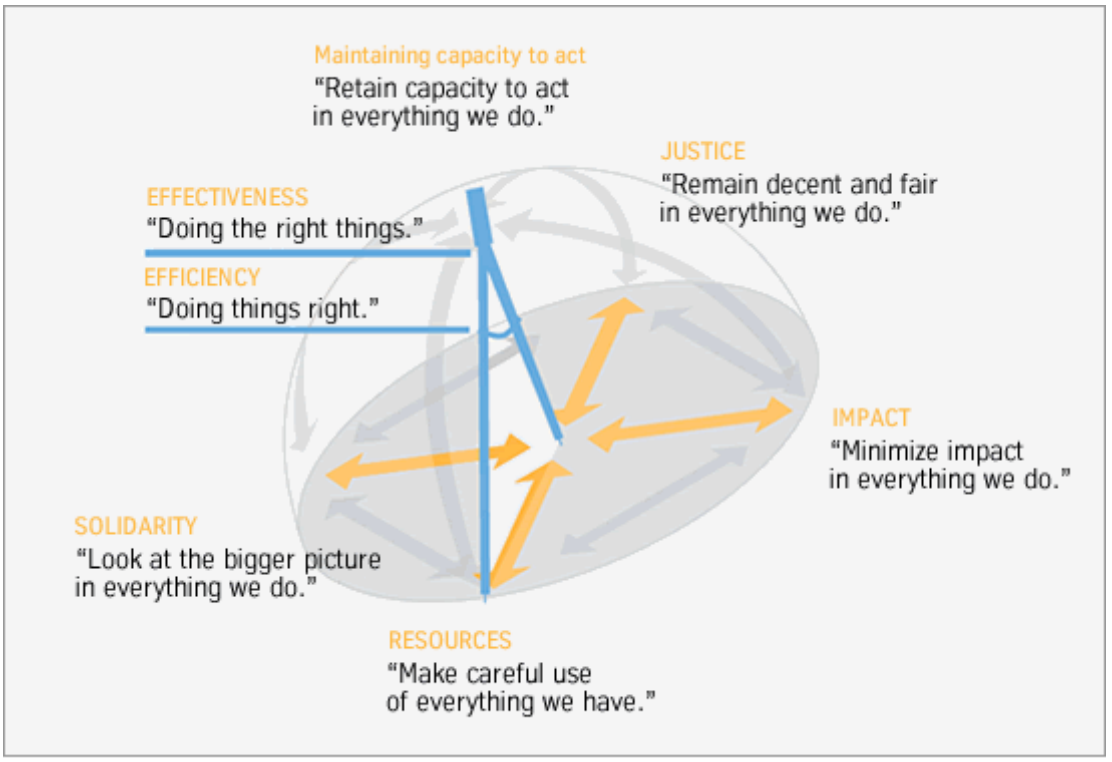
21. Business as a system (Interface (http://www.interfaceglobal.com/Sustainability/Our-Journey/Interface-Model.aspx)) Prototypical company of 21st Century (cf typical model of 20th (http://www.interfaceglobal.com/getdoc/41c9a7c9-c89d-43c2-bb81-86fc5b079a8d/interface_sustainability_model_p1.aspx)), and the damaging links that need to be eliminated (http://www.interfaceglobal.com/getdoc/f2b6e1c1-ce4b-4fb0-a334-69fe695ef4e9/Eliminating-Damaging-Linkages.aspx).



(http://www.interfaceglobal.com/getdoc/92b5b881-2a2e-4906-b305-0bac0609ad03/interface_sustainability_model_start.aspx)

22. 6 factor compass (ThyssenKrupp Steel (http://www.thyssenkrupp-steel.com/nachhaltigkeitsbericht2004_2005/en/definition_nachhaltigkeit.jsp))

> *In this concept, effectiveness and efficiency are central to all decisions and actions. Effectiveness means offering our customers the products and services they need in the required quality and at competitive prices. To remain successful in the market long term, we must achieve this through excellent productivity with an optimal balance of expense and income. Efficiency is represented symbolically as the opening angle of the equal-sided compass. The opening angle and the length of the legs determine the area circumscribed by the compass. The larger this area, the greater the latitude for a sustainable corporate policy. The degree of efficiency and effectiveness is the dominant factor.*

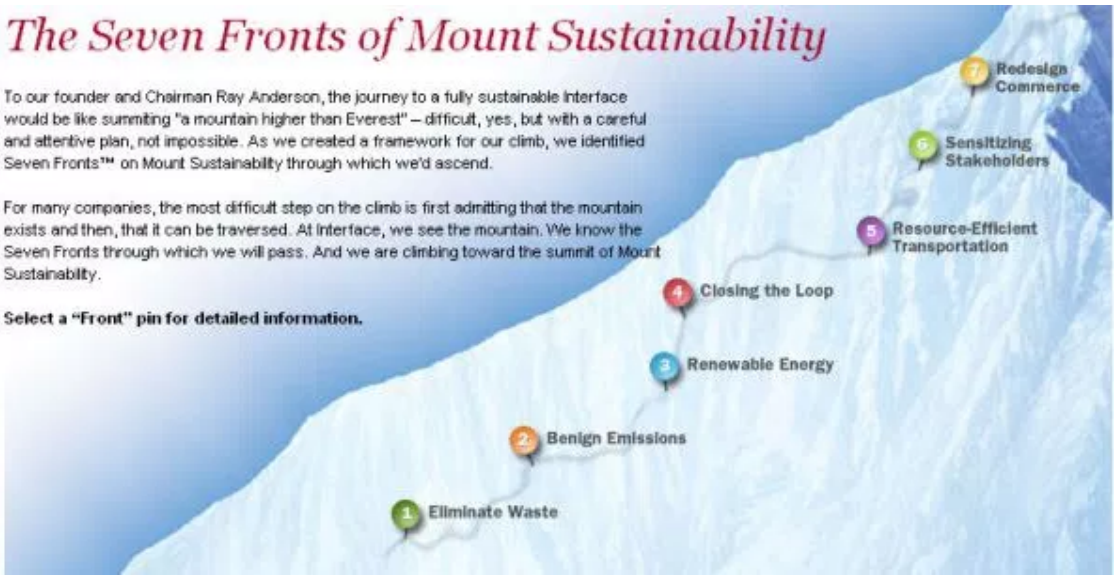


(http://www.thyssenkrupp-steel.com/nachhaltigkeitsbericht2004_2005/data/en/images/content/nachhaltigkeitszirkel.gif)

23. Pathway (Eatwelldogood (http://www.eatwelldogood.com/onthepath.html))

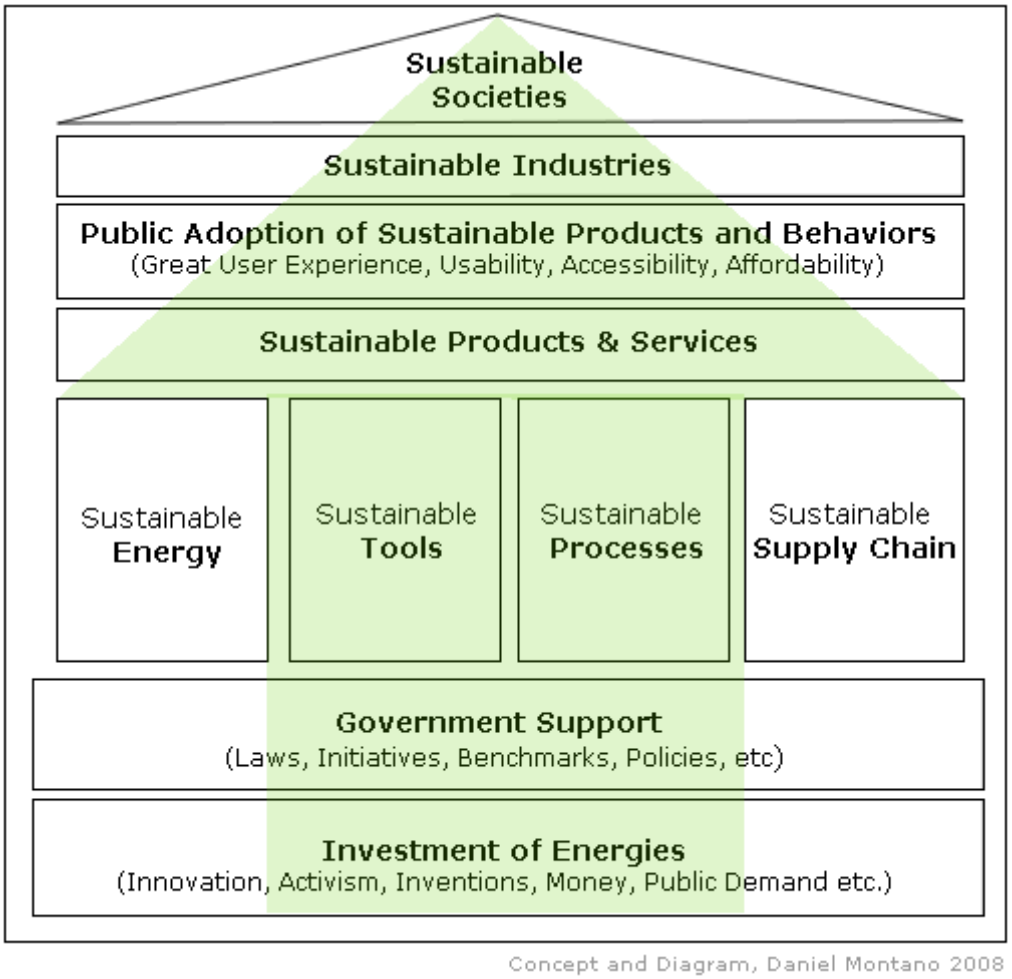
(http://www.eatwelldogood.com/images/sustainability_diagram5.jpg)

24. Anderson's (Interface) pathway: Seven fronts of Mount Sustainability (http://www.interfaceglobal.com/Sustainability/Our-Journey/7-Fronts-of-Sustainability.aspx)



(http://www.interfaceglobal.com/Sustainability/Our-Journey/7-Fronts-of-Sustainability.aspx)

25. Societies Diagram from Daniel Montano (http://multispective.wordpress.com/2008/03/07/sustainable-societies-diagram/)



26. 3 aspects with 3 dimensions and at different scales (Green Innovations (http://www.green-innovations.asn.au/sustblty.htm))

Ecological	Social	Economic	
Survival sustainability			Global ↕ Local
Protection of life support systems **Prevention of species extinction**	**Capacity to solve serious problems**	**Subsistence**	
Maintaining quality of life			Global ↕ Local
Maintenance of decent environmental quality	**Maintenance of decent social quality (eg. vibrant community life)**	**Maintenance of decent standard of living**	
Improving quality of life			Global ↕ Local
Improving environmental quality	**Improving social quality**	**Improving standard of living**	

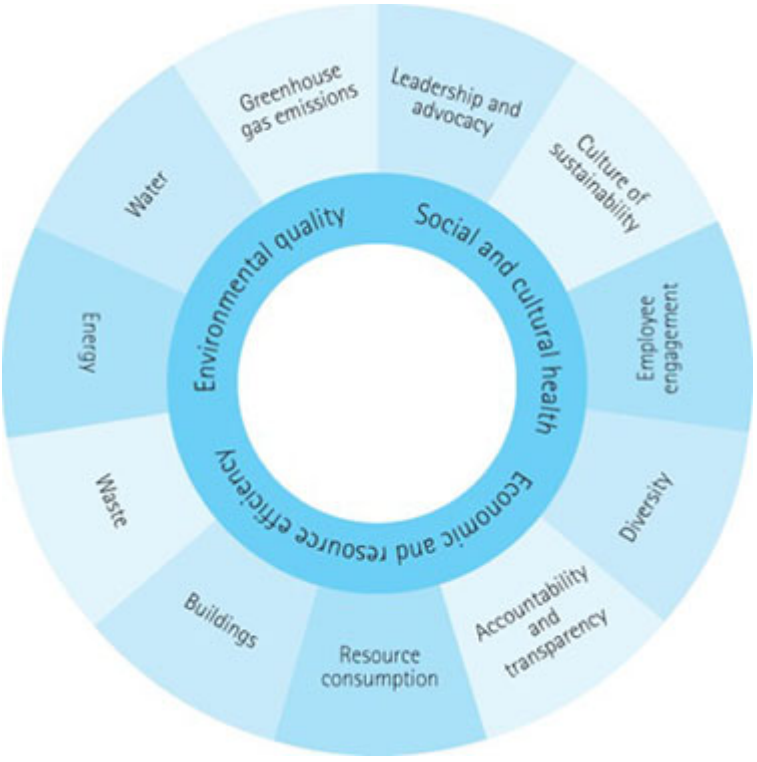
(http://www.green-innovations.asn.au/sustplus.gif)

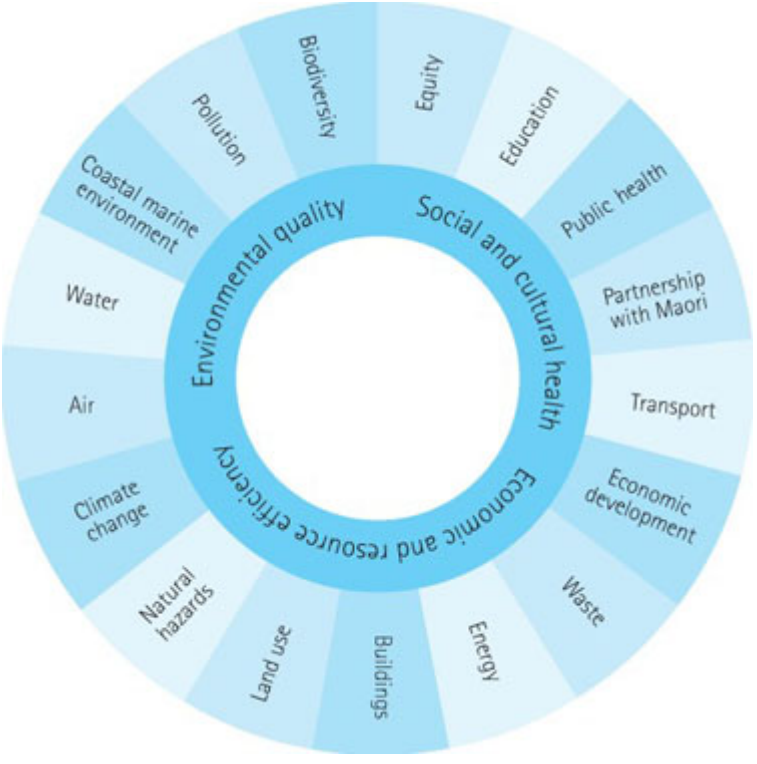
27. Scope (from UN via open-sustainability (http://open-sustainability.org/wiki/Sustainable_Development))

(http://open-sustainability.org/w/images/thumb/6/60/Sustainability_Scope.jpg/700px-Sustainability_Scope.jpg)

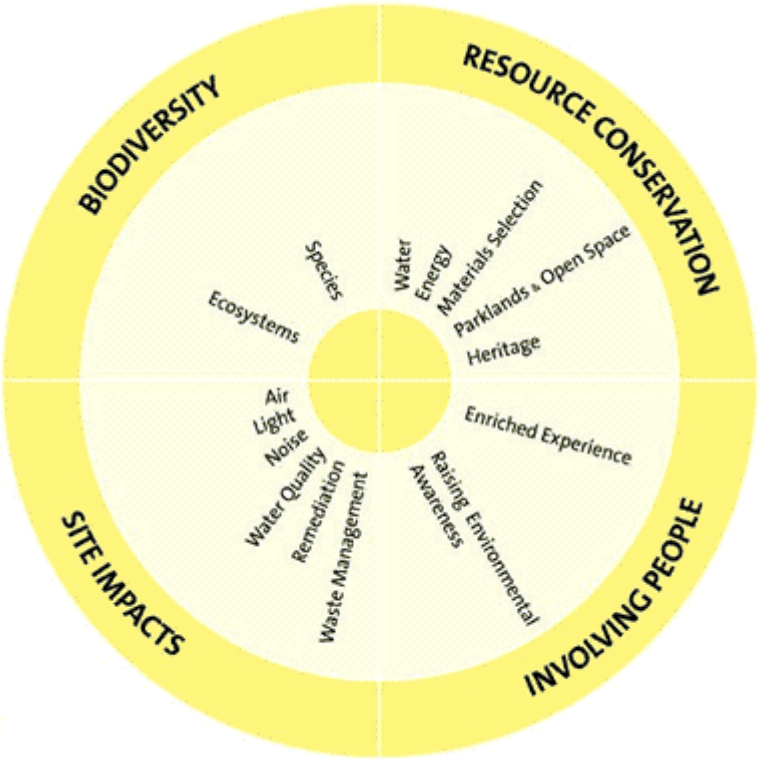
27. Organisational constructions (Auckland) (http://www.aucklandcity.govt.nz/council/documents/bright/themes.asp)

(http://www.aucklandcity.govt.nz/council/documents/bright/themes.asp) There are many aspects to be considered if Auckland is to become a truly sustainable city. The Local Government Act 2002 makes reference to the 'four well-beings': social, economic, environmental, and cultural, but we need to break these down to a larger number of distinct themes in order to define tangible and achievable goals and targets.



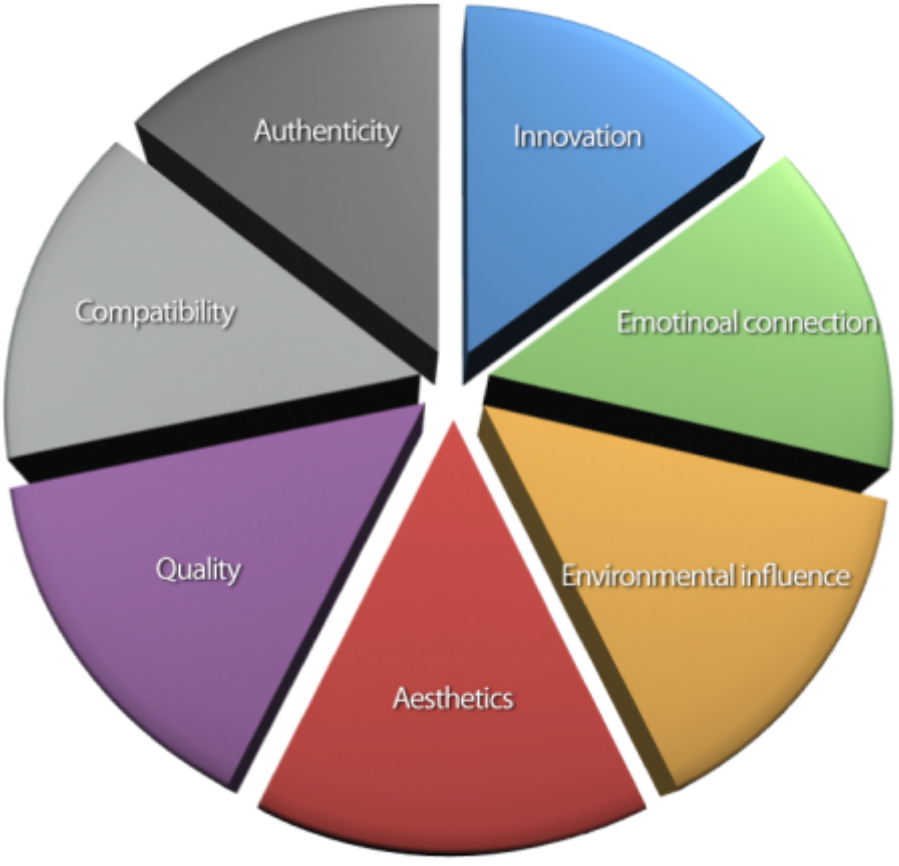


28. Organisational construction (Sydney Olympic Park) (http://www.sydneyolympicpark.com.au/corporate/sustainability/sustainability_strategy)



(http://www.sydneyolympicpark.com.au/corporate/sustainability/sustainability_strategy)

29. 7 spoke wheel (Carlson via Rosengren (http://blog.larsrosengren.com/2008/09/29/a-more-elaborate-perspective-on-sutainability/))

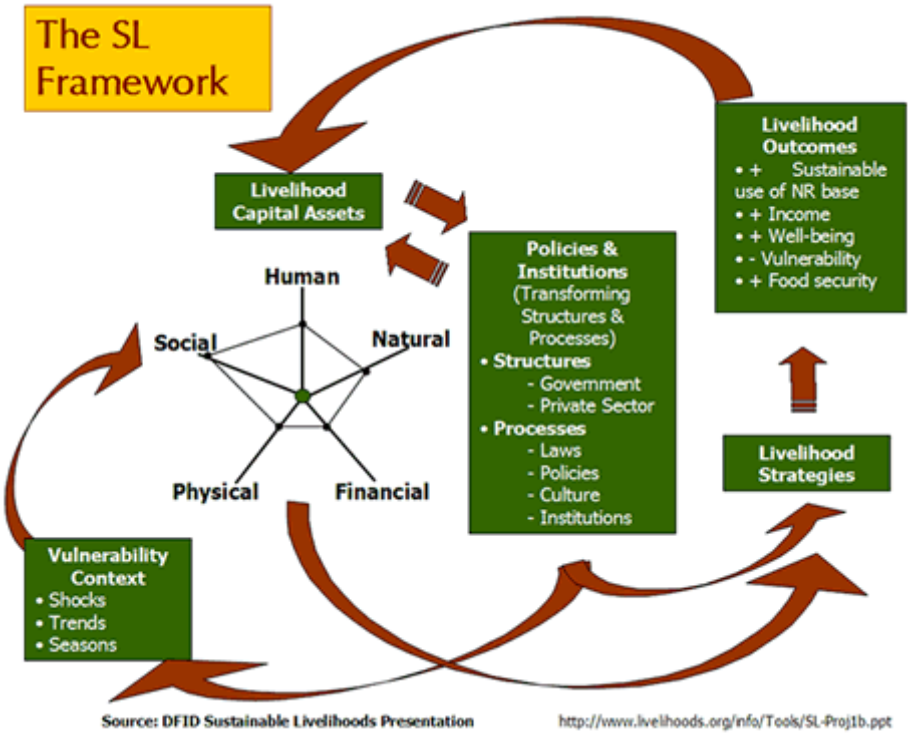


(http://larsrosengren.files.wordpress.com/2008/09/sustainability-wheel.png?w=480&h=433)

30. Sustainable Communities Wheel (Egan review (http://www.communities.gov.uk/publications/communities/eganreview), via Active Citizenship Toolkit (http://citizenship.ascskills.org.uk/sustain.php)).

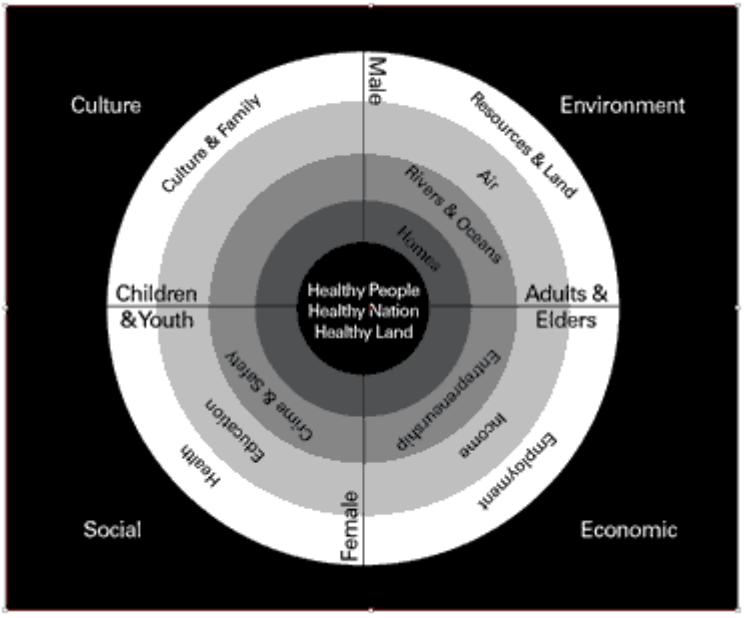
(http://citizenship.ascskills.org.uk/resources/text_wheel_550px.jpg)

31. People centred sustainability concepts: Sustainable Livelihoods framework . (see use and explanation on Chronic Poverty (http://www.chronicpoverty.org/toolbox/Livelihoods.php) and another example on Practical Action (http://practicalactionpublishing.org/?id=disaster_approaches_livelihoods))



(http://www.chronicpoverty.org/toolbox/Livelihoods.php)

32. Medicine wheel (this from Cardinal and Adin via Creative City Network Canada (http://www.creativecity.ca/news/special-edition-4/models-sustainability.html), lots of others- used by PennState Solar decathlon team (http://solar.psu.edu/2007/almanac_medicine_wheel.aspx?lang=en))

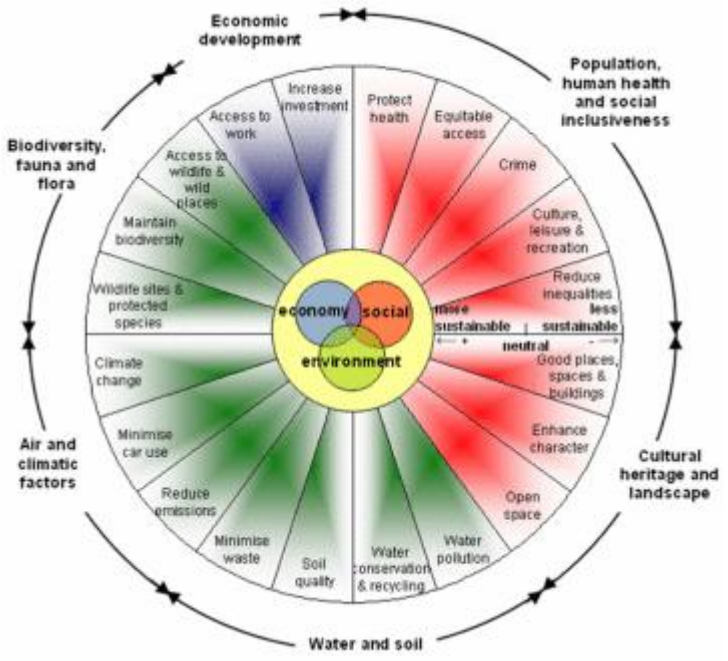


33. Wheel from 350 (http://www.share350.com/tag/community/) "every citizen should be a sustainability steward" (source not cited)

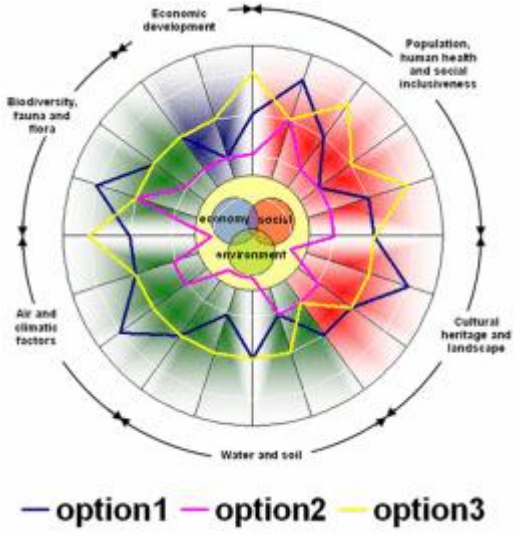
(http://www.share350.com/wp-content/uploads/2008/04/sustainability-wheel-300x273.jpg)

34. Stockport's Sustainability Wheel (http://s1.stockport.gov.uk/council/corestrategy/chapter_391.html)

During the sustainability appraisal process each individual proposed policy will be assessed against each of the twenty sustainability objectives. Commentaries are the most important outcome of the appraisal process. The purpose of the Sustainability Appraisal is to assist the Council in its selection of a preferred option by highlighting the sustainability implications of all development plan options



(http://s1.stockport.gov.uk/council/corestrategy/images/460.jpg)



(http://s1.stockport.gov.uk/council/corestrategy/images/461.jpg)

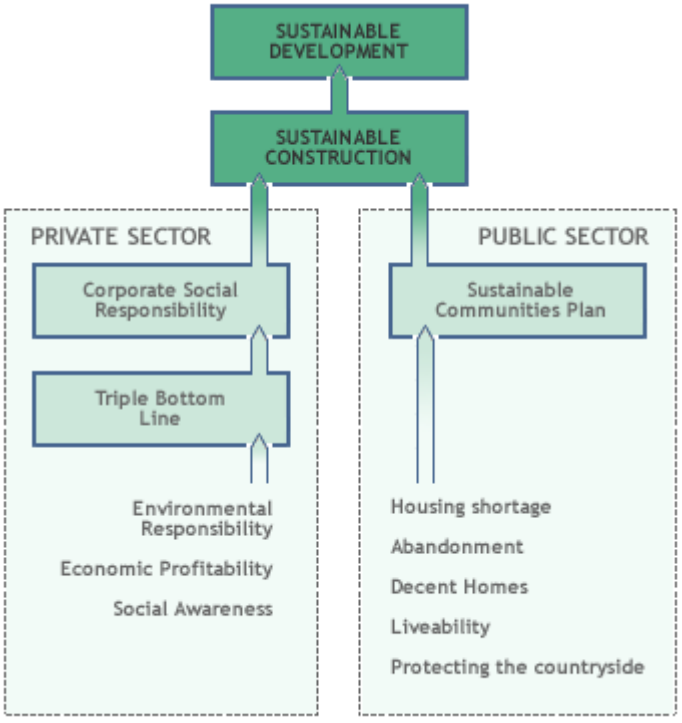
35. Building sustainability via a wheel with a pie graph (Packard)
(http://www.packard.org/assets/files/about_the_foundation/343%20second%20street/PF_Sustainability_W

(http://www.packard.org/assets/files/about_the_foundation/343%20second%20street/PF_Sustainability_W

36. Samsung's wheel is somehow separated inside (3 aspects) and outside (Samsung (http://www.samsung.com/hk_en/aboutsamsung/citizenship/oursustainabilityreports.html))

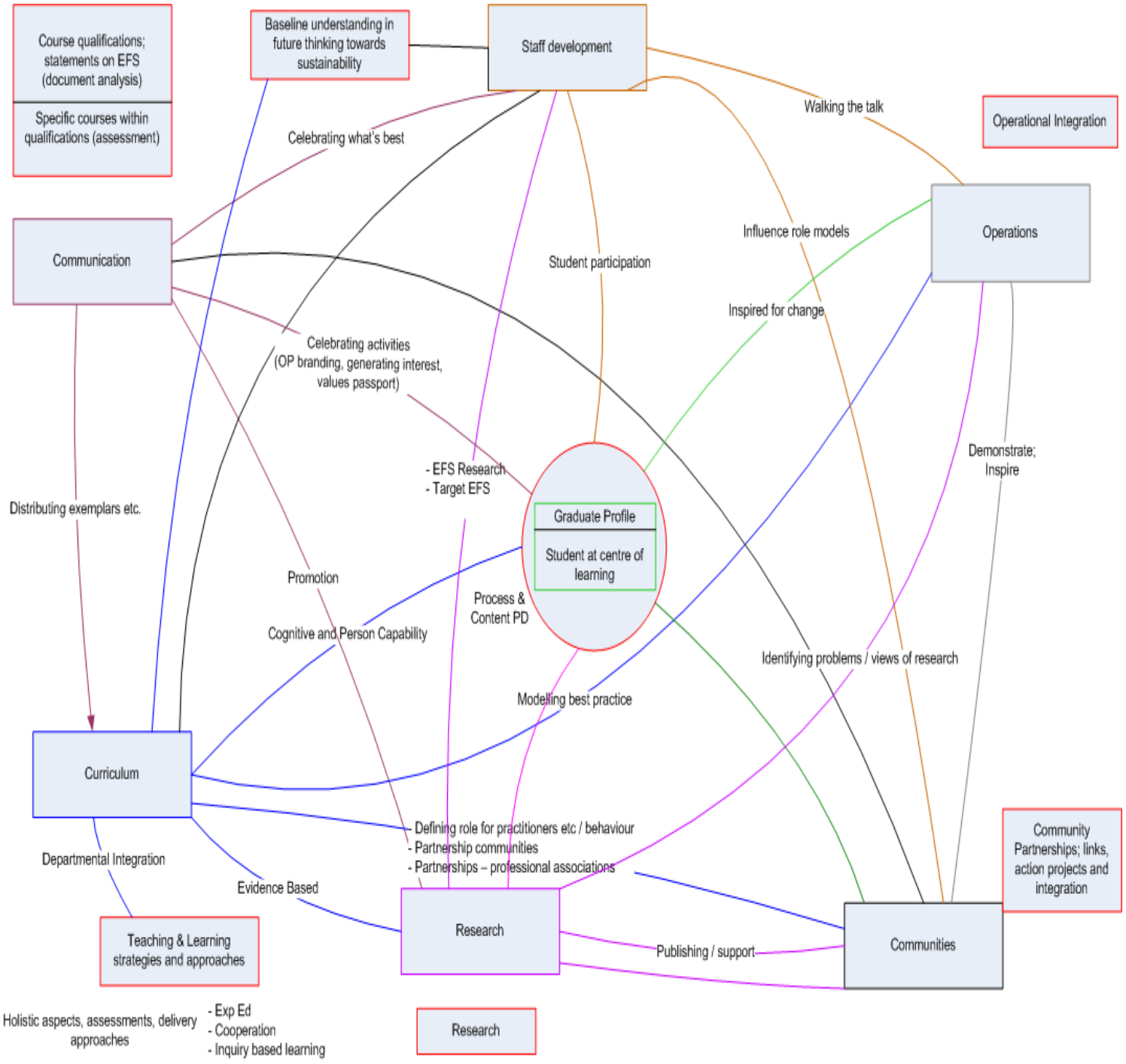
(http://www.samsung.com/hk_en/images/aboutnew/citizenship/report_img01.gif)

37. Responsibilities of different parts of a sector (Wrap – construction (http://www.aggregain.org.uk/sustainability/sustainability_in_construction/index.html)) – why isn't "decent housing" a role for the private sector?

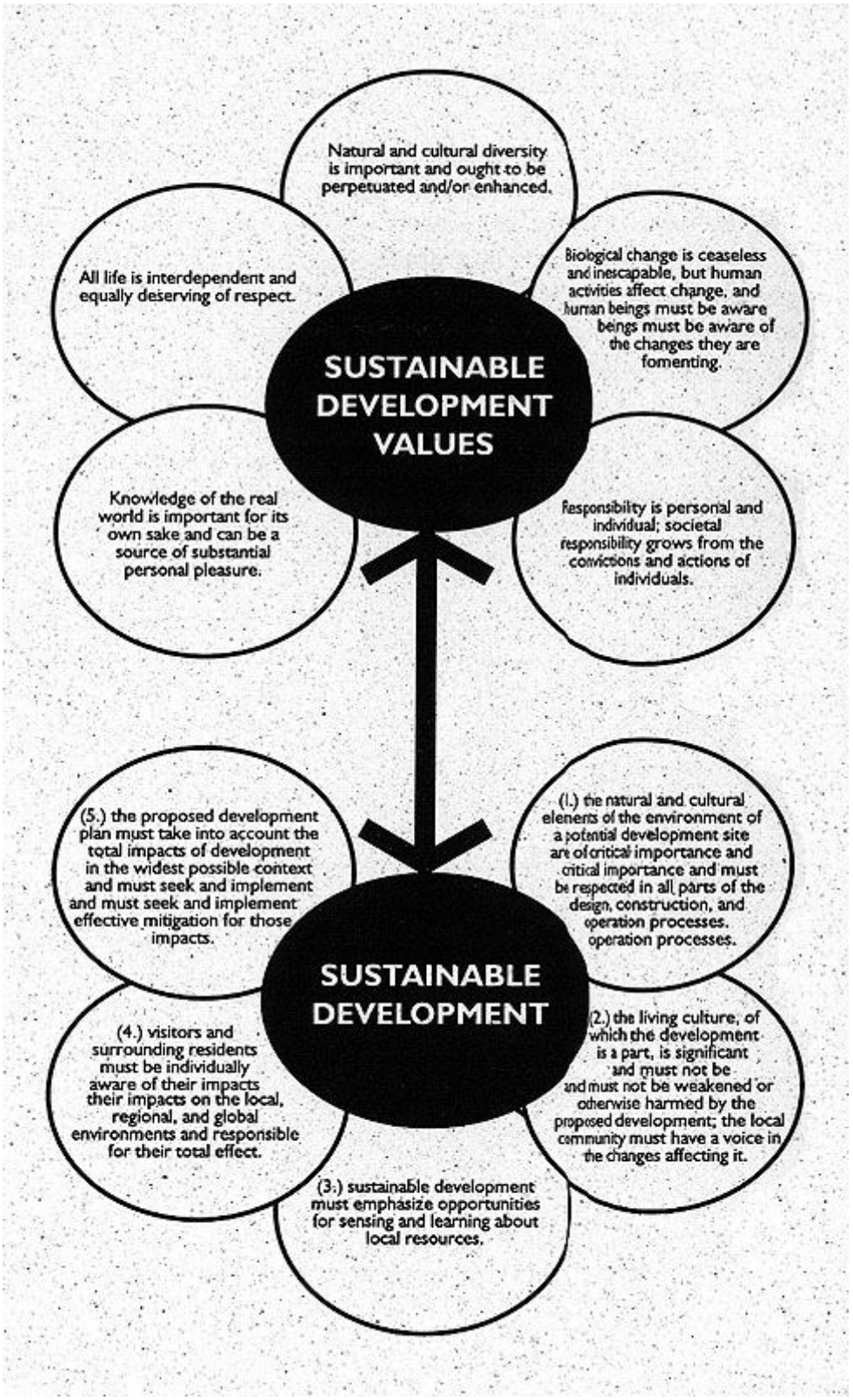


(http://www.aggregain.org.uk/images/hi_res/2008_sustainability_flow11.gif)

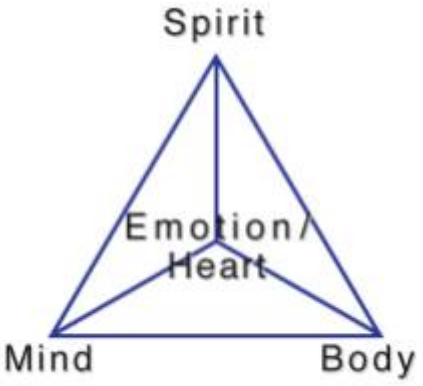
38. Web of workstreams (Otago Polytechnic (https://computingforsustainability.files.wordpress.com/2007/12/sustainability_webdiagram.png))



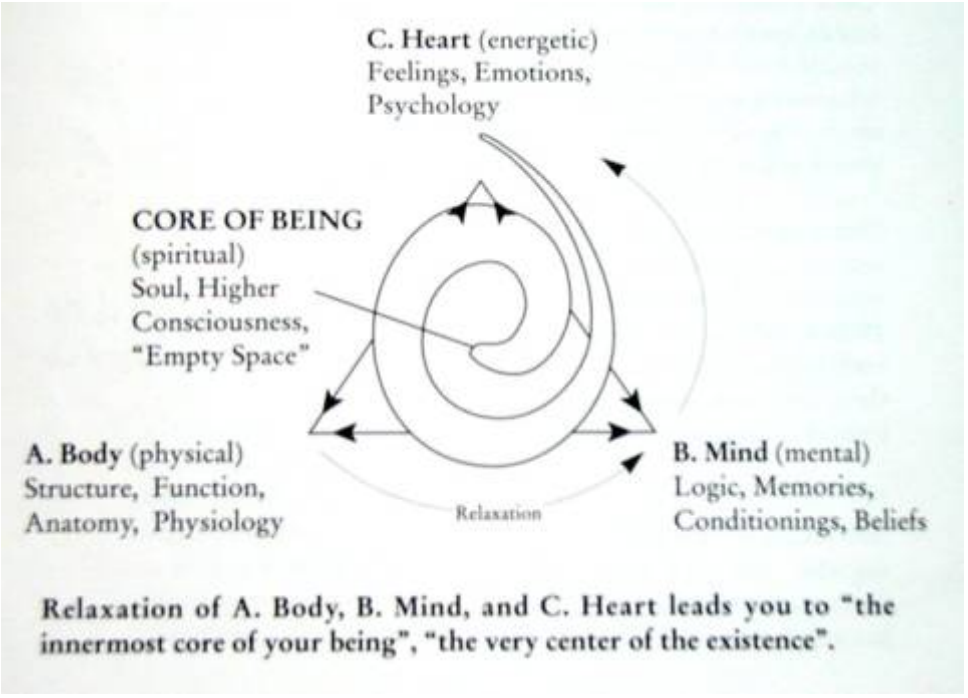
39. US Parks Service Guiding Principle of Sustainable Design (http://www.nps.gov/dsc/dsgncnstr/gpsd/toc.html) (Leslie Starr Hart 1994)



40. Seed logo (Geometry of the SeedLogos (http://www.sustainability.org/sustainability/THEORY_DOCS/s-g_of_s-c.htm))



41. Seed logo integrated with balancing bodywork (Structural integration) (Geometry of the SeedLogos (http://www.sustainability.org/sustainability/THEORY_DOCS/s-g_of_s-c.htm))

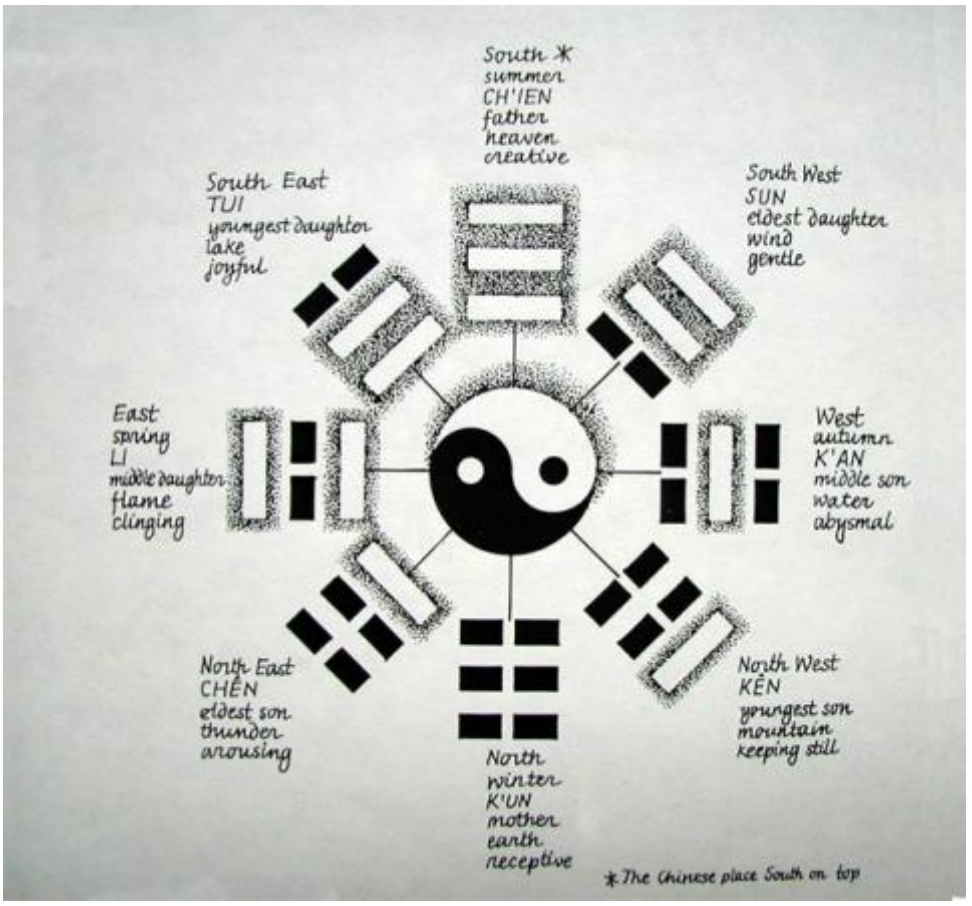


42. Primary cross (Geometry of the SeedLogos (http://www.sustainability.org/sustainability/THEORY_DOCS/s-g_of_s-c.htm))

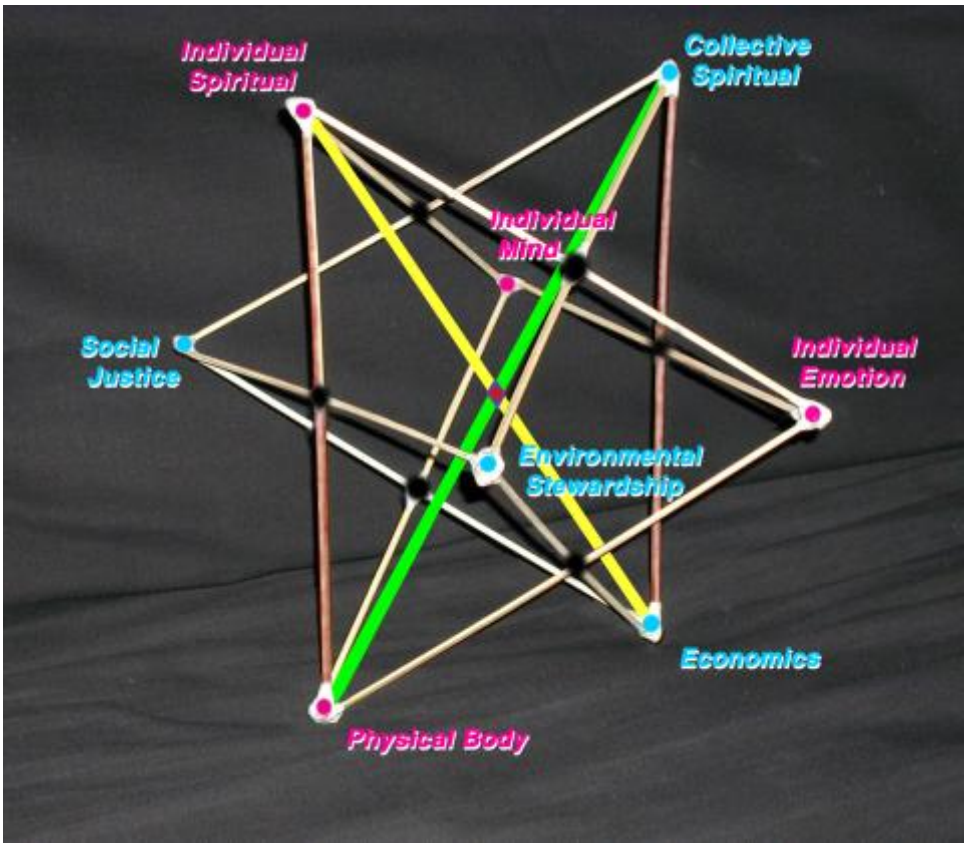
Sky / Spiritual Earth / Material

Mind / Yang / Masculine Heart / Yin / Feminine

42. which gives… (Geometry of the SeedLogos (http://www.sustainability.org/sustainability/THEORY_DOCS/s-g_of_s-c.htm))

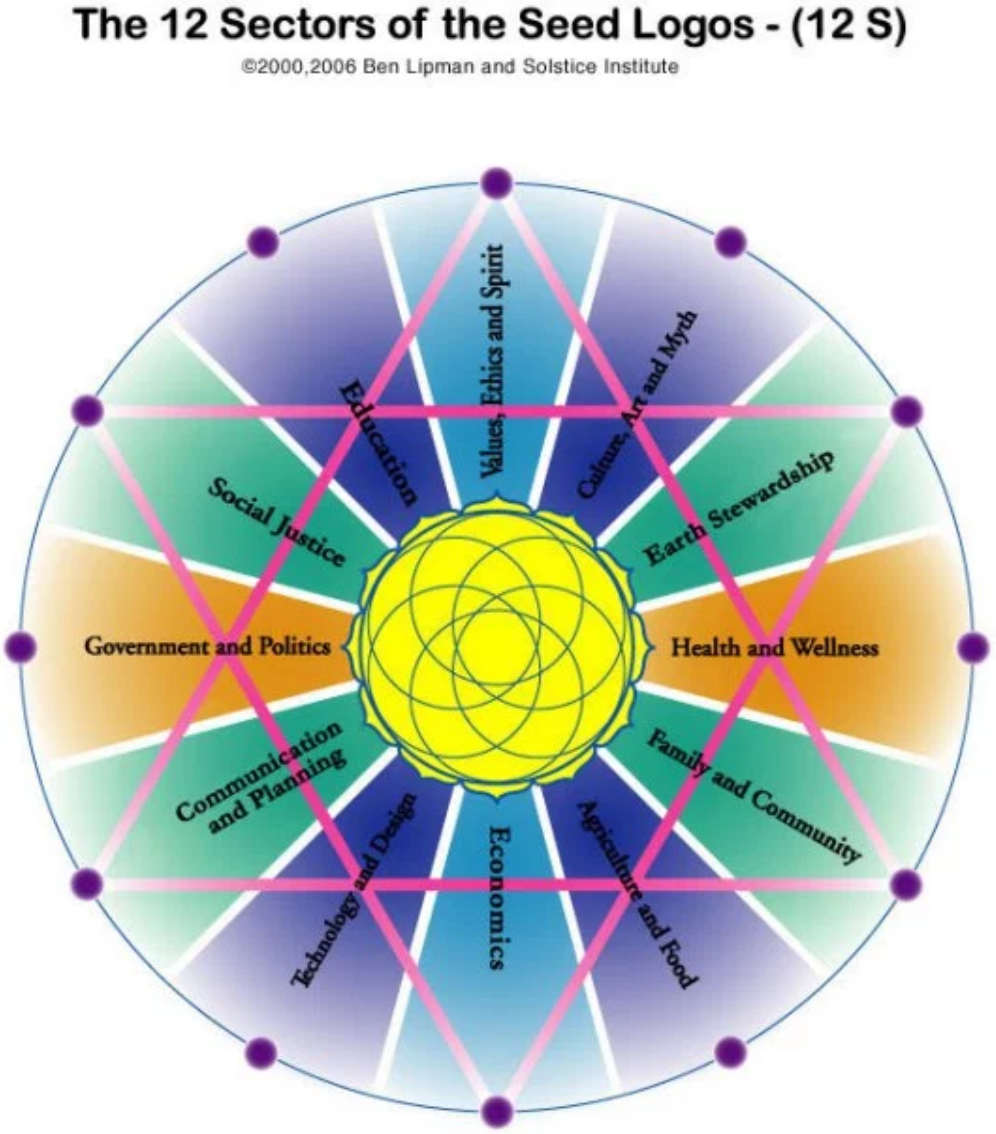


(http://www.sustainability.org/sustainability/THEORY_DOCS/s-g_of_s-c_files/image034.jpg)**43. Star Tetrahedron** (Geometry of the SeedLogos (http://www.sustainability.org/sustainability/THEORY_DOCS/s-g_of_s-c.htm))



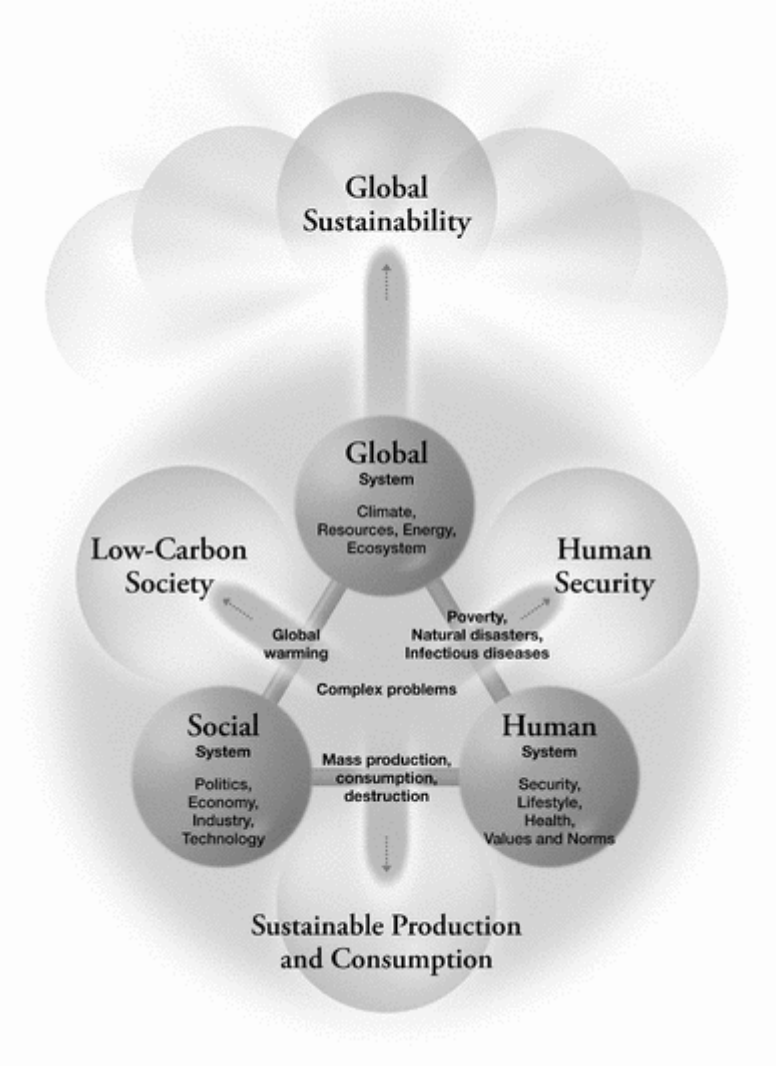
(http://www.sustainability.org/sustainability/THEORY_DOCS/s-g_of_s-c_files/image038.jpg)

44. 12 Sector Seed Logo (Lipman (http://www.sustainability.org/))



(http://www.sustainability.org/sustainability/12S-items/sdlogos-12S.jpg)

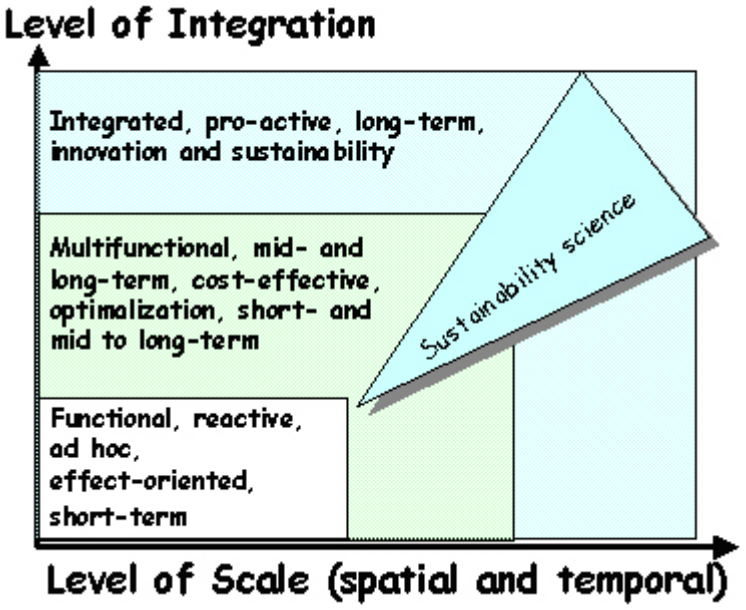
45. Integrated systems Dan Black (http://politicaligor.wordpress.com/2007/06/15/understanding-environmental-urgency/)



(http://www.environcorp.com/services/article.php?t=SustainabilityServices&id=4197)

46. Scale – sustainability is a long term deal (Martens (http://ejournal.nbii.org/archives/vol2iss1/communityessay.martens.html))

> *"One of the options the policy-maker has—and this is not so far from the current situation—is to go for short-term goals and simple or cheap means of achieving them. In contrast to such an approach, a more pro-active, innovative standpoint can be adopted that pursues longer-term goals, taking into account developments on different levels of scale and in different sectors. Unquestionably, sustainable development demands the latter approach.*
>
> *To facilitate decision making, sustainability scientists must assist in the task of making concrete both problems and solutions on all relevant temporal and spatial scales. This means that sustainability at the systemic level must be assessed, bringing to bear the following procedural elements: analysis of deeper-lying structures of the system,projection into the future, and assessment of sustainable and unsustainable trends.Evaluation of the effects of sustainable policy and the design of possible solutions through sustainable strategies also belong here.*



(http://ejournal.nbii.org/archives/vol2iss1/0601-001.fig1.jpg)

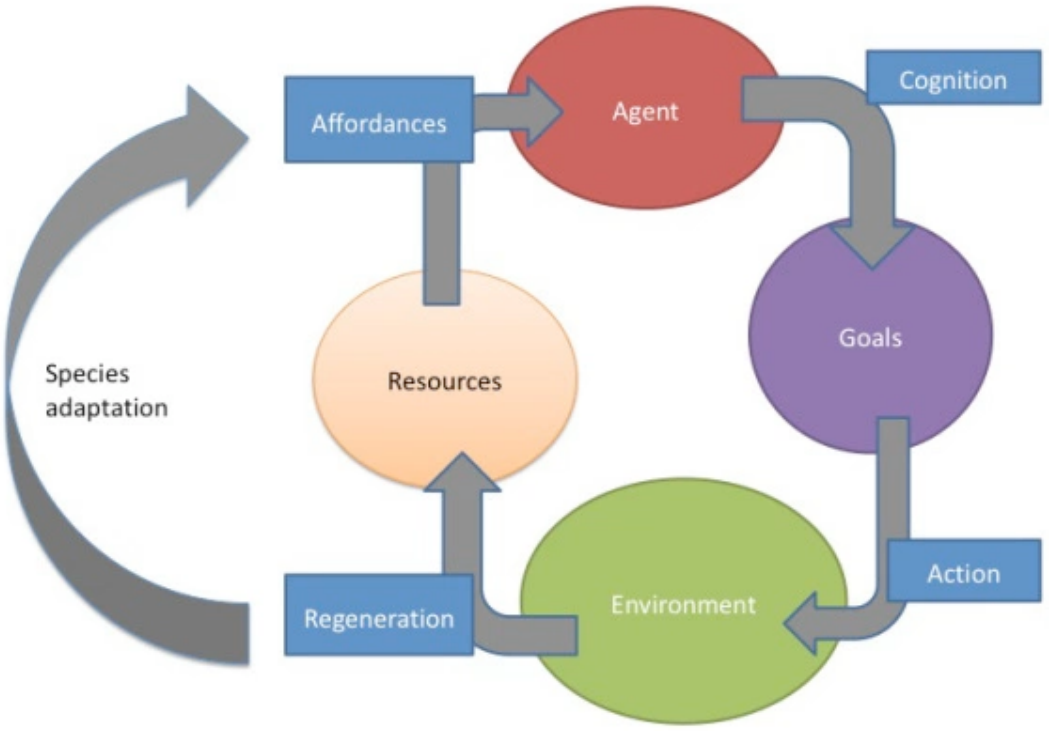
47. Business operations from Environ (http://www.environcorp.com/services/article.php?t=SustainabilityServices&id=4197)

(http://www.environcorp.com/img/practices/sustainability-large.jpg)

48. Aesthetically applied to seafood (found here (http://naturalpatriot.org/wp-content/uploads/2007/02/sustainability.gif), by Ray Troll and Terry Pyles for NOAA Fisheries (http://www.nmfs.noaa.gov/speciesid/Sustainability.html))

49. Systems and timescales (Eucognition (http://www.eucognition.org/wiki/index.php?title=Sustainability_and_autonomy,_a_shared_framework))

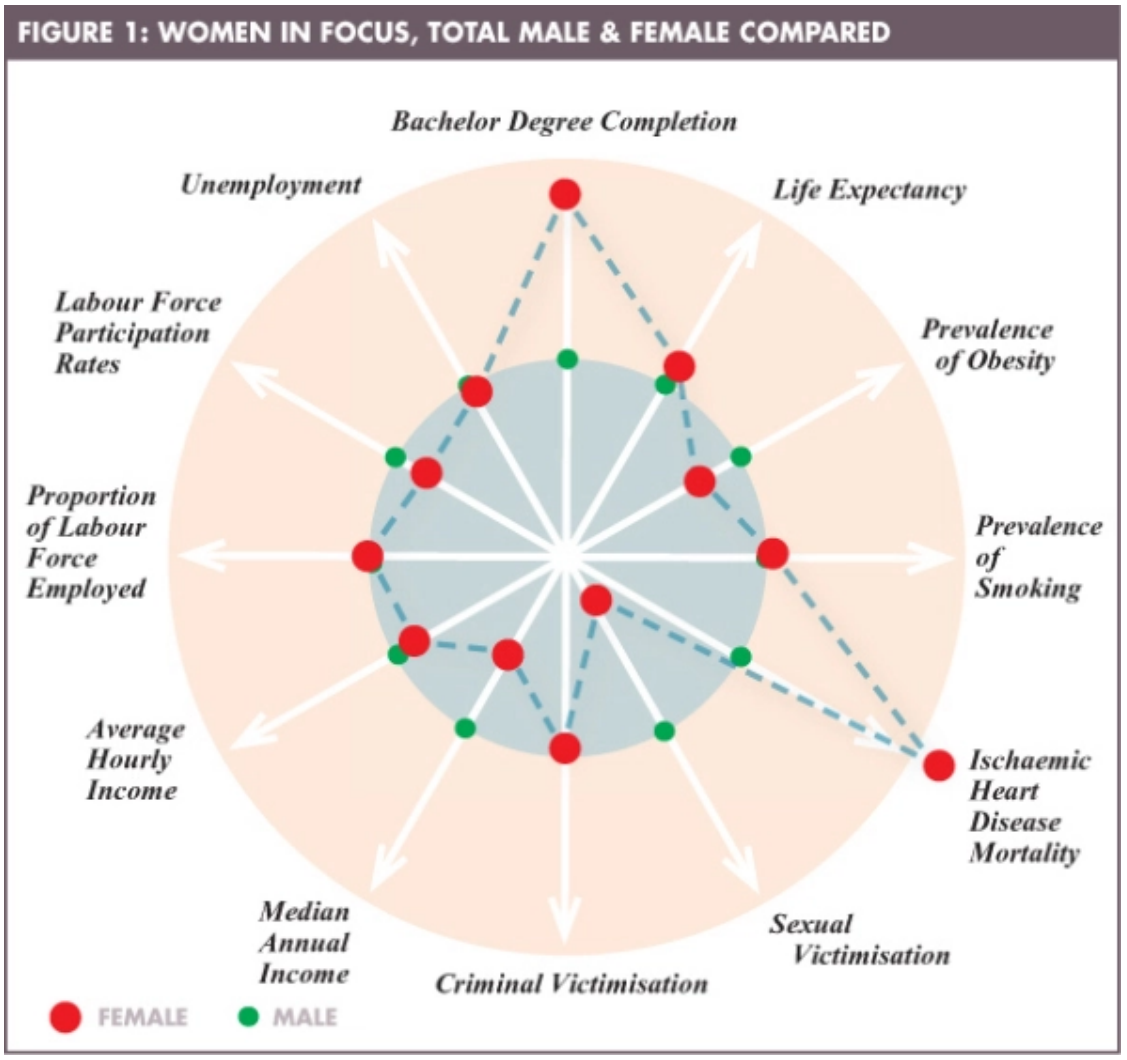
> *"show the different time-scales that relate to the goal-oriented and autonomous agency of a system, and the life cycle of its adaptation to the environment"… "Sustainability is guaranteed by an evolutionary process that underlies the actual behaviour of natural systems, and which is analysed at a different time-scale. It is for this reason that the sustainability of human technological and social systems is not guaranteed by a close coupling with the environment. The analysis of life cycle becomes therefore an essential component to determine the adaptive value of human activity."*



(http://www.eucognition.org/wiki/images/4/48/Sustainability.jpg)

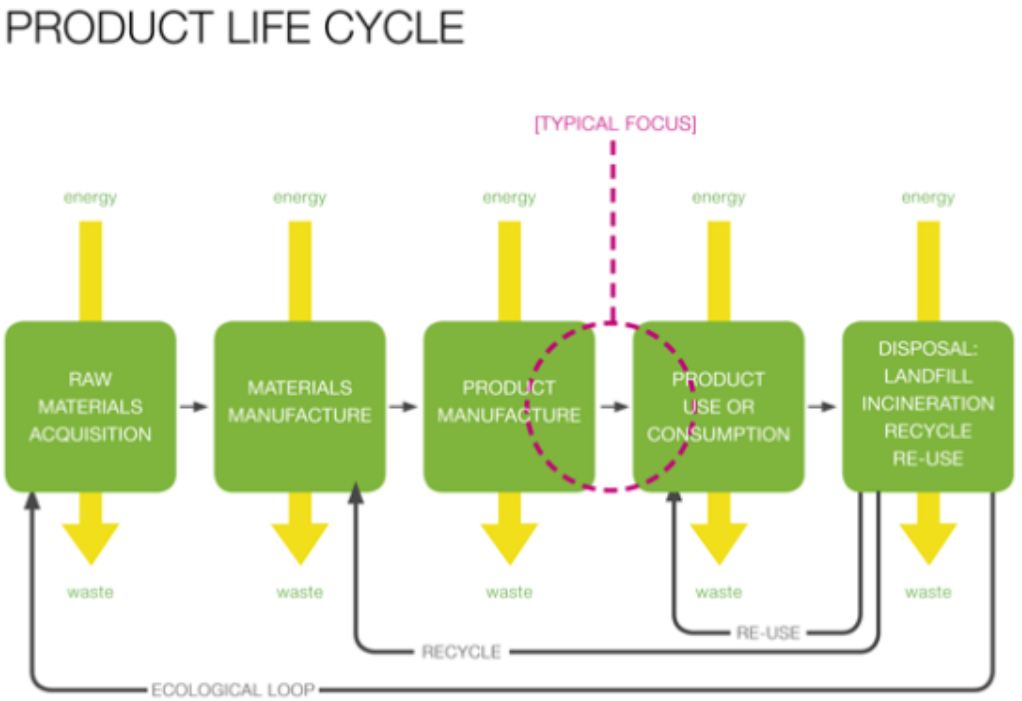
50. UK government: Securing the future – five key themes

51. Representation of issues with sustainable lens, NZ gender imbalances (http://www.mwa.govt.nz/news-and-pubs/publications/appendix1-background?set_language=mi&cl=mi)



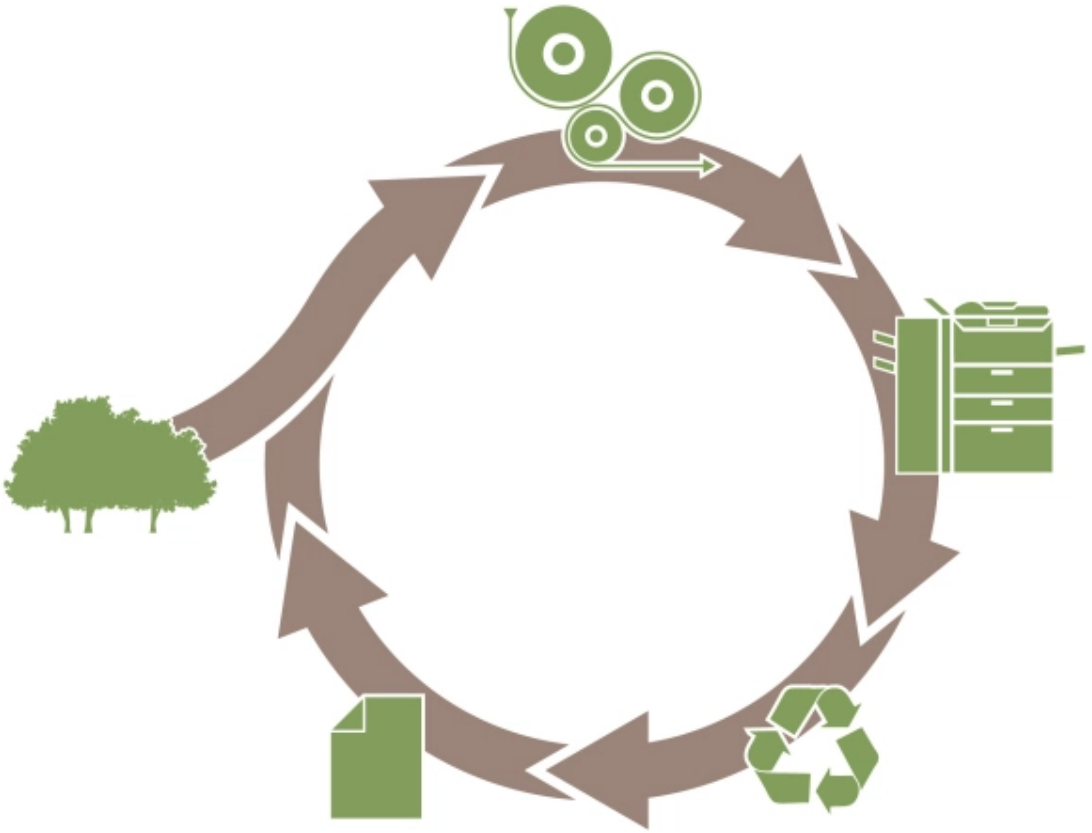
(http://www.mwa.govt.nz/news-and-pubs/publications/appendix1-background?set_language=mi&cl=mi)

52. IDEO's lifecycle



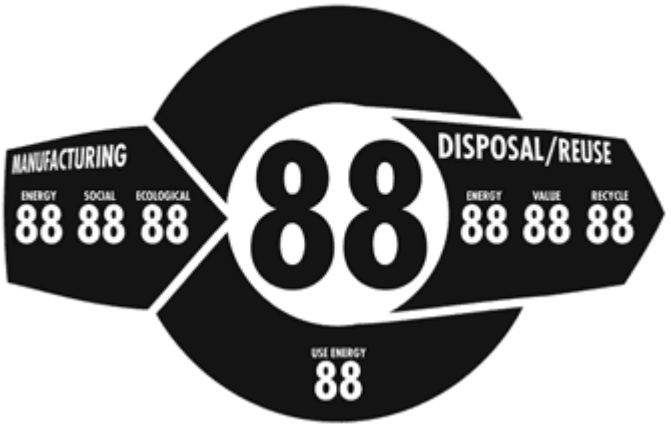
(http://intwo.ca/wp-content/images/IDEO_Product_Life_Cycle.png)

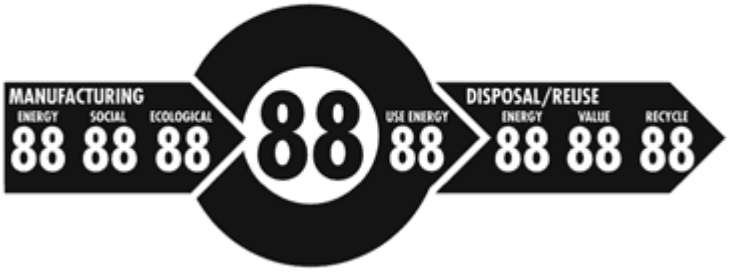
53. Paper cycle (from Boise (http://www.boiseinc.com/products/imaging/aspen/RecycledSummit.html)"culture of sustainability)



(http://www.boiseinc.com/products/imaging/aspen/RecycledSummit/mainContent/01/columnOne/00/tex

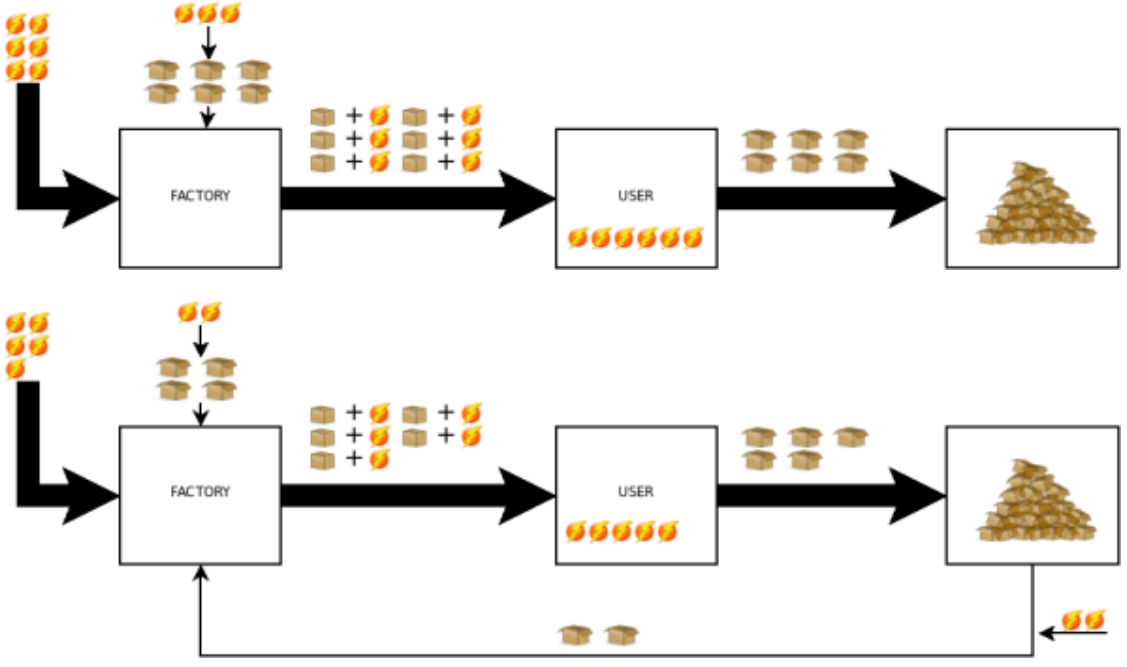
54. Product labelling (here because it represents a flow rather than checkboxes) (Nathan Shedroff (http://www.nathan.com/projects/2002/sustainability.html))

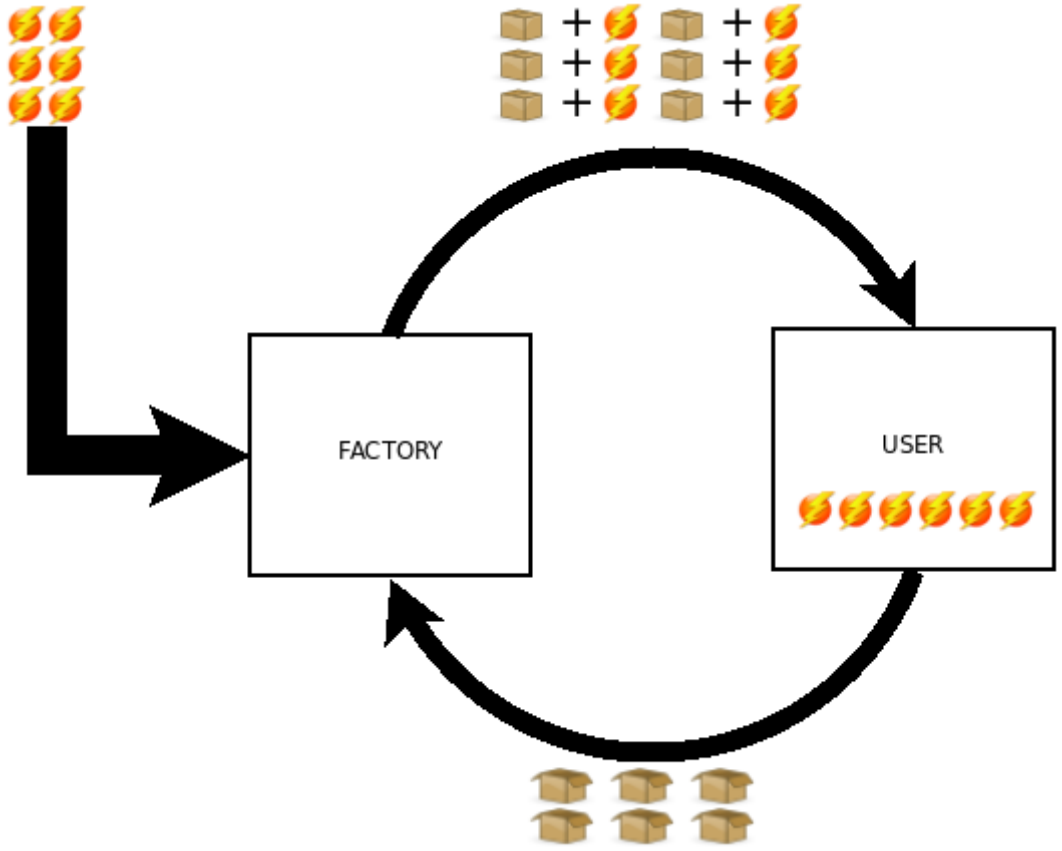




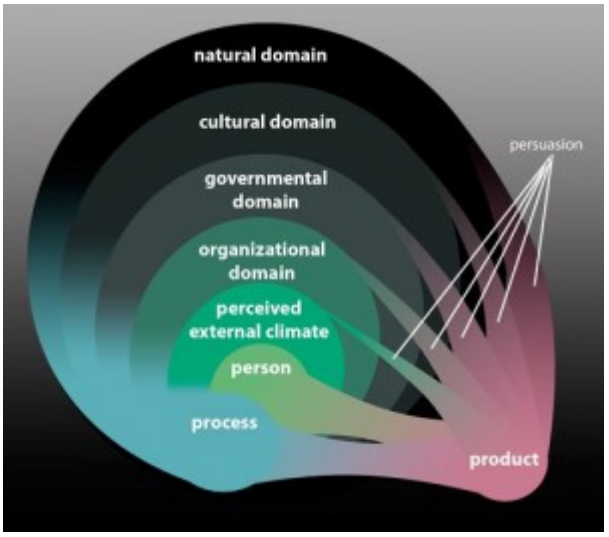
(http://www.nathan.com/projects/2002/images/sustain2s.gif)

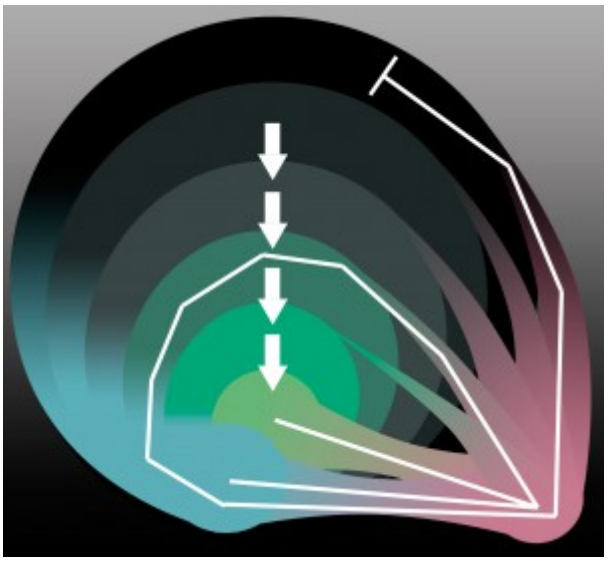
55. Product pathway comparison (http://en.technocracynet.eu/index.php?option=com_content&task=view&id=156&Itemid=137)(unsustainable, unsistainable with recycling, sustainable) from Tech



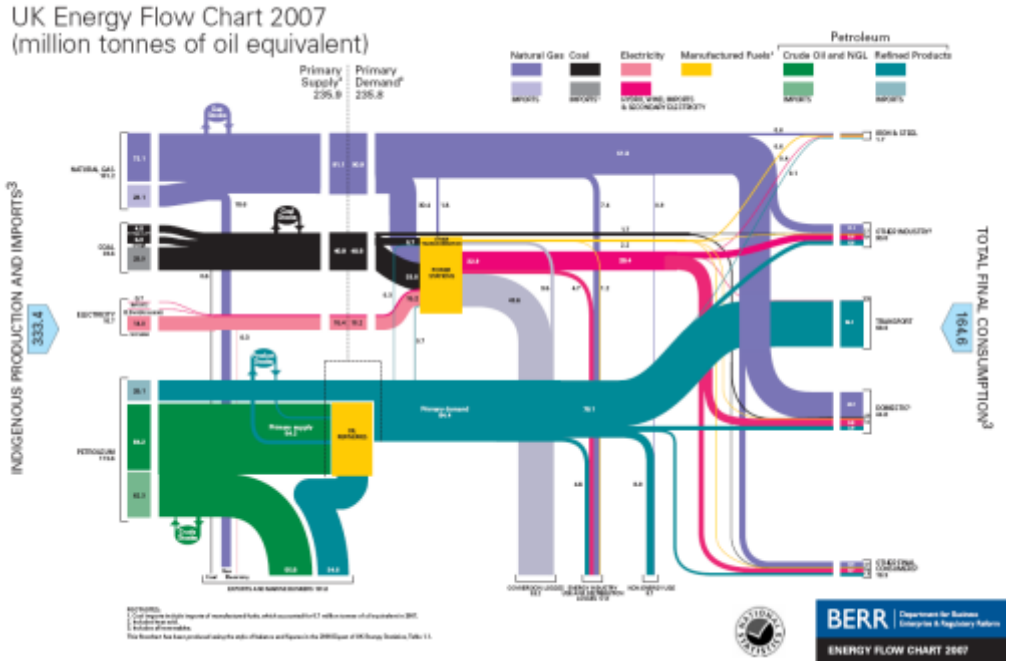


56. Social-ecological perspective for products, especially role of persuasion (Aaron "The value of sustainable development (http://aarongilbee.info/wordpress/?p=14)")

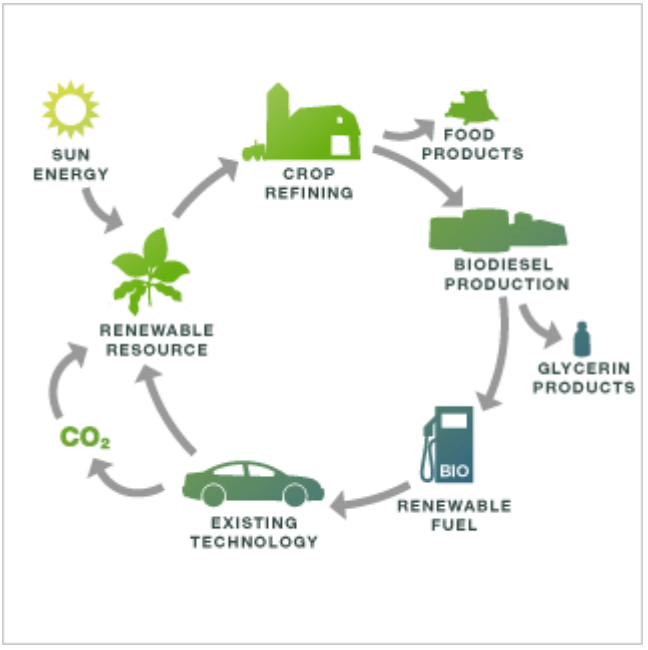




57. UK energy flow (http://europe.theoildrum.com/node/4488) (pdf (http://www.berr.gov.uk/files/file46984.pdf)) (many other Sankey diagrams (http://www.sankey-diagrams.com/))



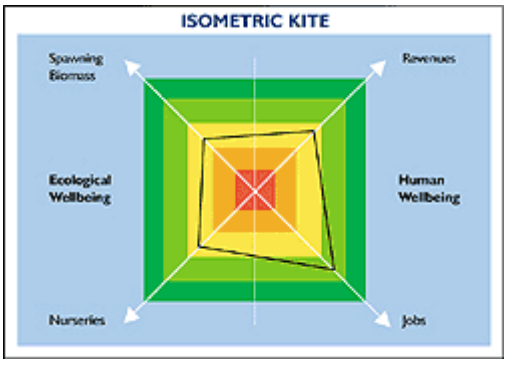
58. Monash fuel cycle (http://www.ewb.monashclubs.org/Biodiesel.html)



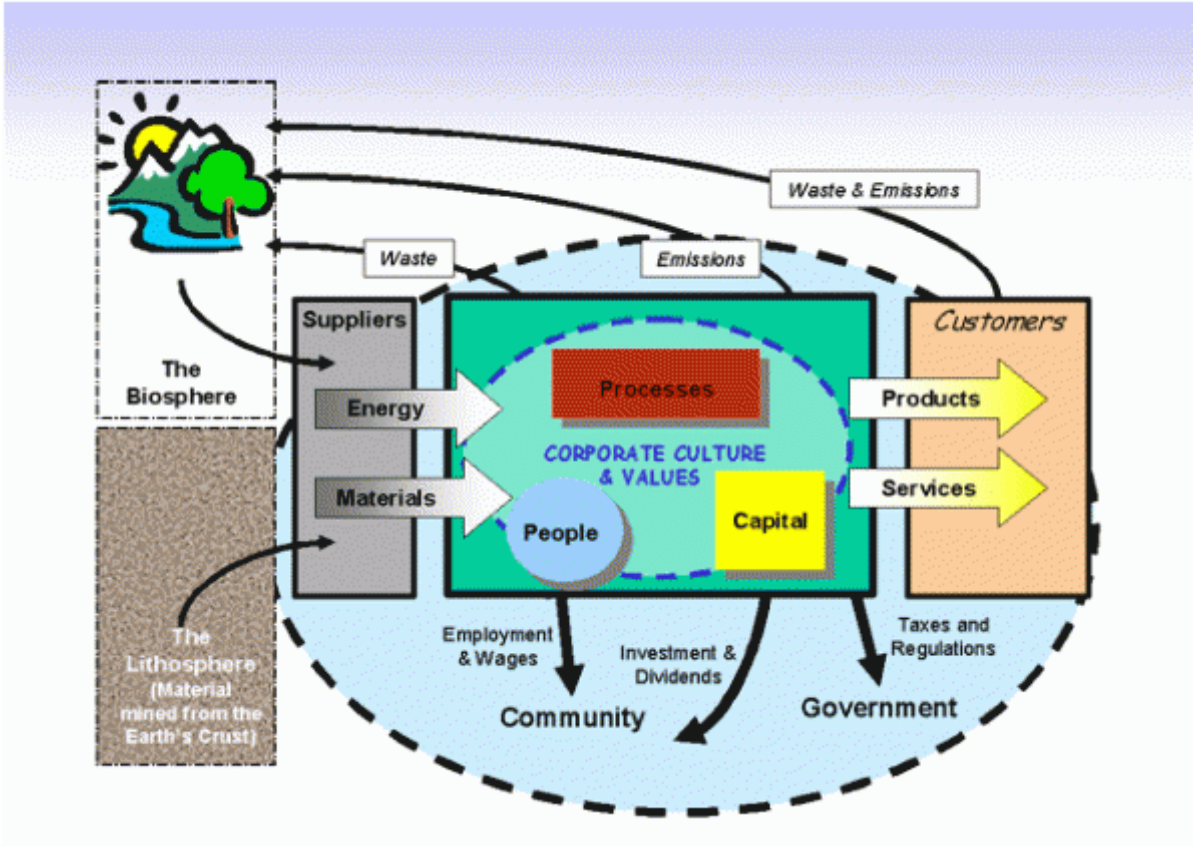
(http://www.ewb.monashclubs.org/Biodiesel.html)

59. Global Effects (Beechenhill Farm (http://www.beechenhill.co.uk/sustainability.htm))

60. FAO fisheries kite (http://www.fao.org/fishery/topic/13297)



61. Integration of sustainability into business (Ecosteps (http://www.ecosteps.com.au/content.asp?id=65))

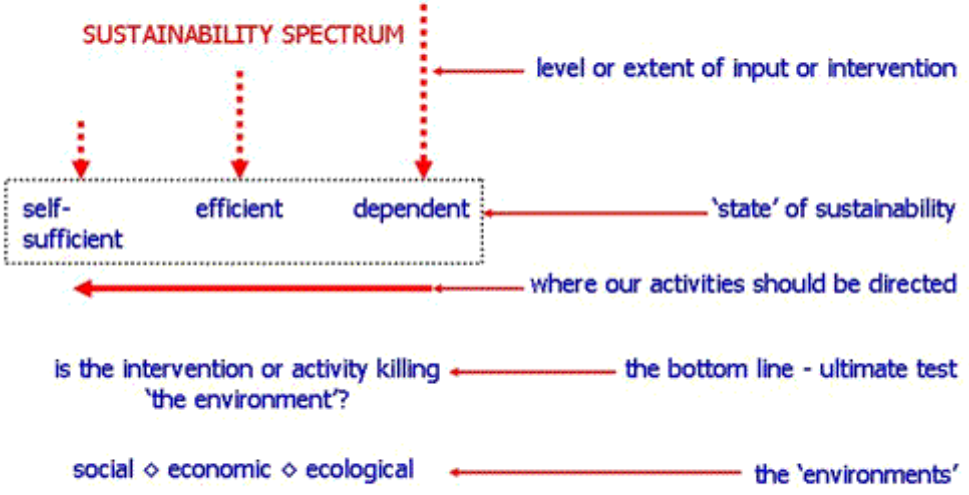


(http://www.ecosteps.com.au/imagesDB/webPages/Corporate-Culture.gif)

62. Business opportunity (Treehugger (http://www.treehugger.com/files/2008/01/being_sustainab.php))

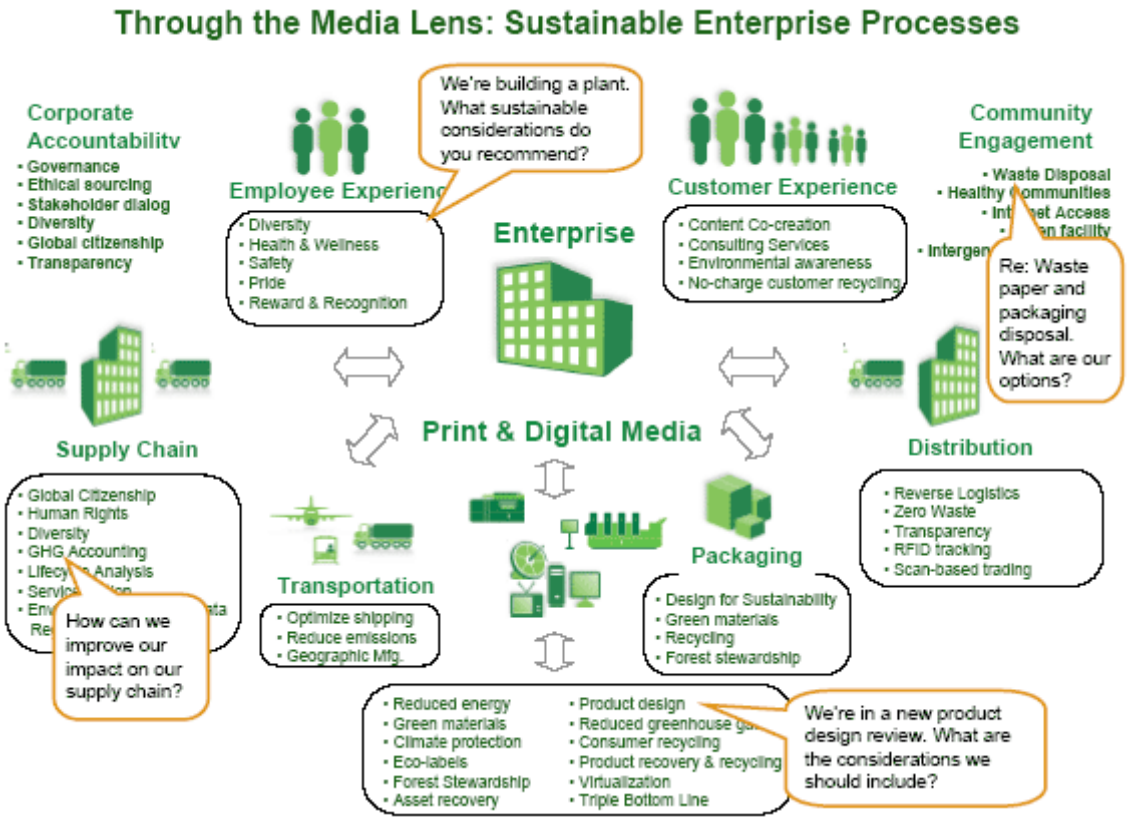
(http://www.treehugger.com/business_sustainability_practices_treehugger.jpg)

63. Decision filter (Pumicestone Institute (http://www.pumicestoneinstitute.org/about-pumicestone-institute.php))



(http://www.pumicestoneinstitute.org/images/sustainability-spectrum.gif)

64. Enterprise process though sustainability lens from SustainCommWorld (http://www.sustaincommworld.com/general/consulting.asp)

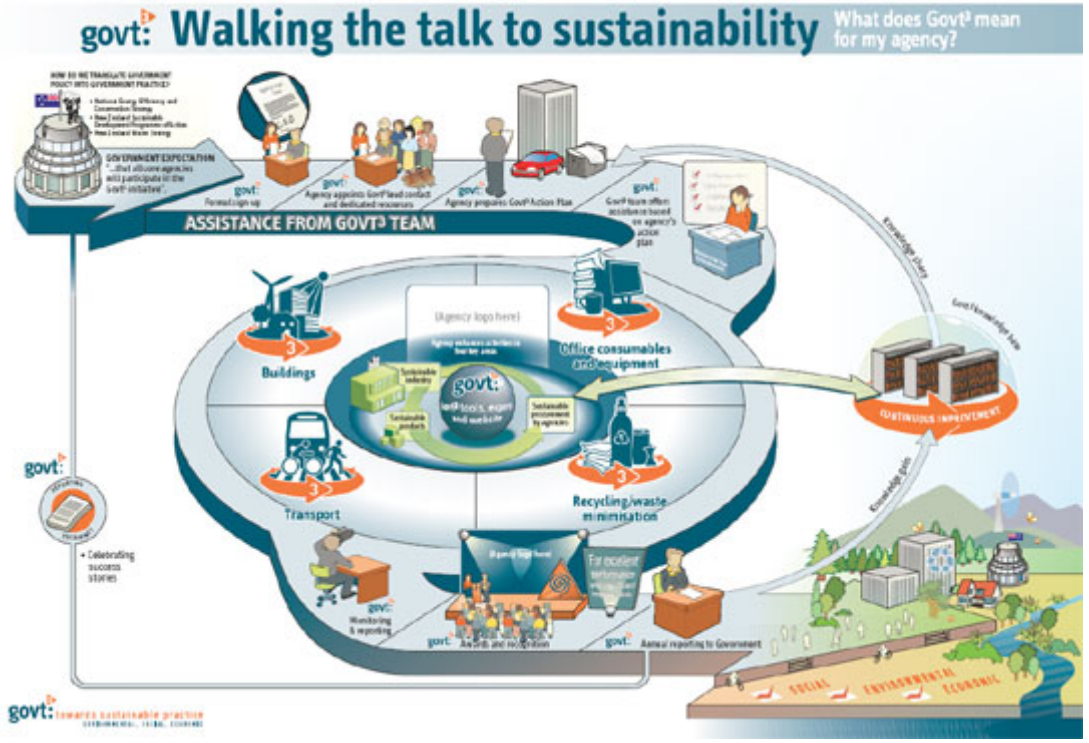


(http://www.sustaincommworld.com/images/diagram_consulting_media_lens.gif)

65. GreenCanary's process (http://www.greencanary.net/what-cultural-assessment.php).

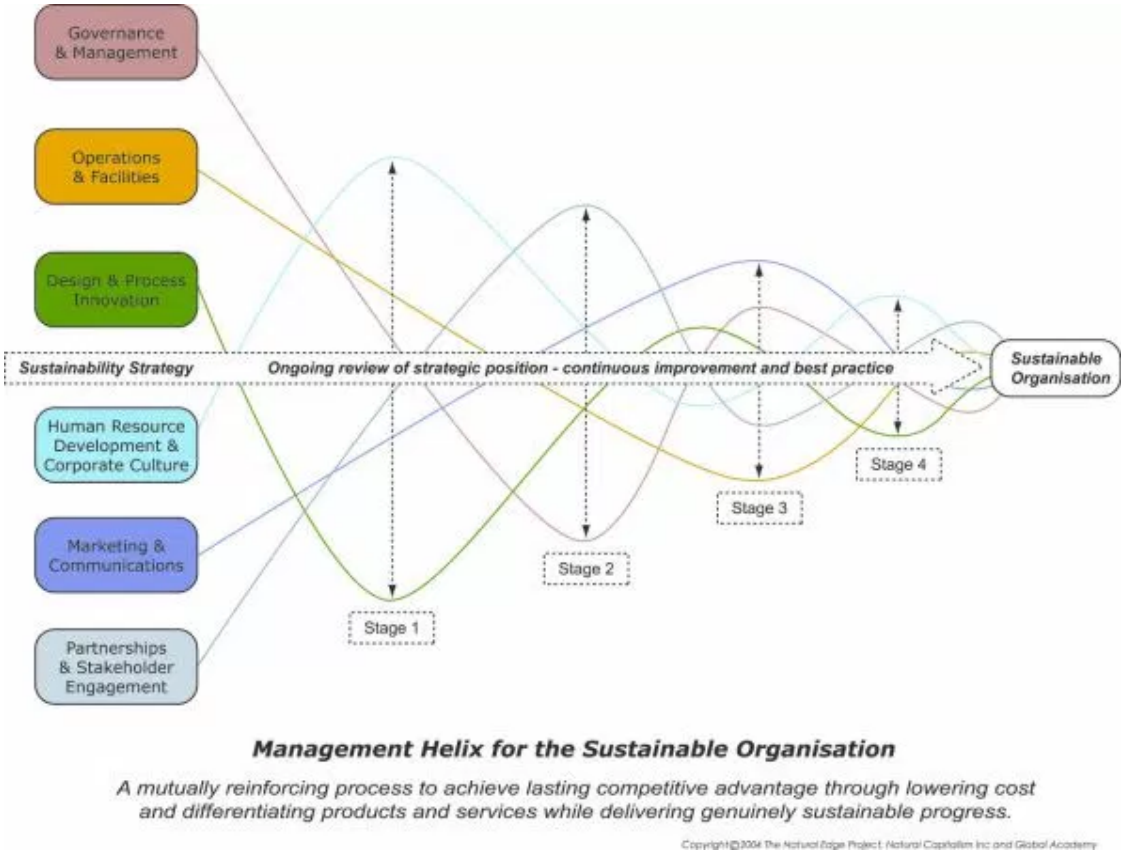
(http://www.greencanary.net/what-cultural-immersion.php)

66. Government process (NZ) "walking the talk (http://www.mfe.govt.nz/issues/sustainable-industry/govt3/walking-the-talk-to-sustainability.html)"



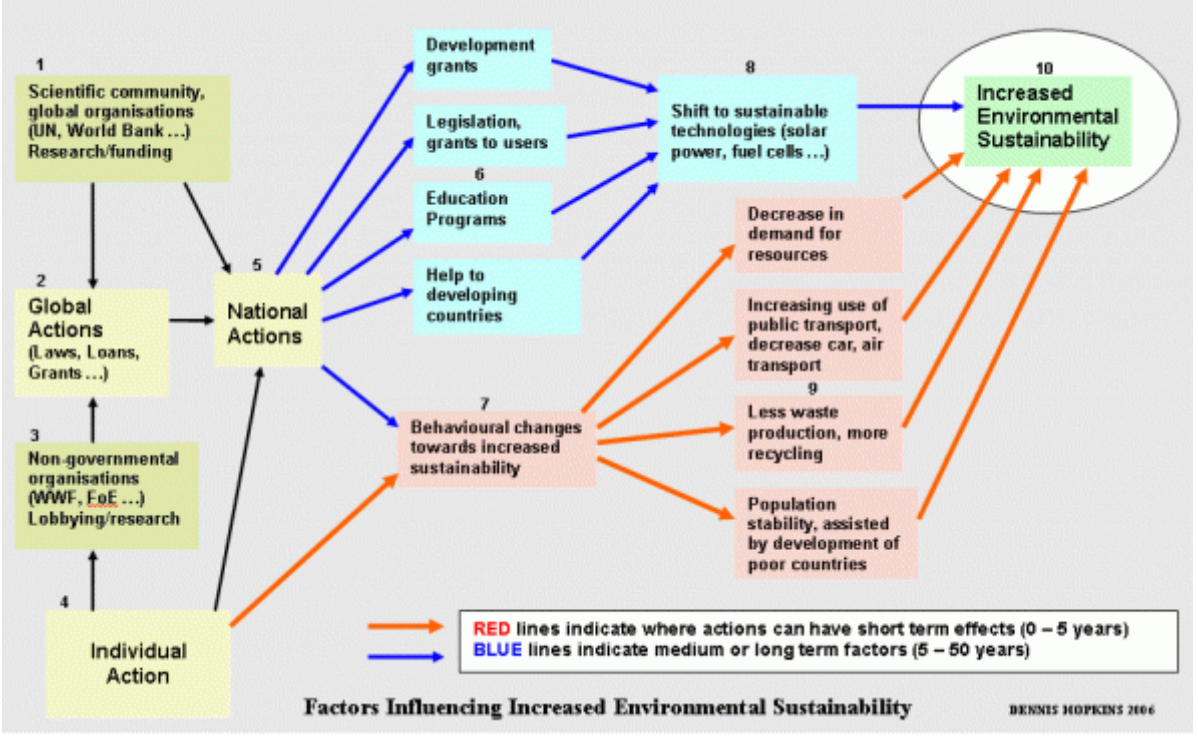
(http://www.mfe.govt.nz/issues/sustainable-industry/govt3/walking-the-talk-to-sustainability.html)

67. Management helix for sustainable organisation (Natural Edge (http://www.naturaledgeproject.net/NAON_ch10.aspx))



(http://www.naturaledgeproject.net/images/SustainabilityHelix.jpg)

68. Factors influencing sustainability (Hopkins)

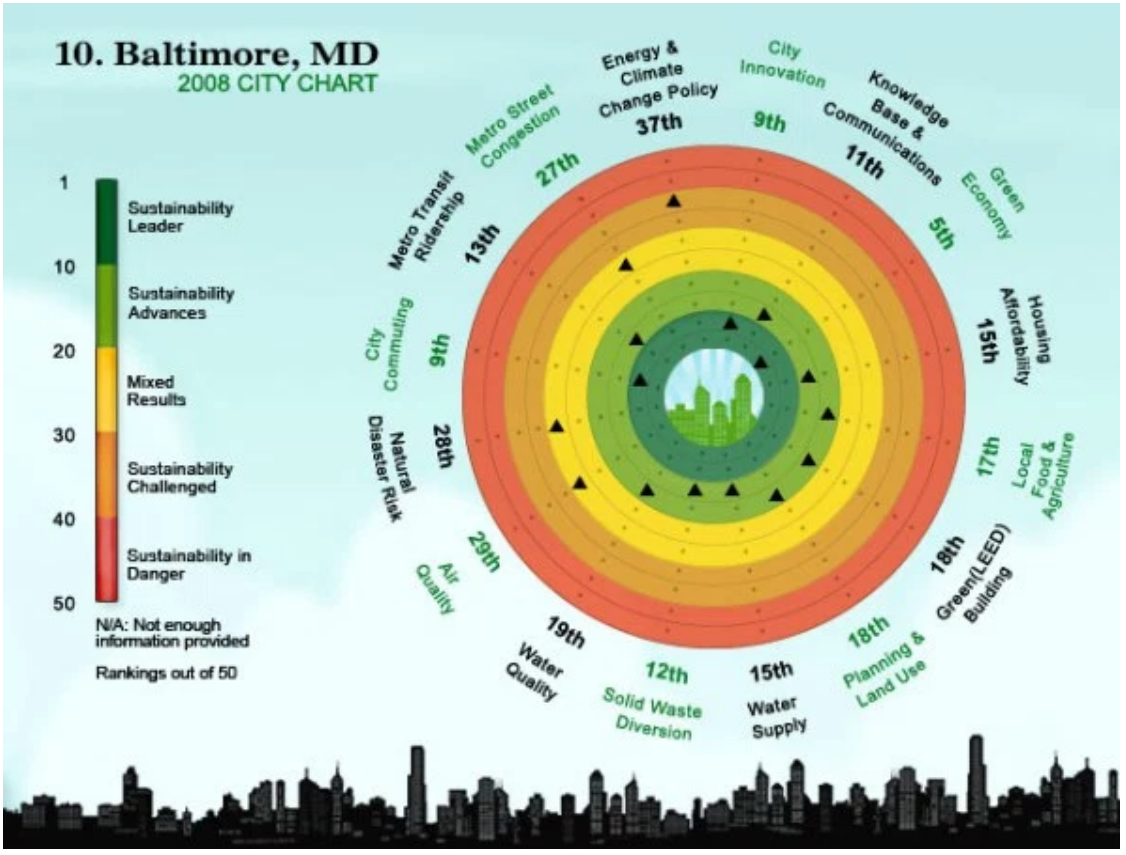


(http://dchopkins.co.uk/env/env_sus_mcd2.gif)

69. Sustainability on a "prosperity continuum" (Muskegon County (http://cccmuskegoncounty.org/images/Prosperity%20Continuum_sustainable2_reduced.png))

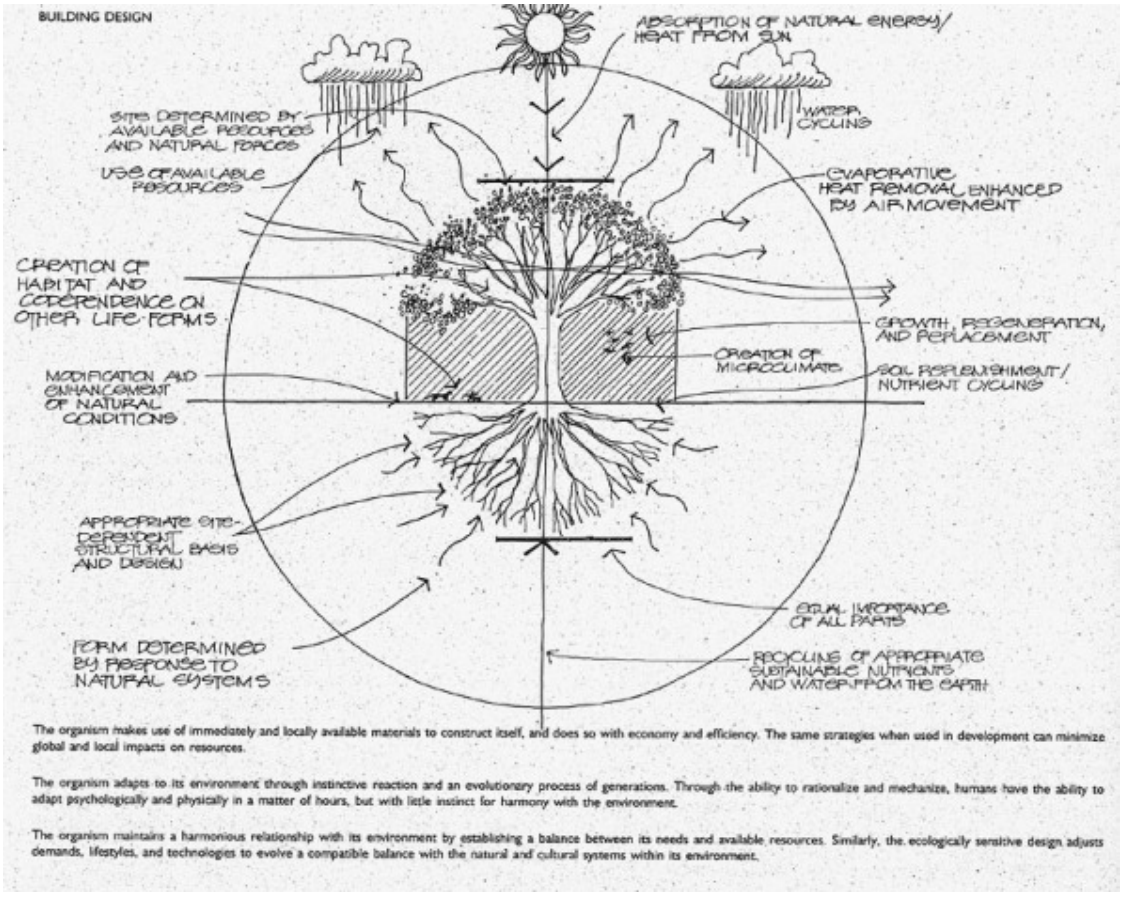
(http://cccmuskegoncounty.org/images/Prosperity%20Continuum_sustainable2_reduced.png)

70. City rankings (Sustainlane (http://www.sustainlane.com/us-city-rankings/overall-rankings))



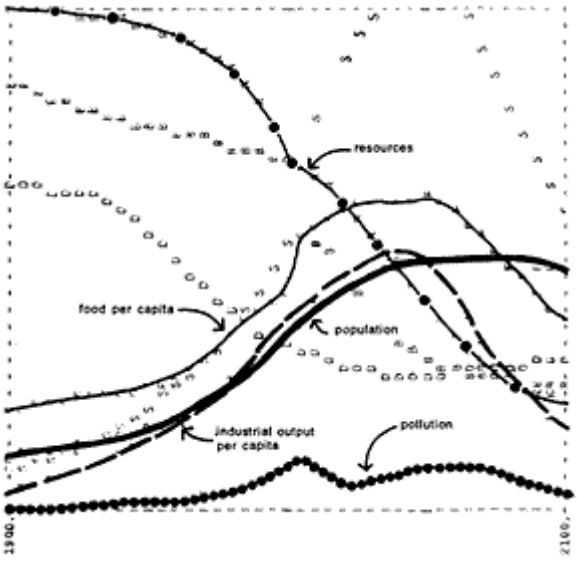
(http://pix.sustainlane.com/l/r/f/0/T/f.jpeg)

71. Sustainable design as organism Guiding Principle of Sustainable Design **(http://www.nps.gov/dsc/dsgncnstr/gpsd/toc.html)** (Leslie Starr Hart 1994)

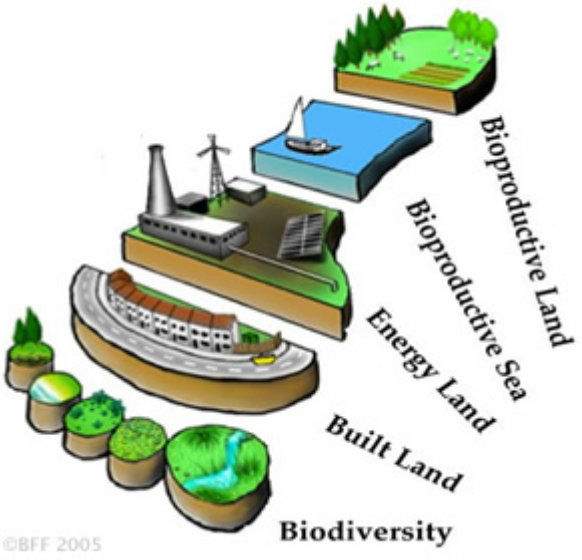


(http://www.nps.gov/dsc/dsgncnstr/gpsd/22.jpg)

72. Limits to growth graphs

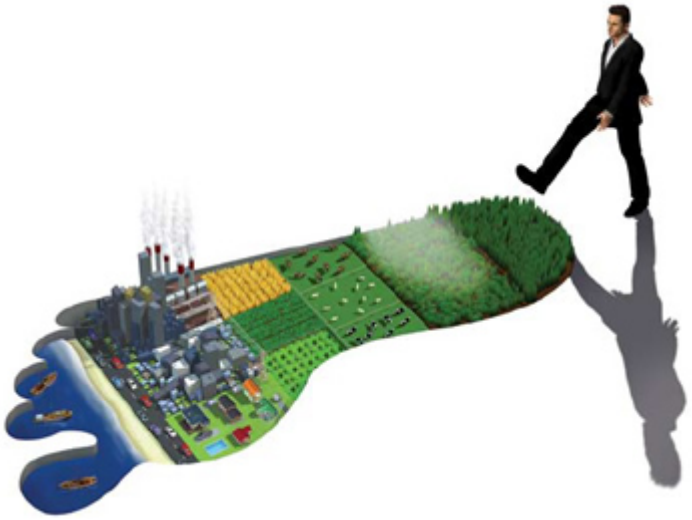


73. Ecological footprint



(http://blog.lib.umn.edu/tupp0008/environment/fig3.jpg)

74. Footprint illustration (NZ Ministry for the Environment (http://www.mfe.govt.nz/publications/about/environz/environz-mar08/page5.html))

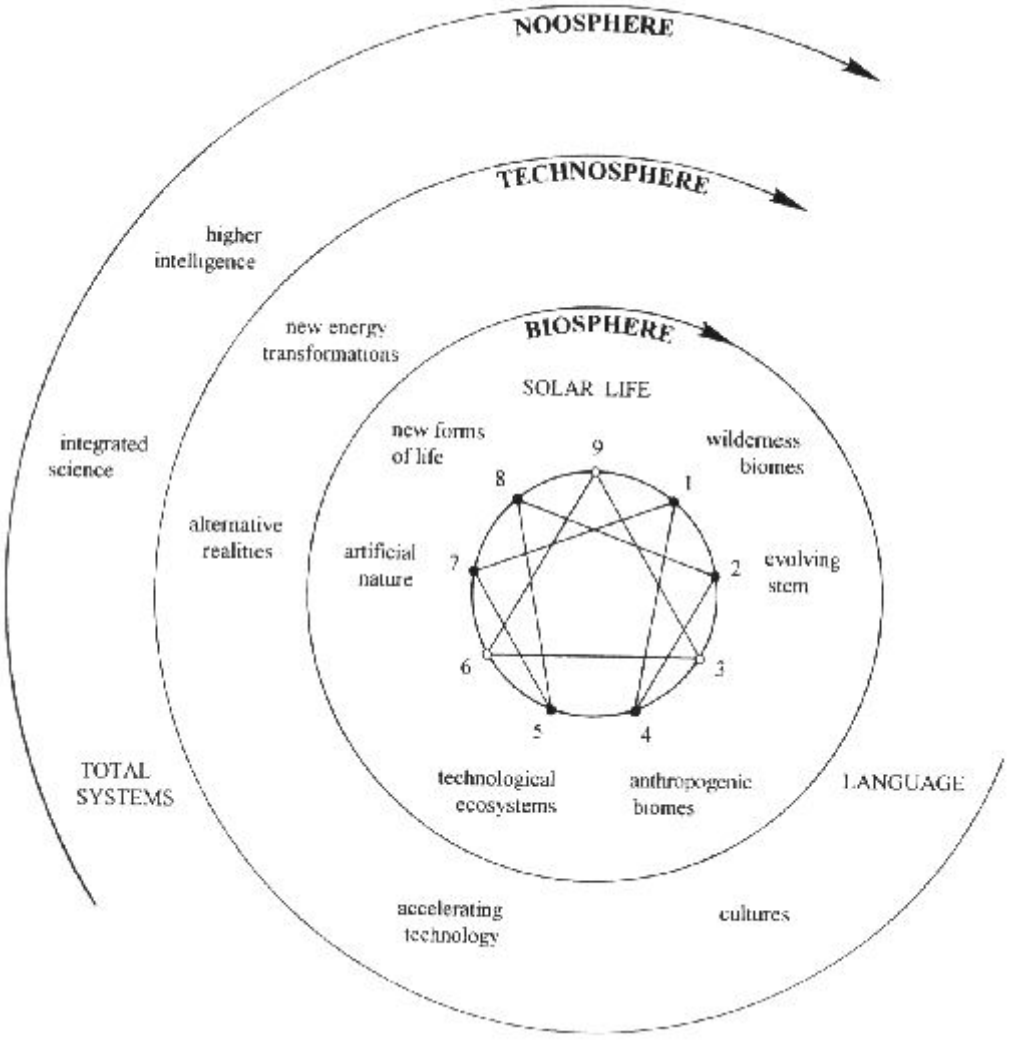


(http://www.mfe.govt.nz/publications/about/environz/environz-mar08/images/ecological-footprint-illustration.jpg)

75. Integrity at core (University New Hampshire (http://www.sustainableunh.unh.edu/whatissustainability.html)).

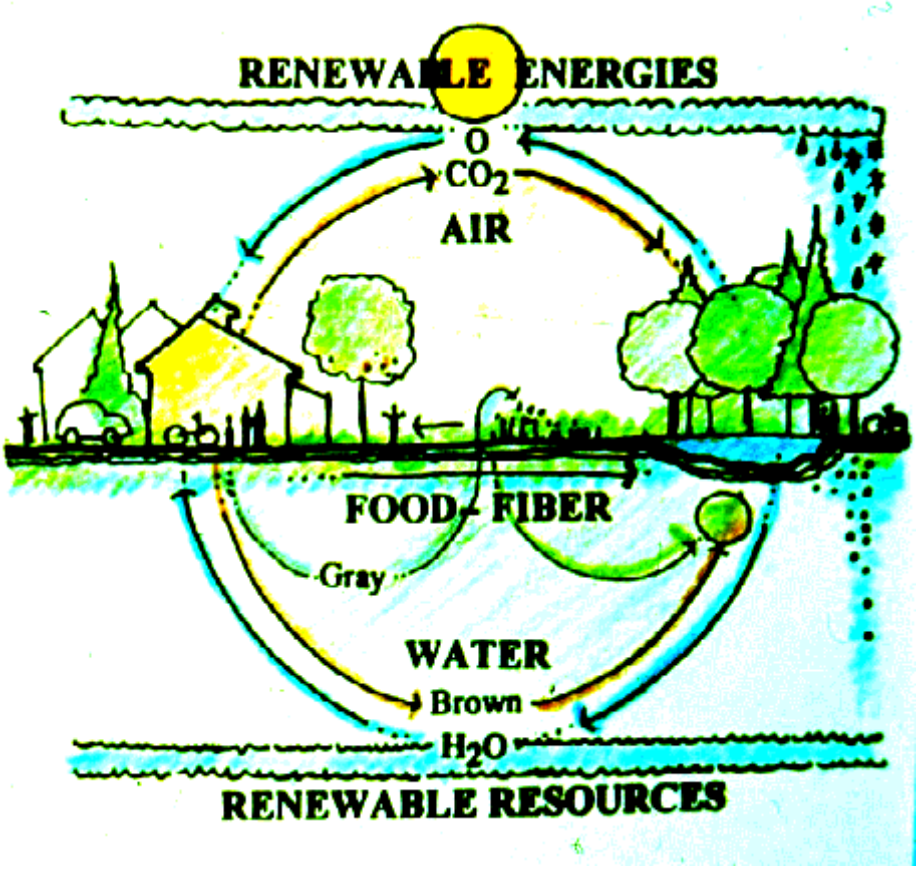
(http://www.sustainableunh.unh.edu/images/unhsustlearningcommunity.jpg)

76. Personality enneagram within spheres (Blake) (http://www.duversity.org/archives/intellennea.html)



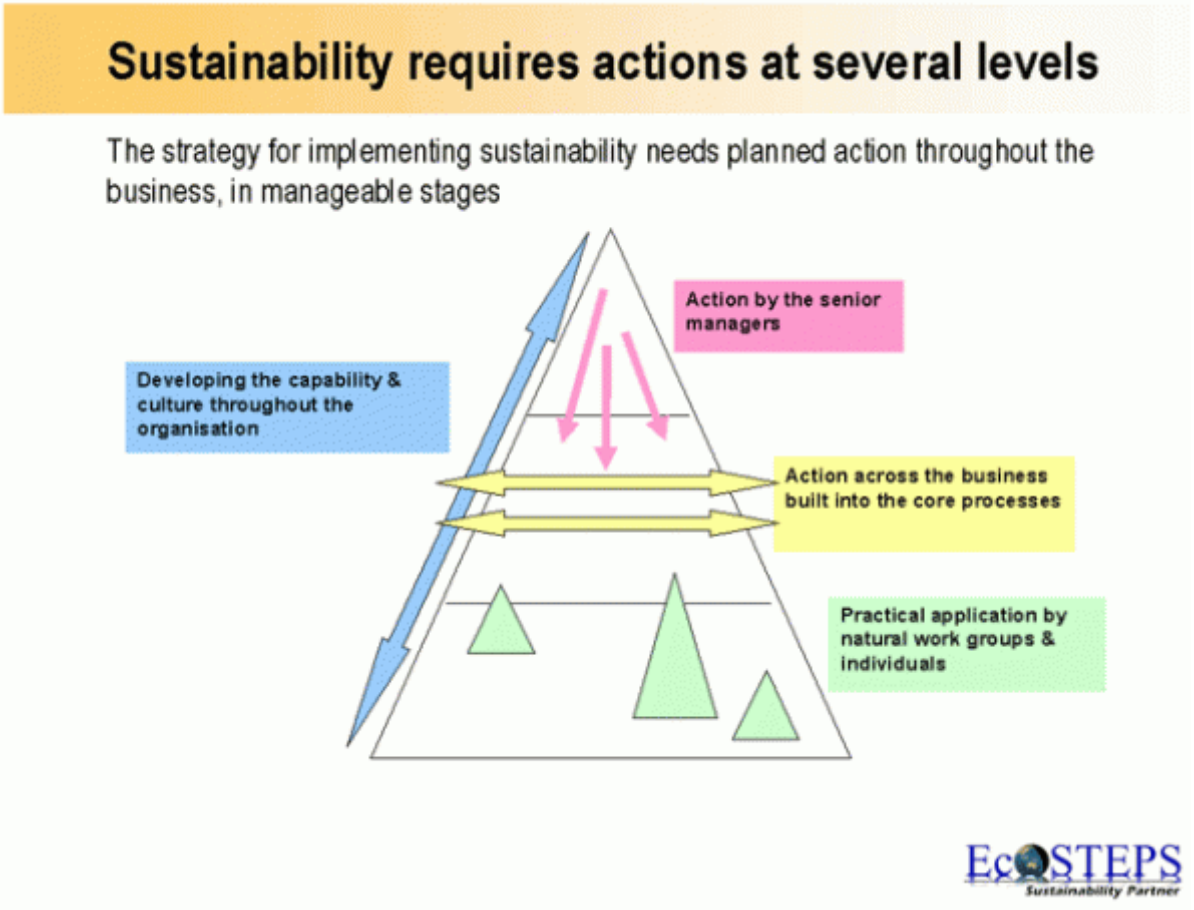
(http://www.duversity.org/images/12-2.gif)

77. Human-ecologic interchange (Washington State University (http://www.arch.wsu.edu/09%20publications/sustain/modlsust.htm))



(http://www.arch.wsu.edu/09%20publications/sustain/rnew6x62.gif)

78. Action at different levels (Ecosteps (http://www.ecosteps.co.nz/content.asp?id=72))



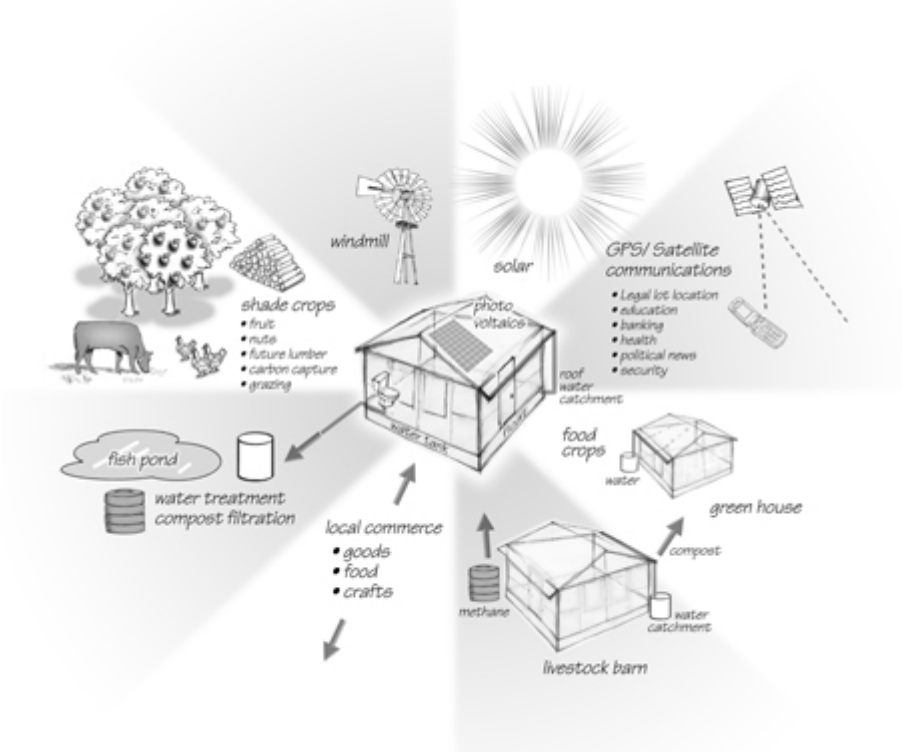
(http://www.ecosteps.co.nz/imagesDB/webPages/Sustainability_Requires_Act.gif)

79. Sun (wheel really) Carillion (http://www.carillionplc.com/sustainability_reports/2006/assets/documents/multimedia/sun_diagram.jpg

(http://www.carillionplc.com/sustainability_reports/2006/assets/documents/multimedia/sun_diagram.jpg

80. House at centre (Icology (http://www.bibbycommunications.ca/icology/benefits.htm): Empowering individuals to end poverty)

This is our vision of the world: Universal access to quality, affordable and ecologically sound housing solutions.

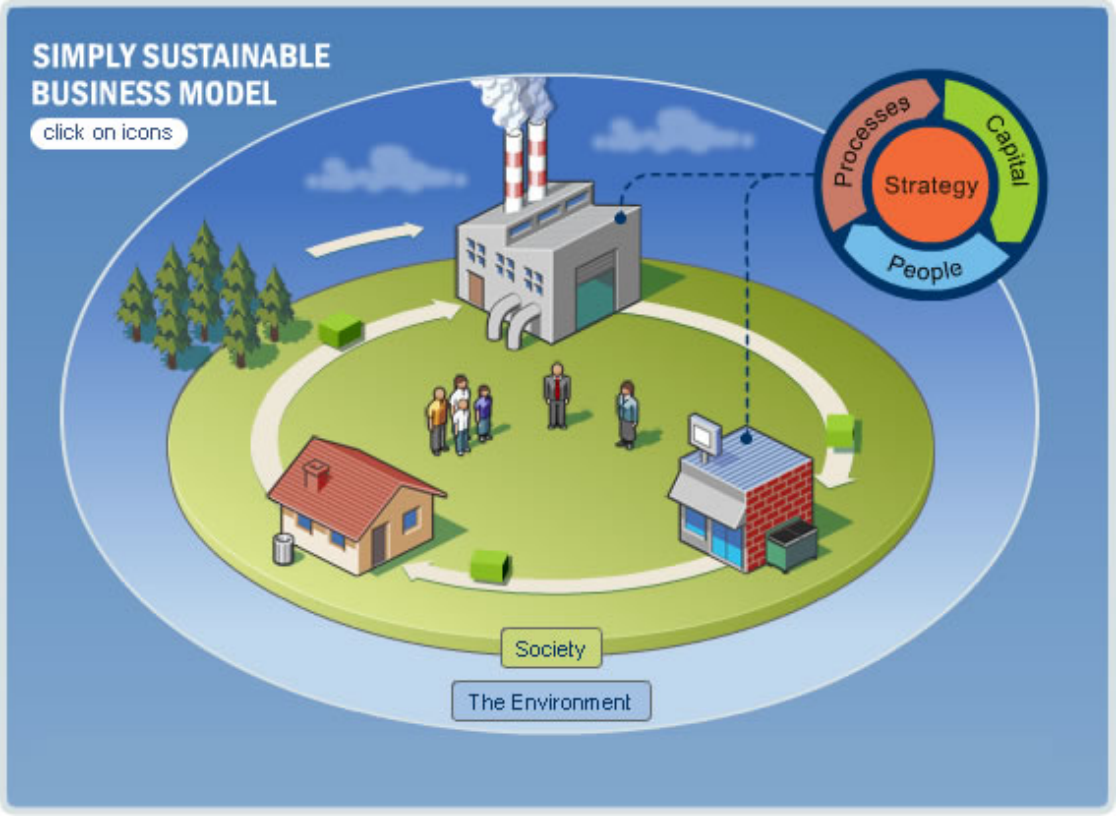


(http://www.bibbycommunications.ca/icology/images/hub_diagram.jpg)

81. Life cycle (Katholieke Universiteit Leuven (http://www.biw.kuleuven.be/LBH/lbnl/forecoman/eng/projbeschrijving.asp?n=40))

(http://www.biw.kuleuven.be/LBH/lbnl/forecoman/img/ccycle-e.jpg)

82. Simply sustainable business model (NZ Ministry for the Environment (http://www.mfe.govt.nz/issues/sustainable-industry/tools-services/model.php))

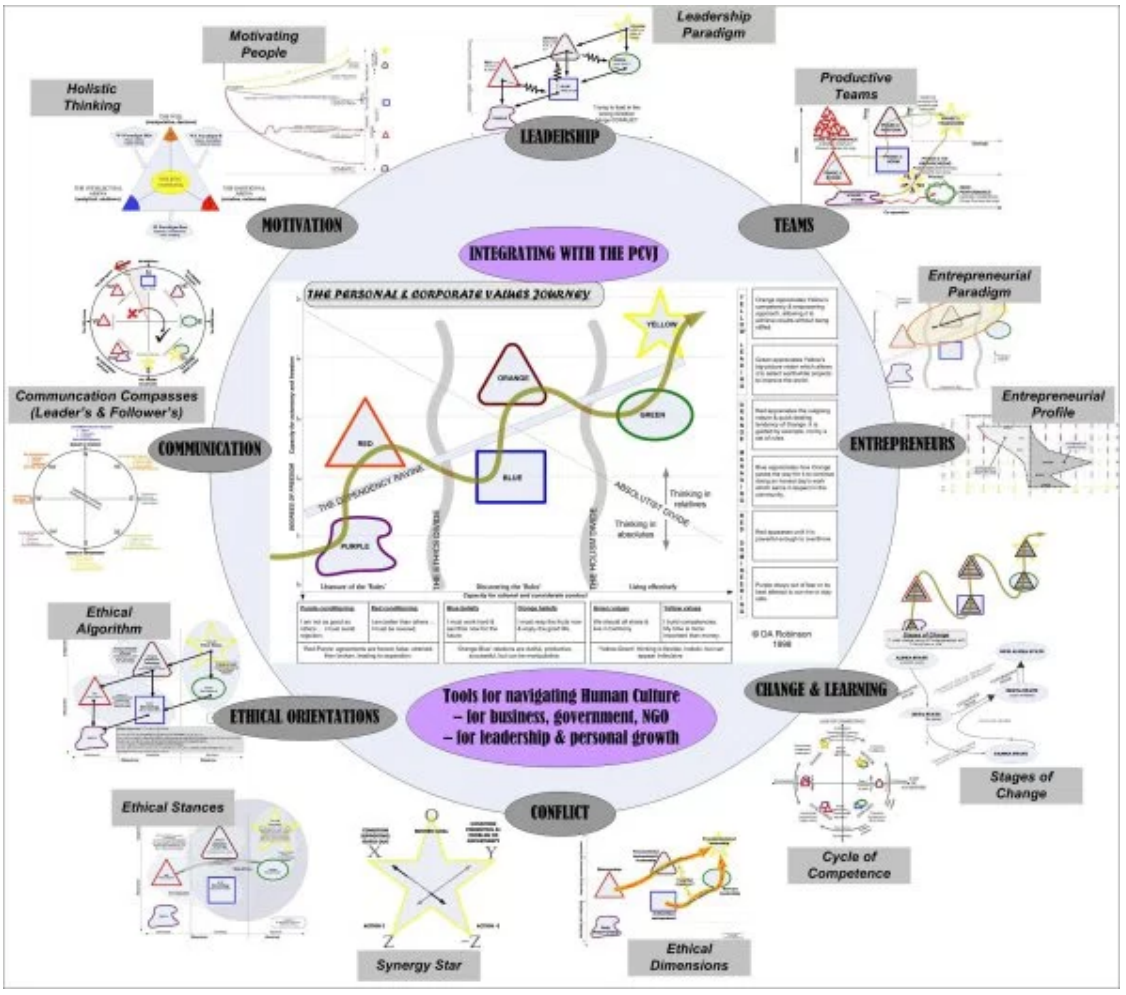


(http://www.mfe.govt.nz/issues/sustainable-industry/tools-services/model.jpg)

83. Simplified flows (from Christain Science Monitor, John Kehe (http://features.csmonitor.com/environment/2008/10/15/toward-a-greener-economy/))

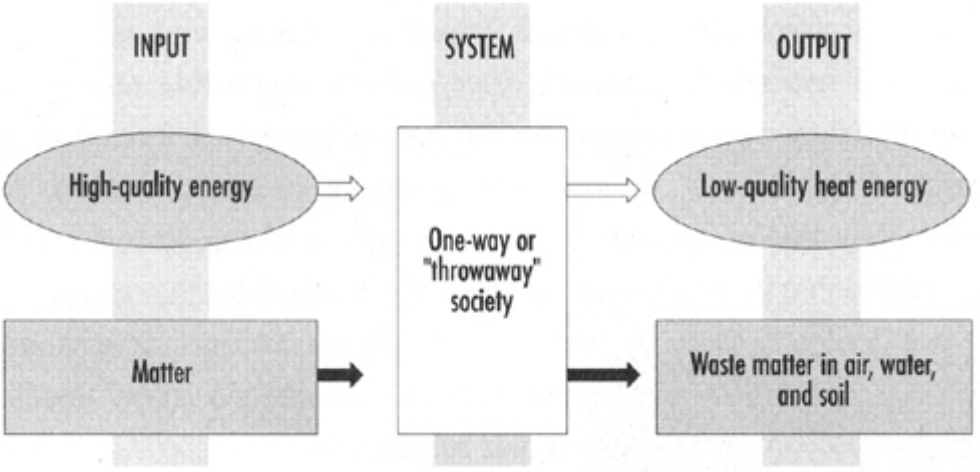
(http://features.csmonitor.com/environment/wp-content/assets/2/554/picture1.jpg)

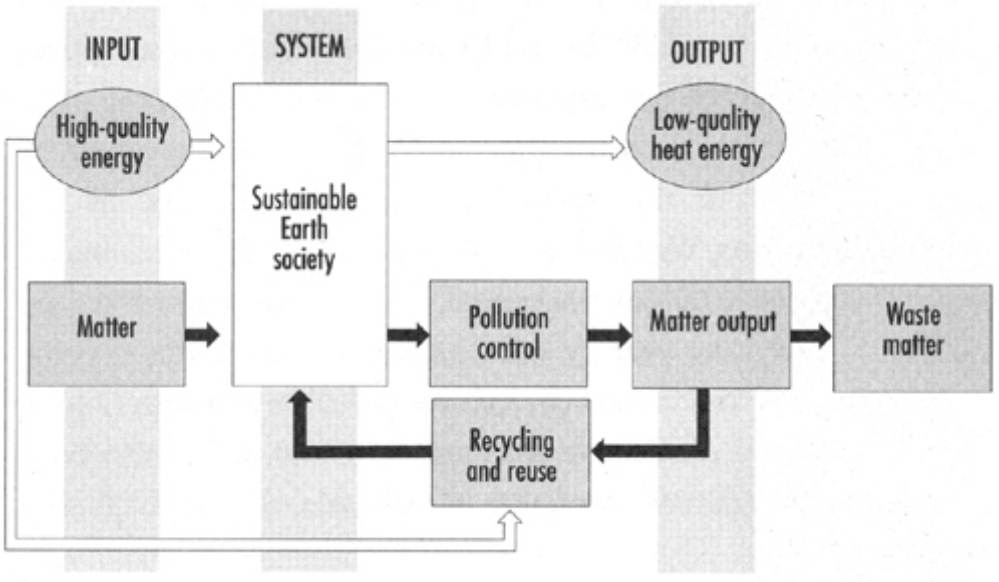
84. Human values journey (Robinson and Goleby (http://valuesjourney.googlepages.com/))



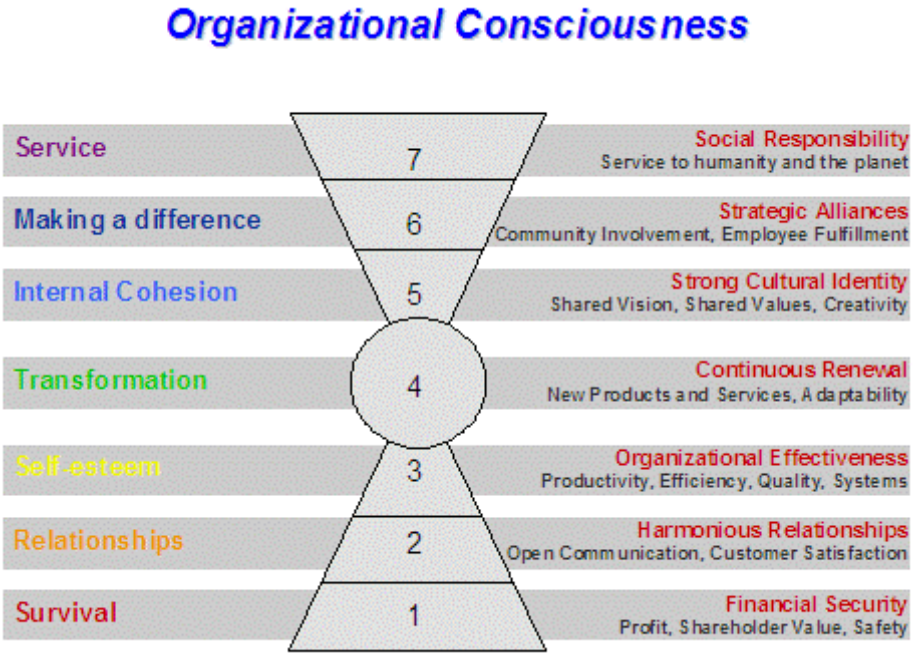
(http://valuesjourney.googlepages.com/_PCVJmodelsintegration2.jpg/_PCVJmodelsintegration2-full;init:.jpg)

85. Balance between society and environment (Taylor after Miller (http://www.idrc.ca/openebooks/710-8/))





86. Organisational consciousness (Hoolenbach, University of Western Cape (http://www.uwc.ac.za/?module=cms&action=showfulltext&id=gen11Srv7Nme54_2181_1210050552&menustate=admin_support_



(http://uwcportaltest.uwc.ac.za/usrfiles/importcms/gen11Srv7Nme54_9345_1210050551/organizational.gi

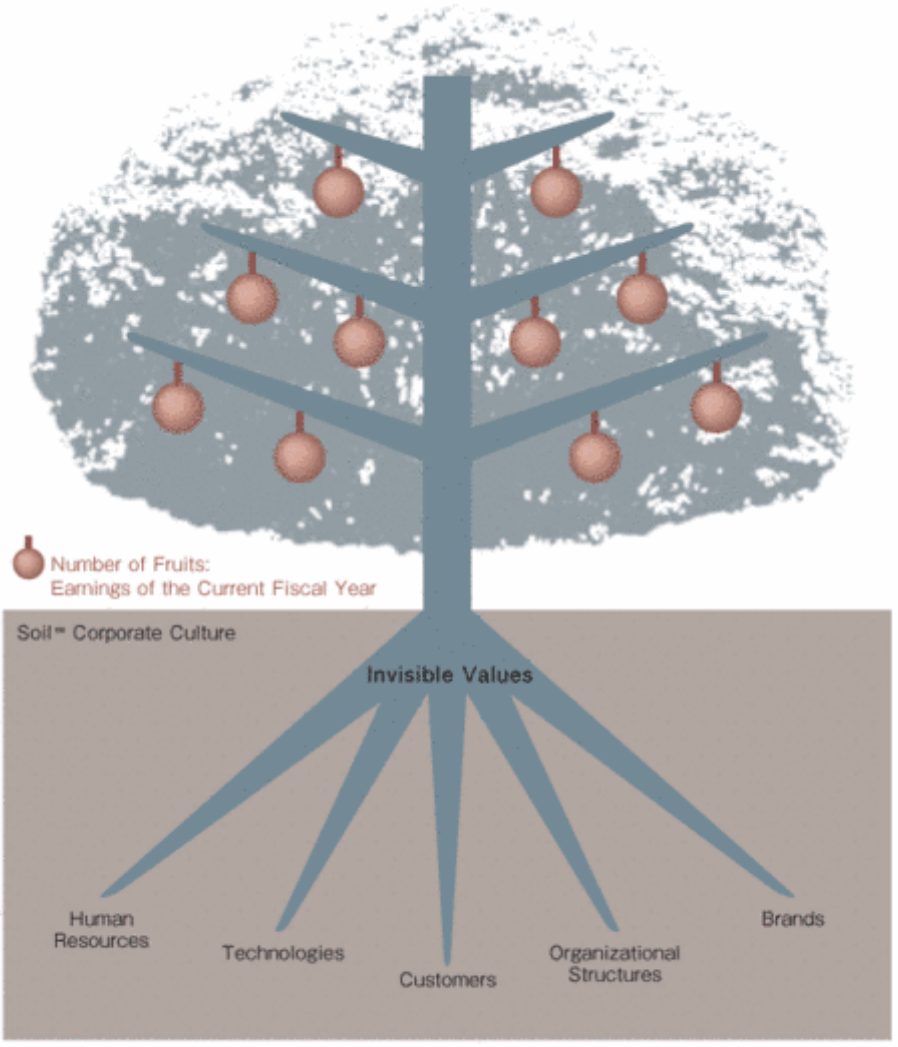
87. Marshall and Toffel apply Maslow to human and natural environment (Goffman: Defining Sustainability, defining the future (http://www.csa.com/discoveryguides/sustain/overview.php))

(http://www.csa.com/discoveryguides/sustain/images/sustain-heir.jpg)

88. Sustainability science (Kyoto (http://iss.iae.kyoto-u.ac.jp/iss/eng/researcher_y.suzuki.html))

(http://iss.iae.kyoto-u.ac.jp/iss/eng/field/y.suzuki_en_v2.png)

89. Invisible values (Horiba investor relations (http://www.horiba.com/investor-relations/mlmap/development-of-invisible-values/))



Rationale of Invisible Values

The number of fruits and the value of the harvest are important but it is more important that the roots are growing strong

(http://www.horiba.com/uploads/pics/invisible_Value.png)

90. Integrated ecological-economic worlview

O'Connor (http://www.catallaxis.com/2006/02/sustainable_gro.html)'s image of non-ecological economic worldview

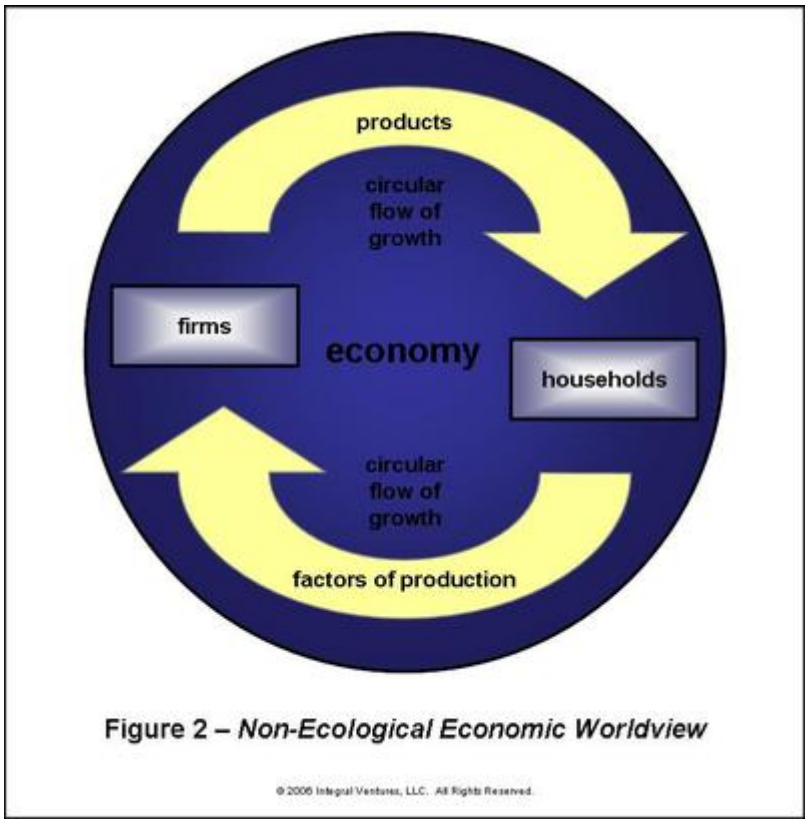
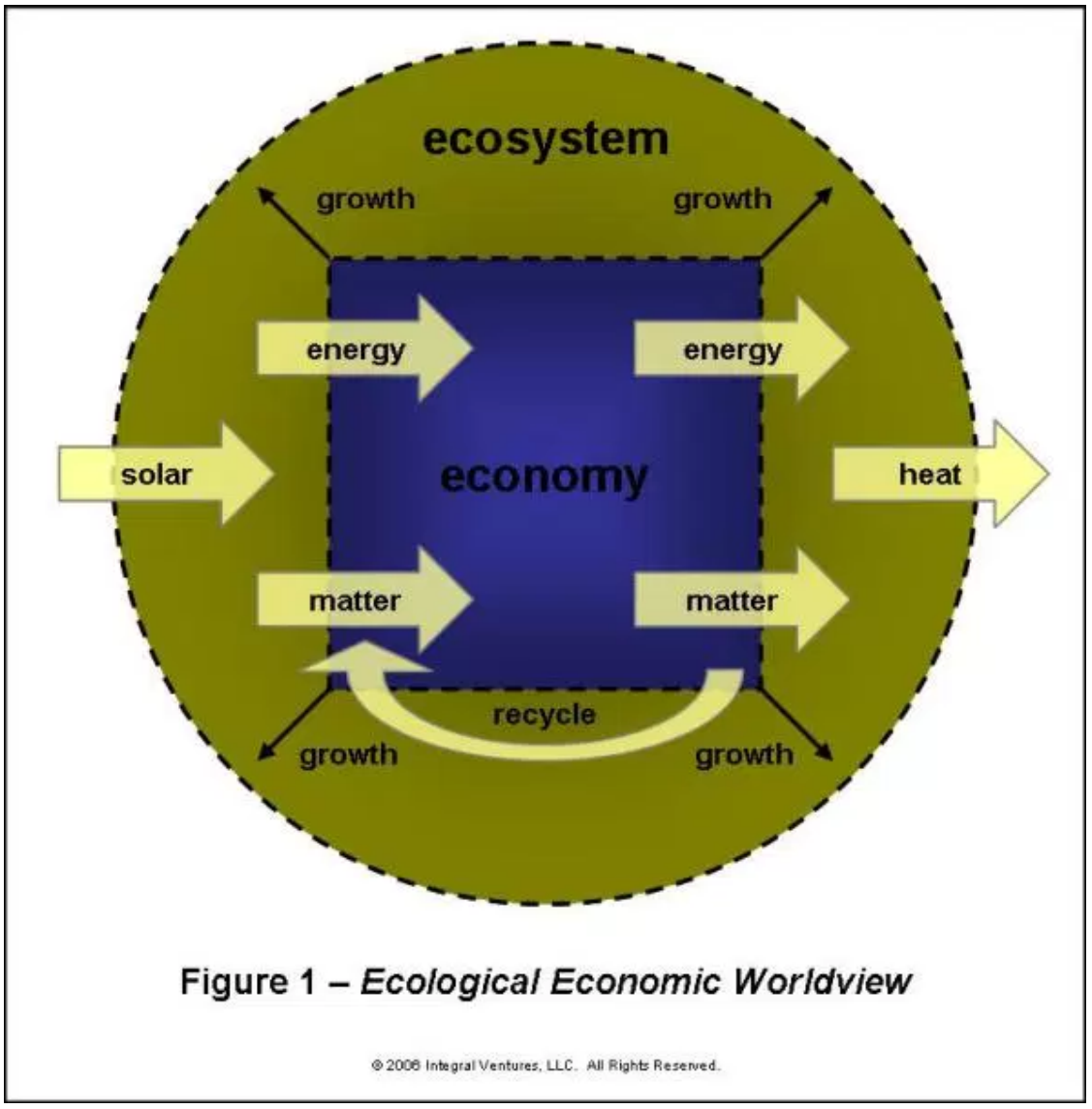


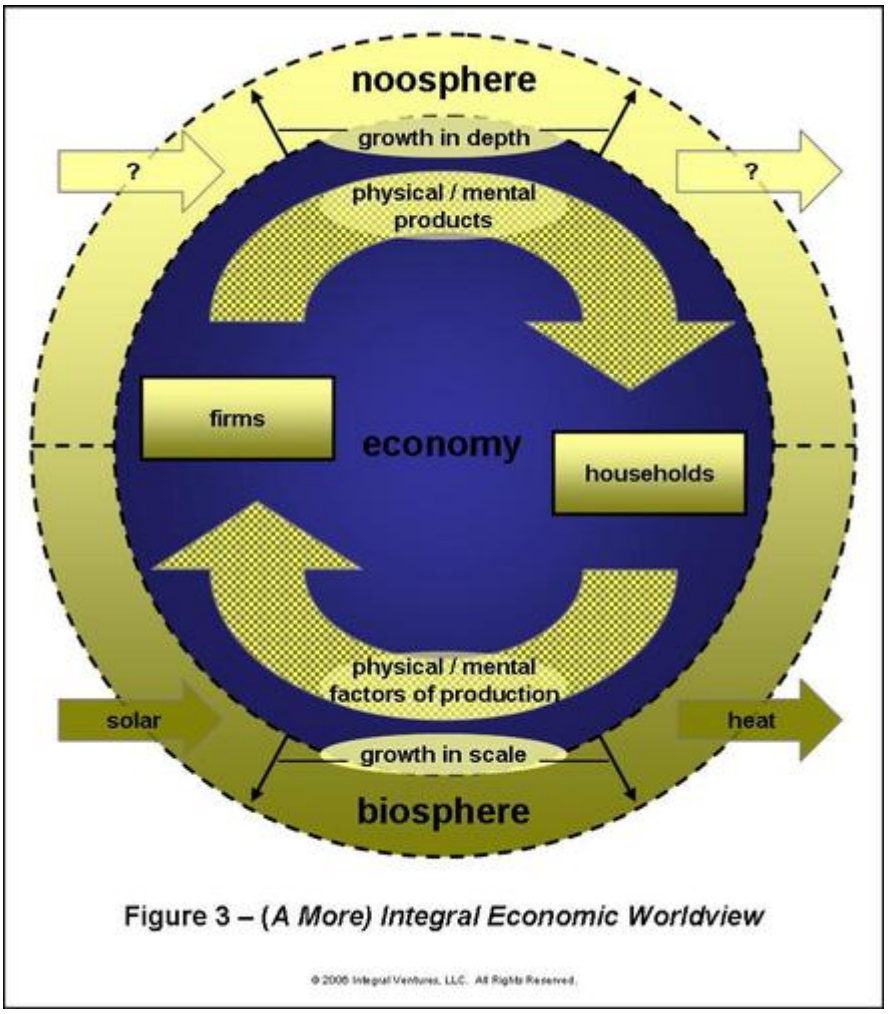
Figure 2 – *Non-Ecological Economic Worldview*

(http://www.catallaxis.com/images/nonecological_economic_worldview_4.jpg)

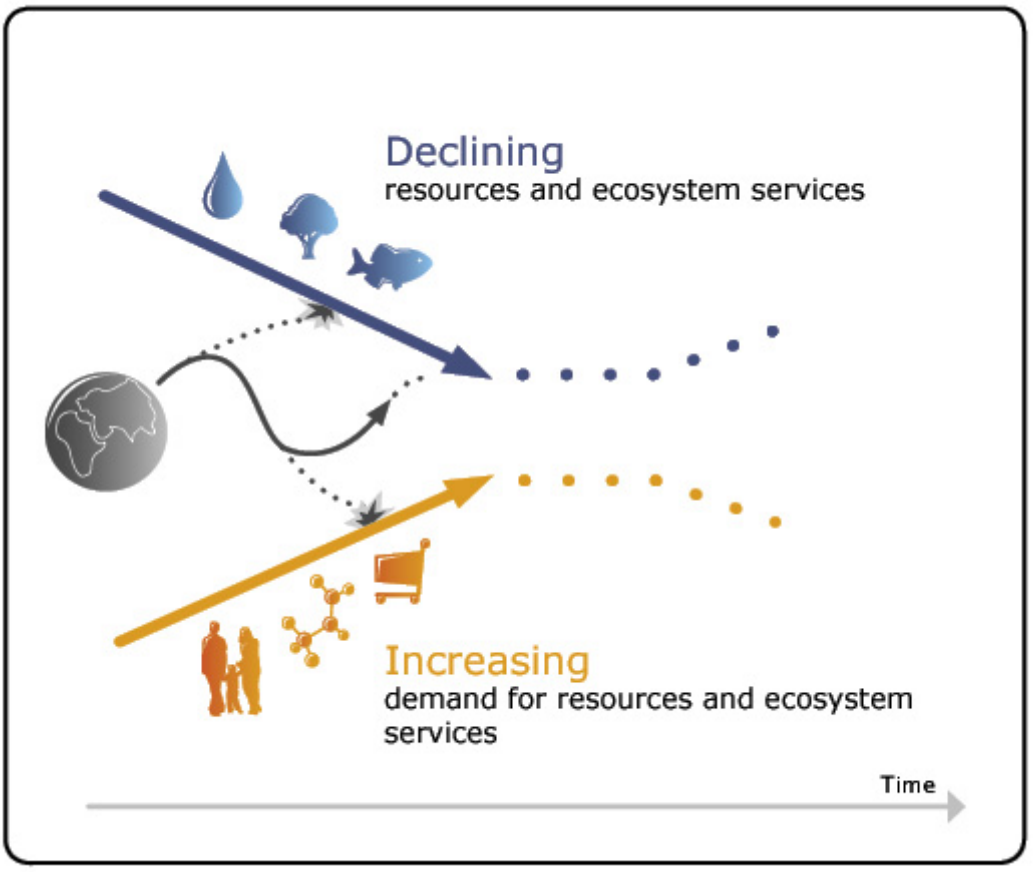
91. O'Connor (http://www.catallaxis.com/2006/02/sustainable_gro.html)'s image of Daly (Beyond Growth)



92. O'Connor (http://www.catallaxis.com/2006/02/sustainable_gro.html)'s Integral Economic worldview

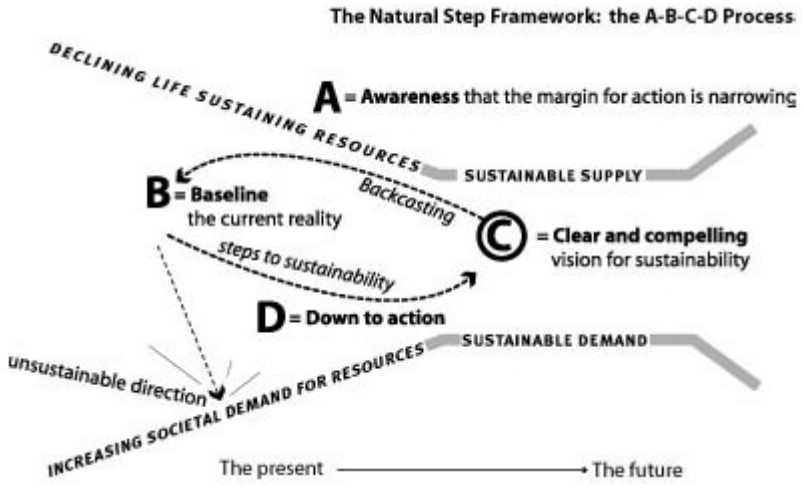


93 Resource funnel (The Natural Step (http://www.thenaturalstep.org/en/natural-step-funnel))



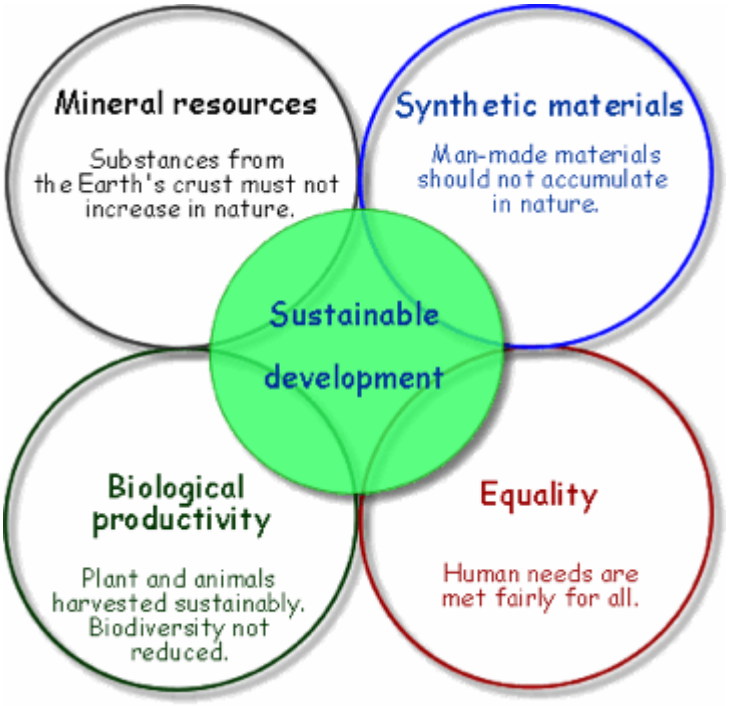
(http://www.thenaturalstep.org/en/system/files/images/NewFunnel.jpg)

94. More complex funnel



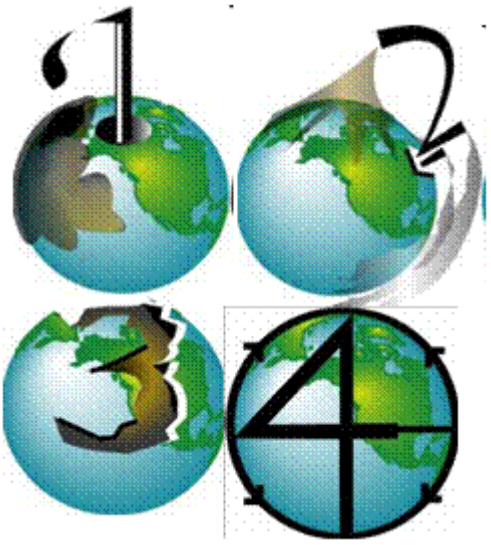
(http://www.naturalstep.org.nz/images/abcd.jpg)

95 Natural Step System Conditions

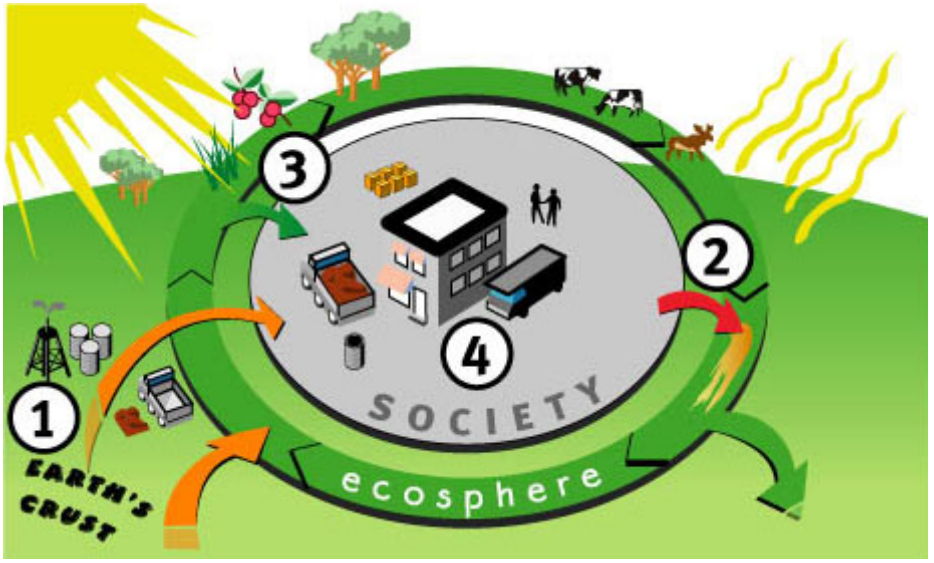


(http://www.greenbusinessratings.com/page6/files/natural-step.gif)

96. Natural Step System Conditions



97. Natural Step System Conditions (again (http://www.naturalstep.org.nz/tns-f-system-conditions.asp))

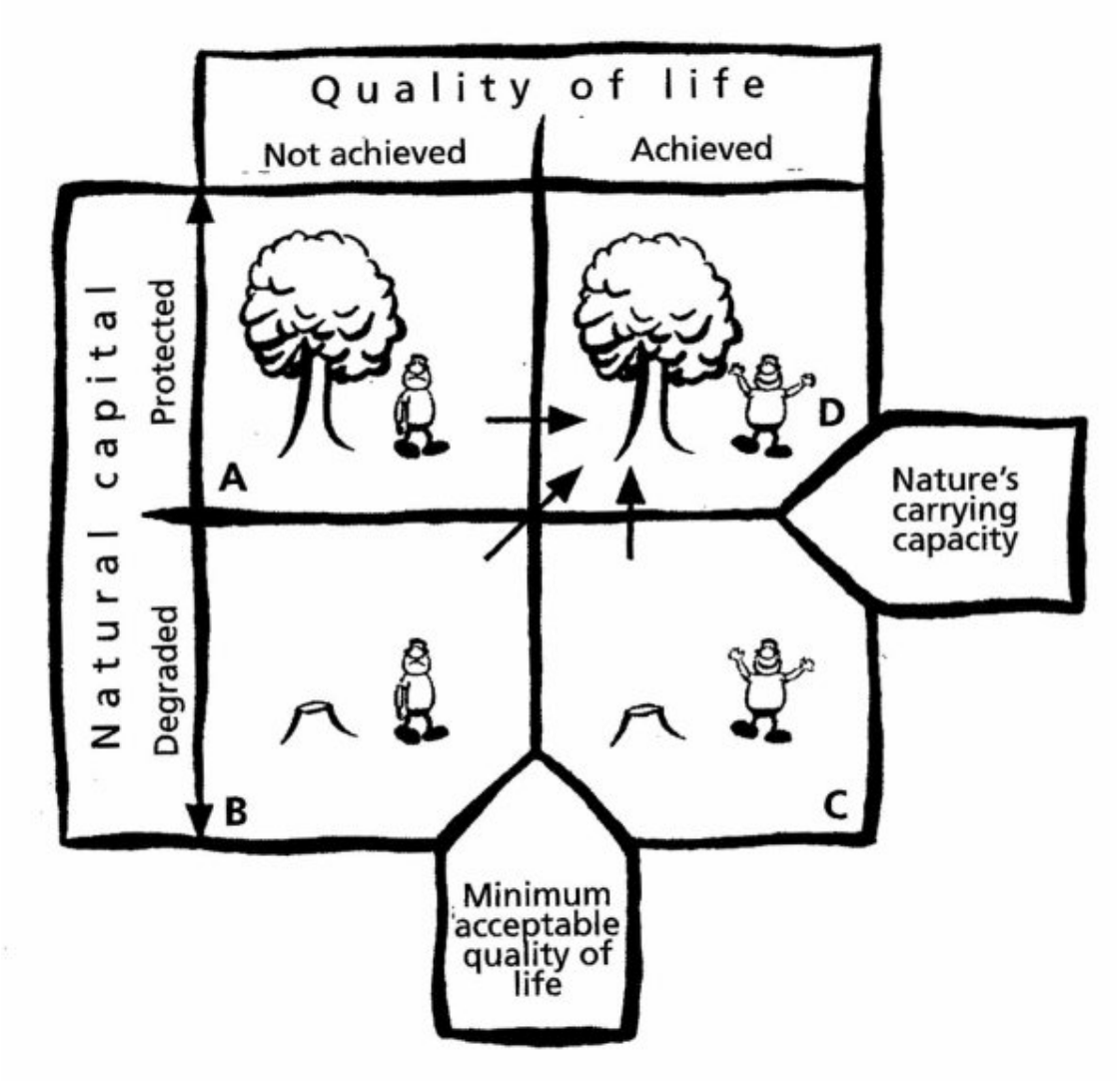


(http://www.naturalstep.org.nz/images/system-conditions.jpg)

98. Criteria flower (Steve Henry and Mark Jackson's arrangement of Edwin Dzaskefki's design criteria) (http://www.biothinking.com/pd.htm)

(https://computingforsustainability.files.wordpress.com/2008/04/flower.jpg?w=300&h=286)

99. Capital and carrying capacity (from Colorado College (http://www.coloradocollege.edu/dept/ev/courses/footprint/Footprint.htm), or here in Italian (http://ecoale.myblog.it/images/Post/Sostenibilita.jpg), neither sourced)



(http://www.coloradocollege.edu/dept/ev/courses/footprint/4Sust.jpg)

100. (no significance in number!) **Computing Impact** (Forum for the Future's Connected: ICT and sustainable development) (http://www.forumforthefuture.org.uk/node/1617)

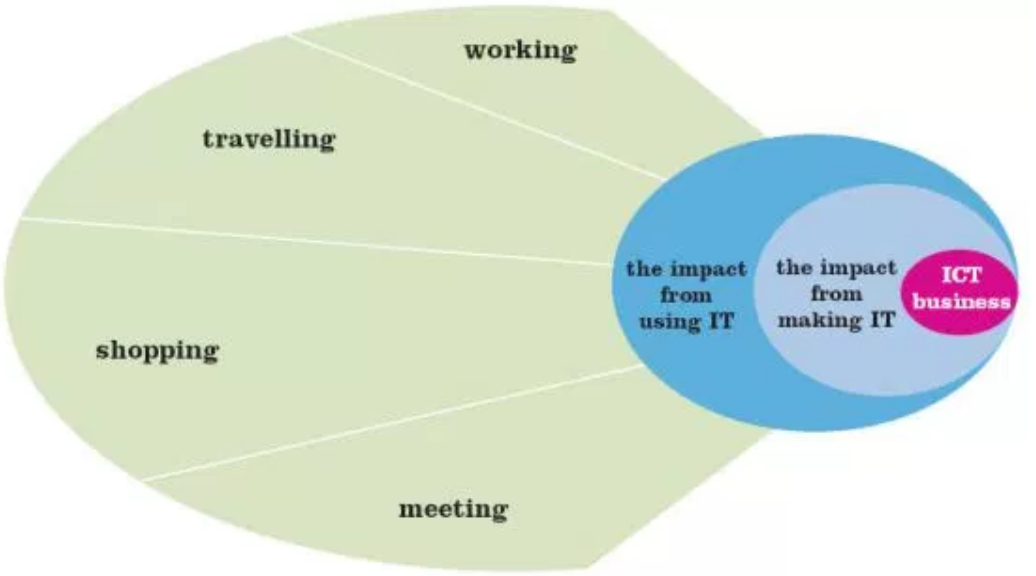
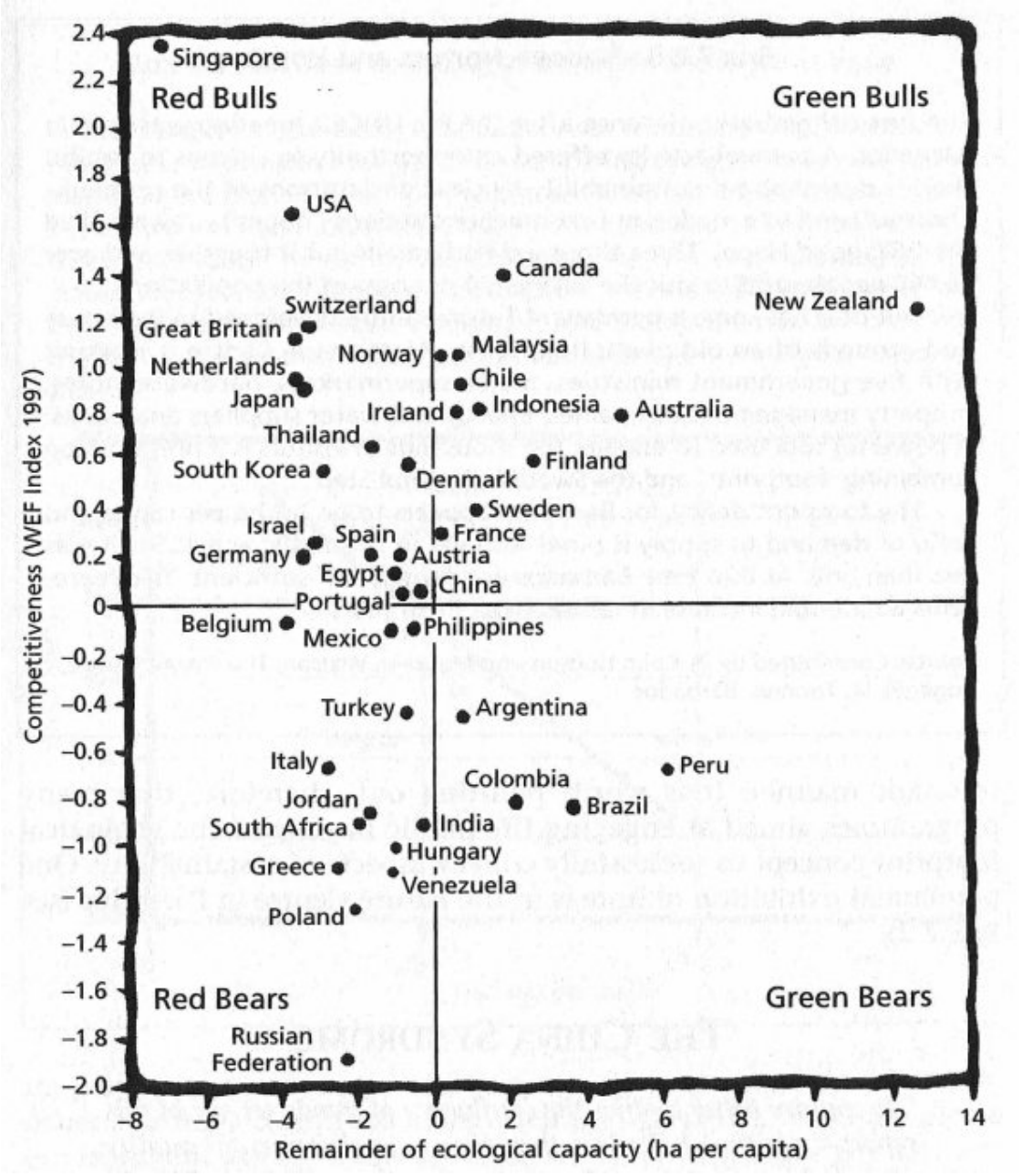


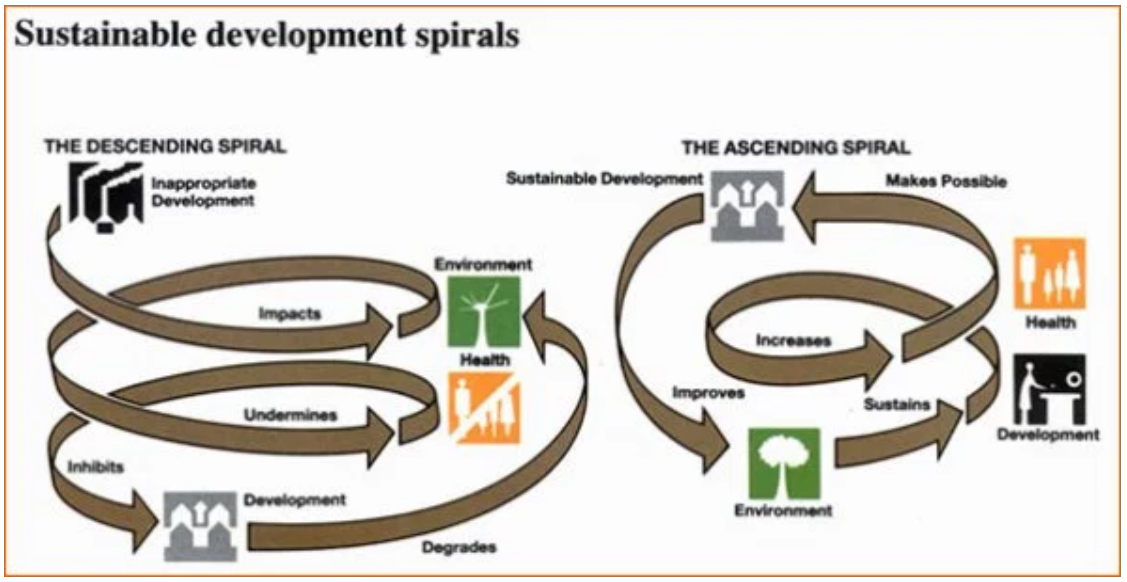
Figure 2. ICT impacts and sustainability opportunities

101. Country positioning (rom Colorado College (http://www.coloradocollege.edu/dept/ev/courses/footprint/Footprint.htm), not sourced)



(http://www.naturalstep.org.nz/tns-f-system-conditions.asp)

102. Development sprials (UNESCO (http://portal.unesco.org/education/es/ev.php-URL_ID=29459&URL_DO=DO_TOPIC&URL_SECTION=201.html))

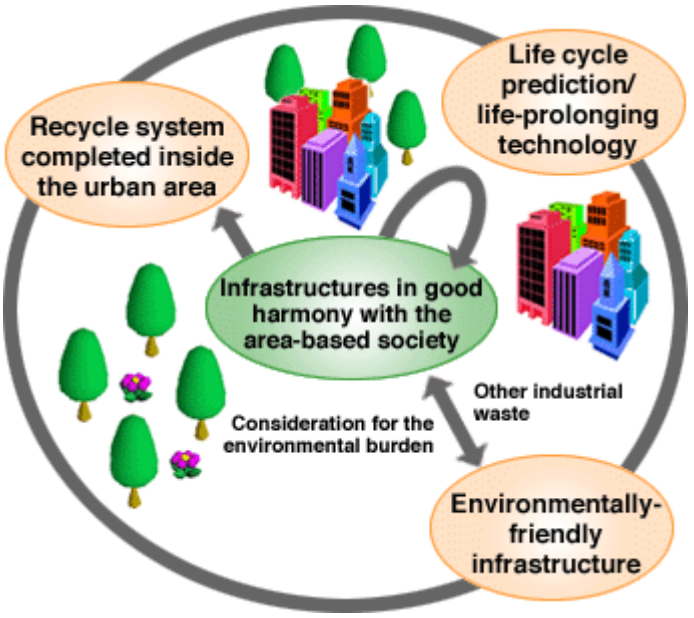


(http://portal.unesco.org/education/es/files/29459/10789163093Sustainable_development_spirals_frame.jp

103. Bottled water (Green Earth Beverage (http://greenearthbeveragesystems.com/going-green.html))

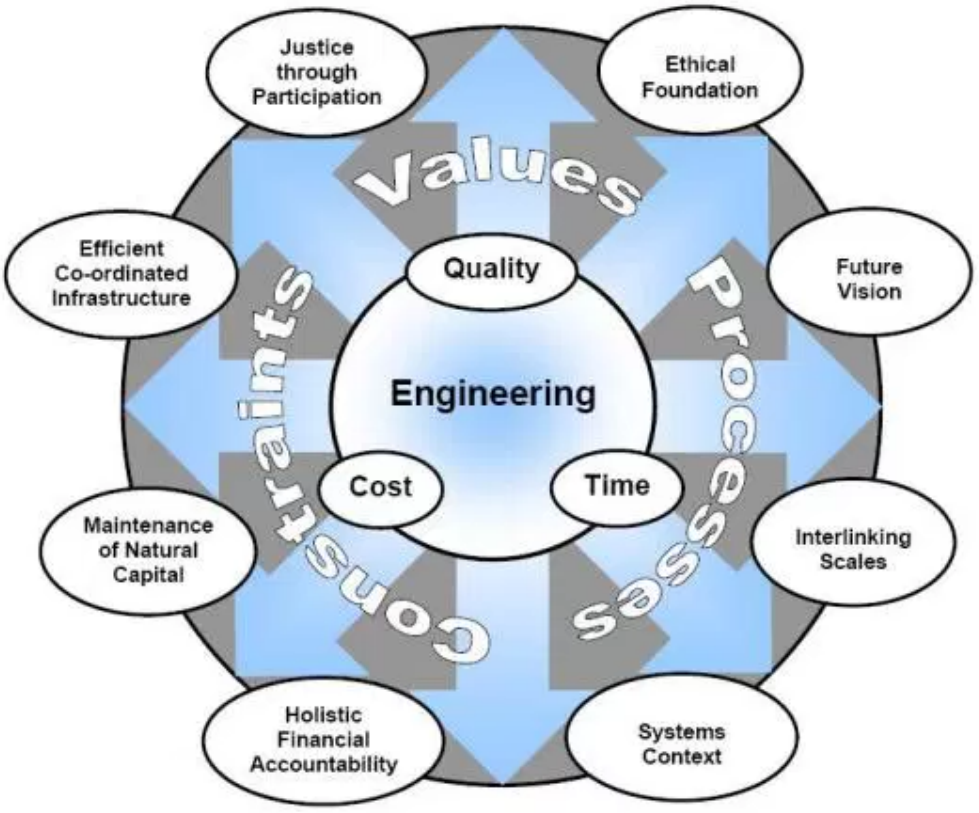
(http://greenearthbeveragesystems.com/images/GoGreenDiagram.jpg)

104. Sustainable infrastructure (Hokkaido University (http://www.eng.hokudai.ac.jp/COE-area/english/e_project/system3.html))



(http://www.eng.hokudai.ac.jp/COE-area/english/e_project/e_img/system3.gif)

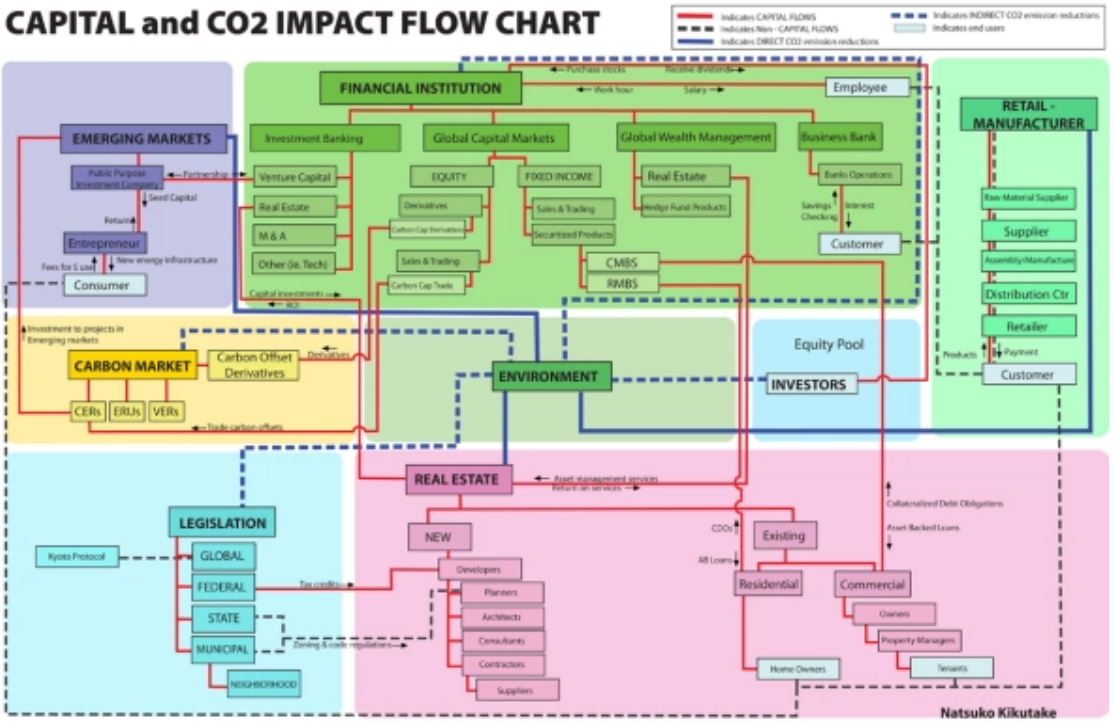
105. Widening engineering framework (University Cambridge Centre for Sustainable Development (http://www-g.eng.cam.ac.uk/sustdev/index.php?option=com_content&task=view&id=476&Itemid=1)) (Note the cost/time/quality at the centre – "pick two you can't have all three")



(http://www-g.eng.cam.ac.uk/sustdev/images/Framework.JPG)**106. Complexity of Sustainability in China**

(Financial) impact flow chart, Natsuko Kikutake NoBoundaries (http://noboundary.tumblr.com/post/34512892) via Zones of Emergency (http://www.zonesofemergency.net/)

(http://www.zonesofemergency.net/)



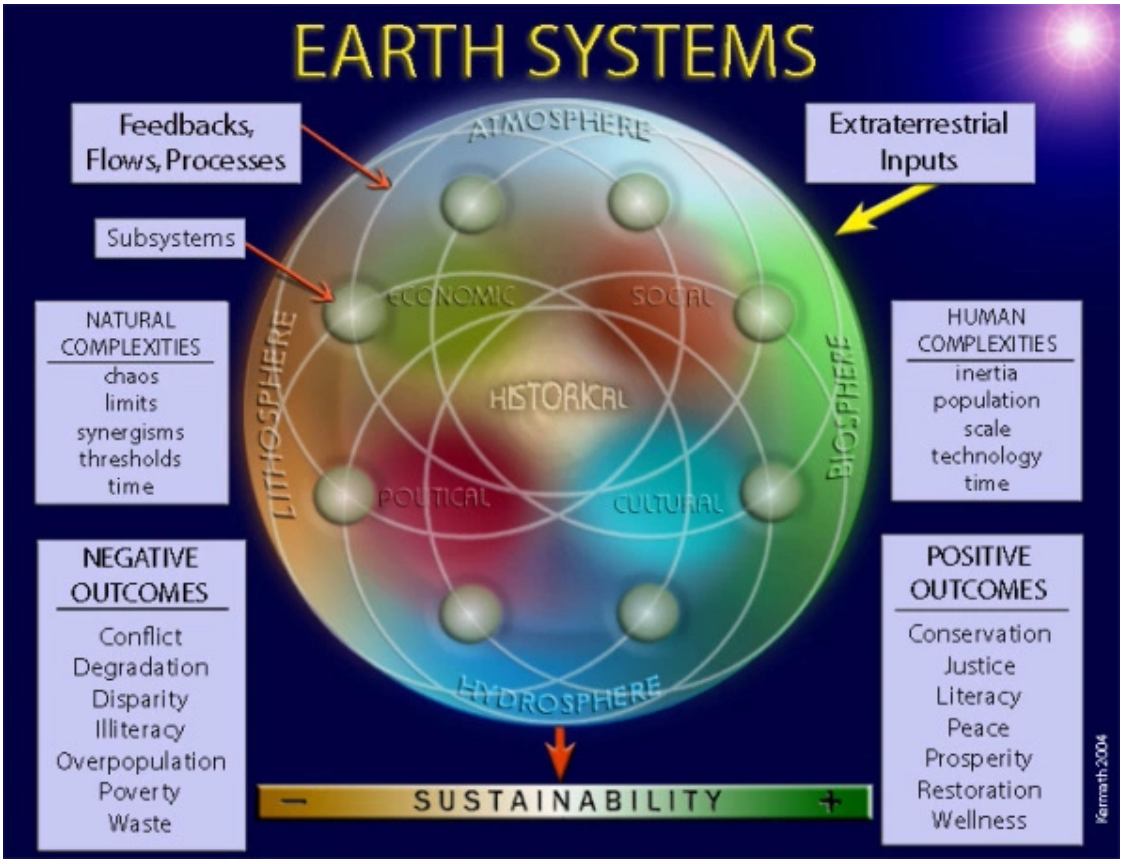
(http://www.zonesofemergency.net/wp-content/uploads/2008/04/11small.jpg)

107. Poverty linkages interactive from Density Design (http://www.densitydesign.org/)

(http://www.flickr.com/photos/densitydesign/3285286273/)

> *Who are the poor? Poverty is neither a number nor an index. It cannot be reduced to a line that divides those who are above and those who are below, establishing a unique space for social exclusion. Poverty is a multidimensional and complex phenomenon.*

108. Earth systems (Global Envrionmental Centre, U (http://www.uwsp.edu/cnr/gem/ambassador/)niversity of Wisconsin-Stevens Point)



(http://www.uwsp.edu/cnr/gem/ambassador/EarthSystems1.3.05small2.jpg)

109. Force field analysis model (Stuart Hill (http://eap.mcgill.ca/publications/eap23.htm), after Lewin)

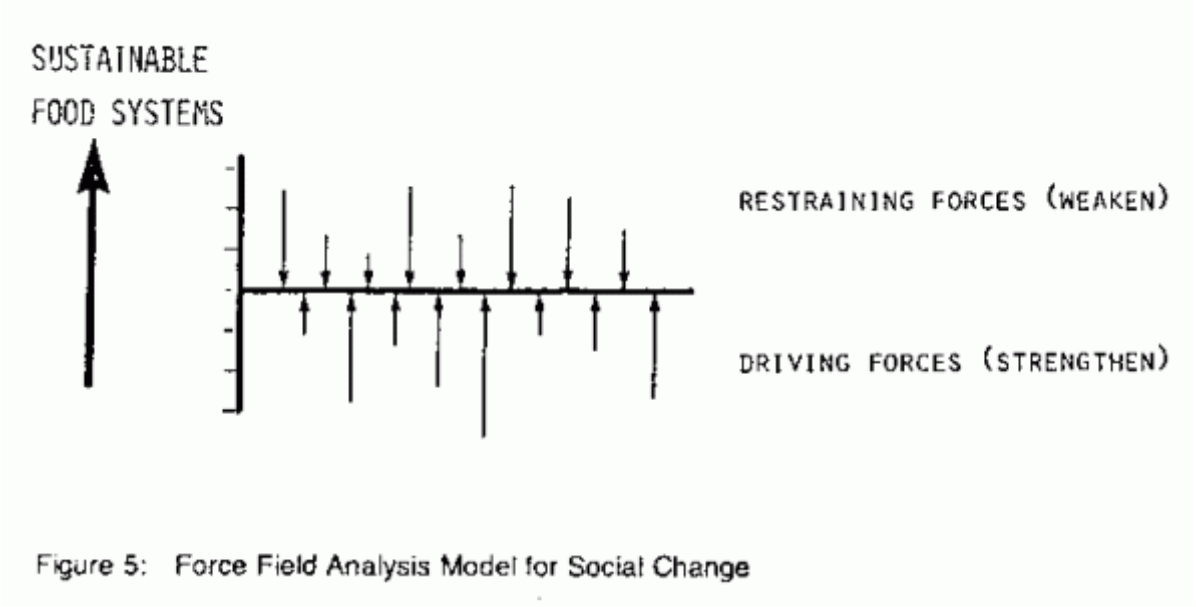
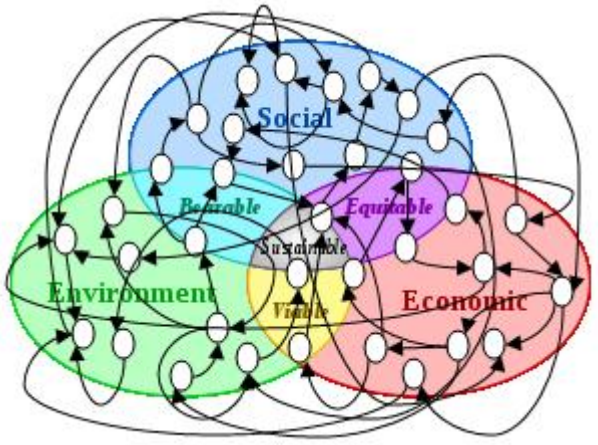


Figure 5: Force Field Analysis Model for Social Change

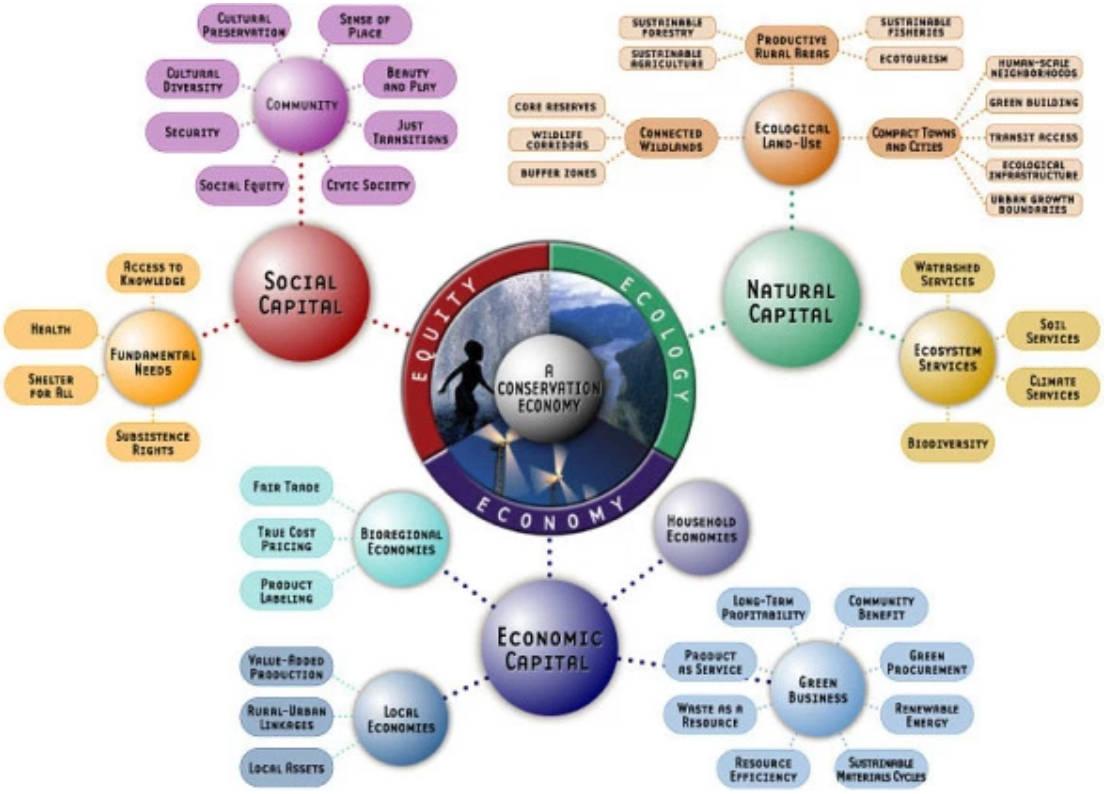
(http://eap.mcgill.ca/publications/eap23_f5.gif)

110. Venn Diagram as a web (Gutierrez, Sustainable Development Paradox (http://pelicanweb.org/solisustv05n01.html))



(http://pelicanweb.org/sustainabledevelopmentweb.jpg)

111. Pattern Map (Conservation Economist (http://www.conservationeconomy.net/pattern_map/noflash/index.html))

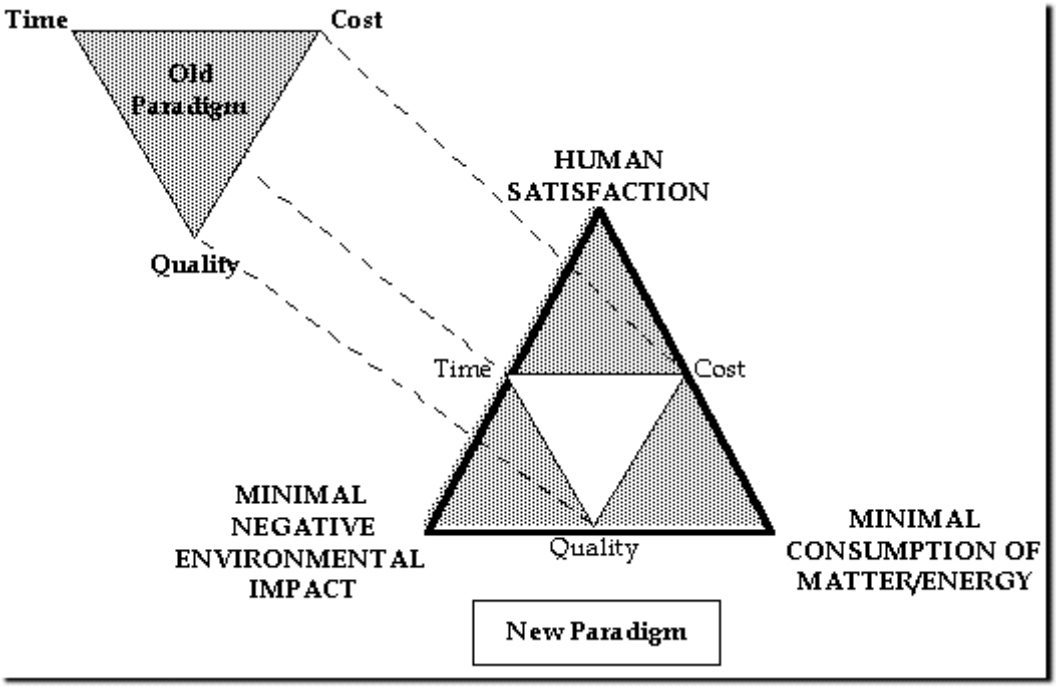


(http://www.conservationeconomy.net/pattern_map/images/alt_pattern_map.jpg)

112. 4 agendas for design (Design Issues Databan (http://www.a420.com/databank.htm)k)

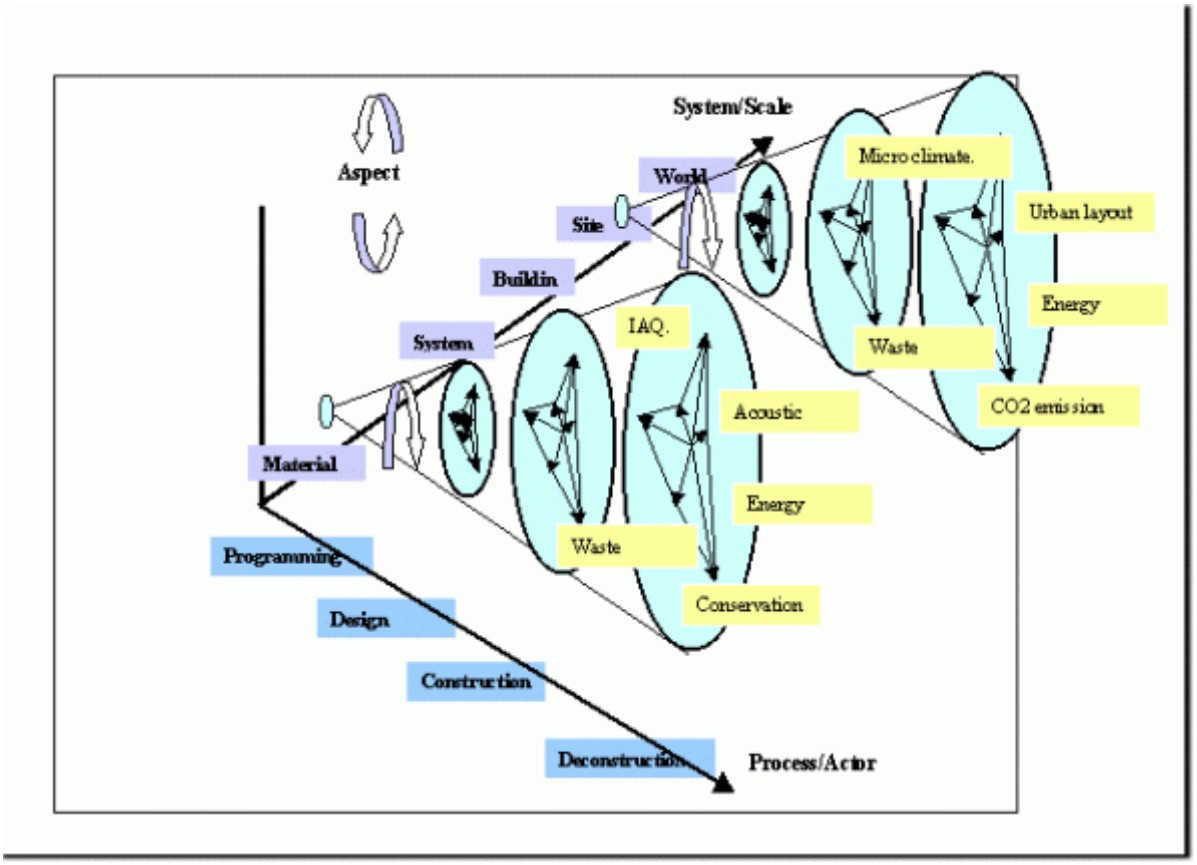
(http://www.a420.com/images/agenda-sustainable.jpg)

115. New paradigm (extension of time/cost/quality) Augenbroe and Pearce (http://www.p2pays.org/ref/14/13358.htm)



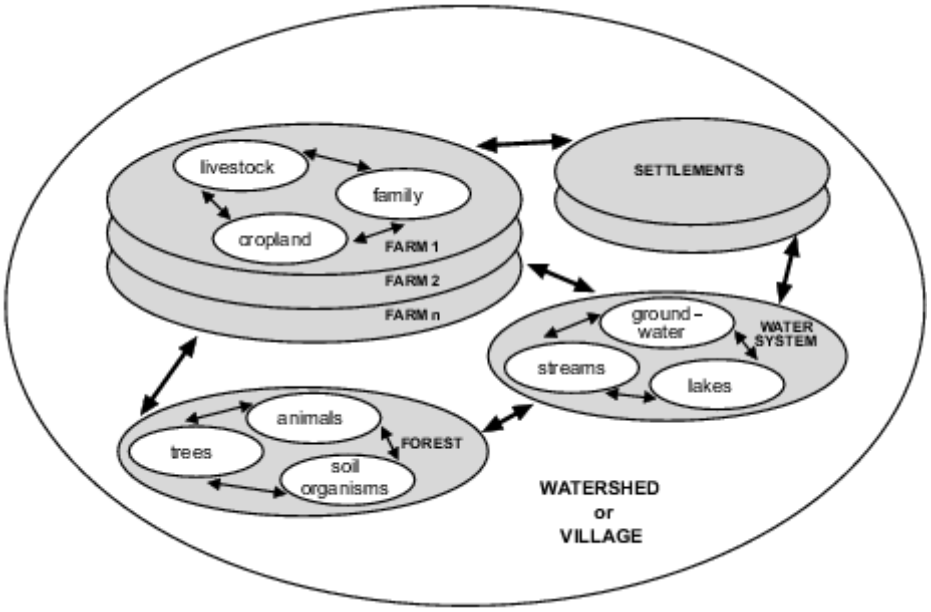
(http://www.p2pays.org/ref/14/13358/f1.gif)

116. Sustainable construction in a methodological framework, consisting of three main axes: System (boundary), Process (actor) and Aspect (sustainability). Augenbroe and Pearc (http://www.p2pays.org/ref/14/13358.htm)e

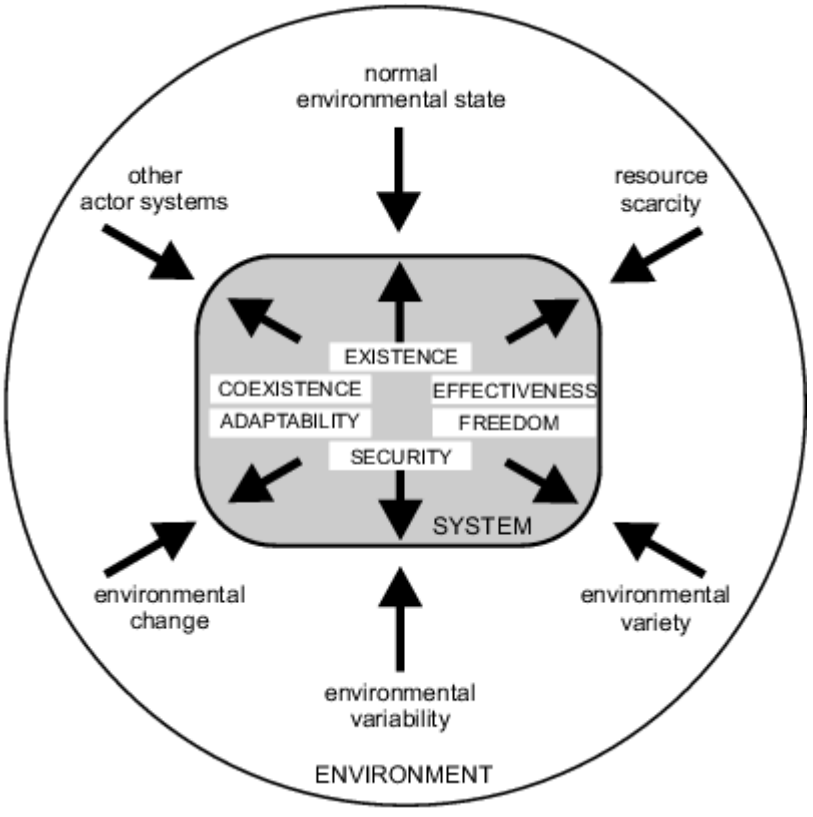


(http://www.a420.com/databank.htm)

117. Systems approach (Bossel (http://www.ecologyandsociety.org/vol5/iss2/art12/)) (Interacting nested systems)

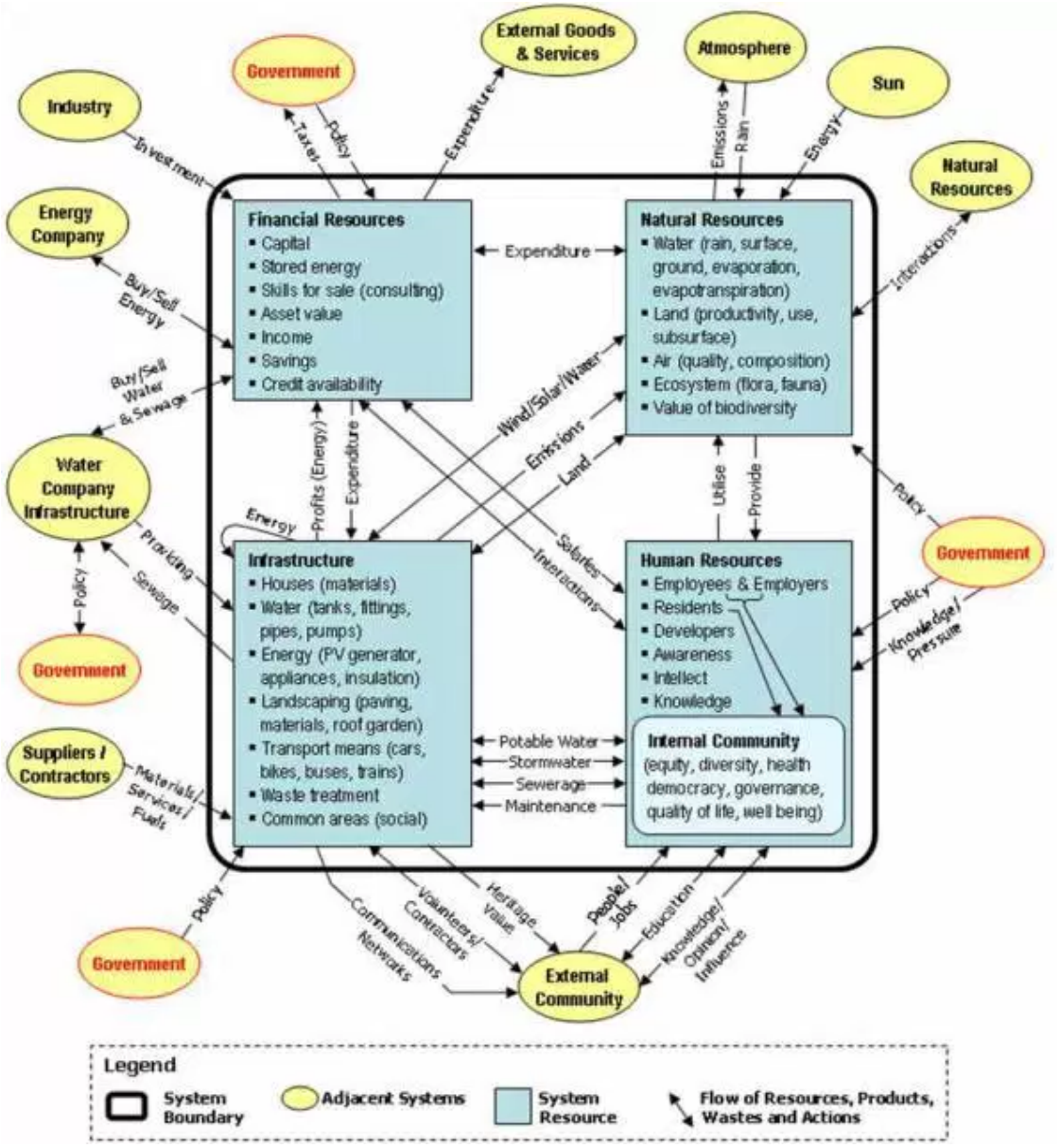


(http://www.ecologyandsociety.org/vol5/iss2/art12/figure1.gif)



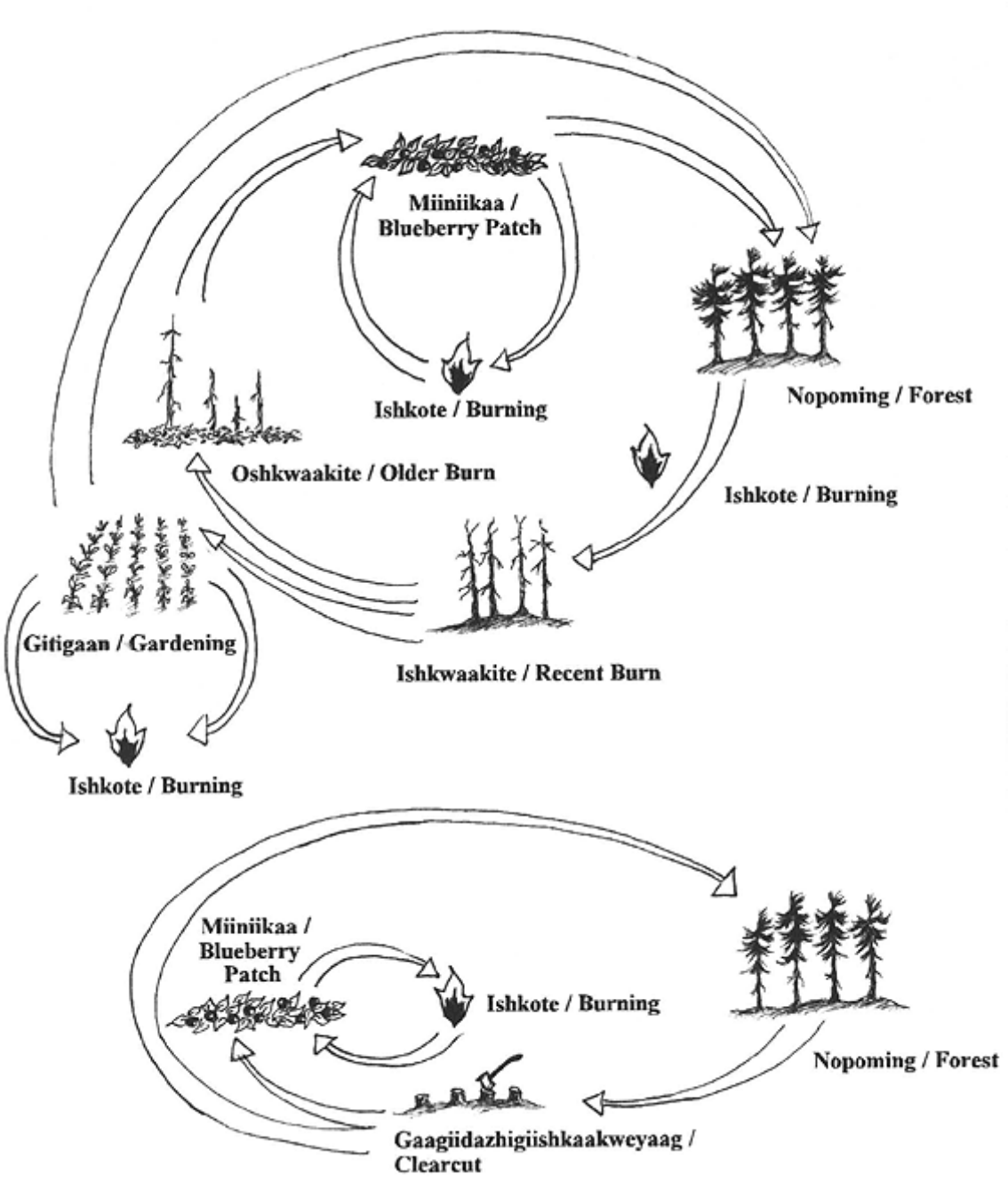
(http://www.ecologyandsociety.org/vol5/iss2/art12/figure4.gif)

118. Factors affecting housing sustainability (Daniell et al ANU (http://epress.anu.edu.au/cs/mobile_devices/ch07s03.html))



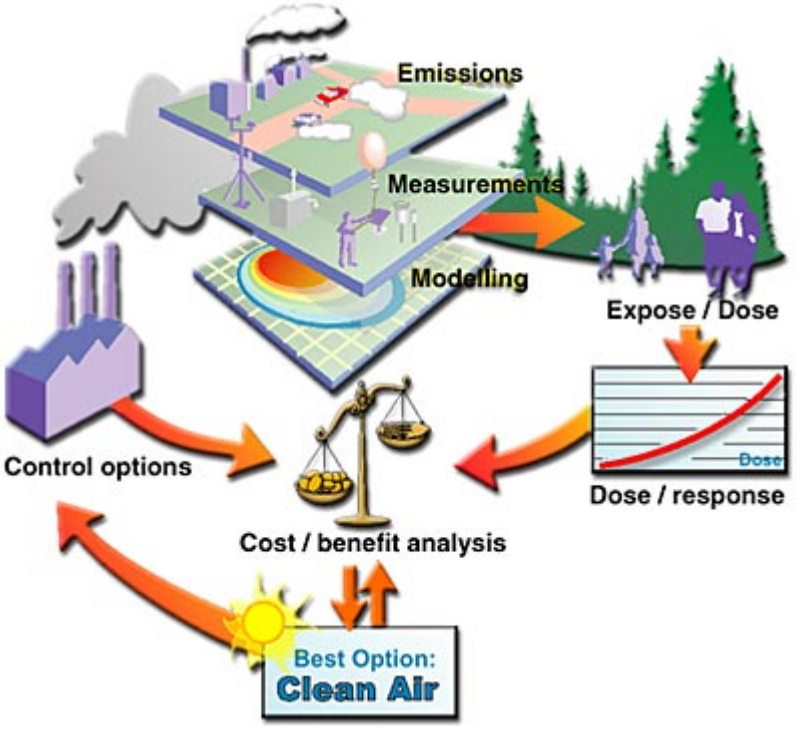
(http://epress.anu.edu.au/cs/chap7Daniell-final-2.jpg)

119. Anishinaabe Perception of Social-ecological Environments (Davidson-Hunt and Berkes (http://www.ecologyandsociety.org/vol8/iss1/art5/inline.html))



(http://www.ecologyandsociety.org/vol8/iss1/art5/figure4.gif)

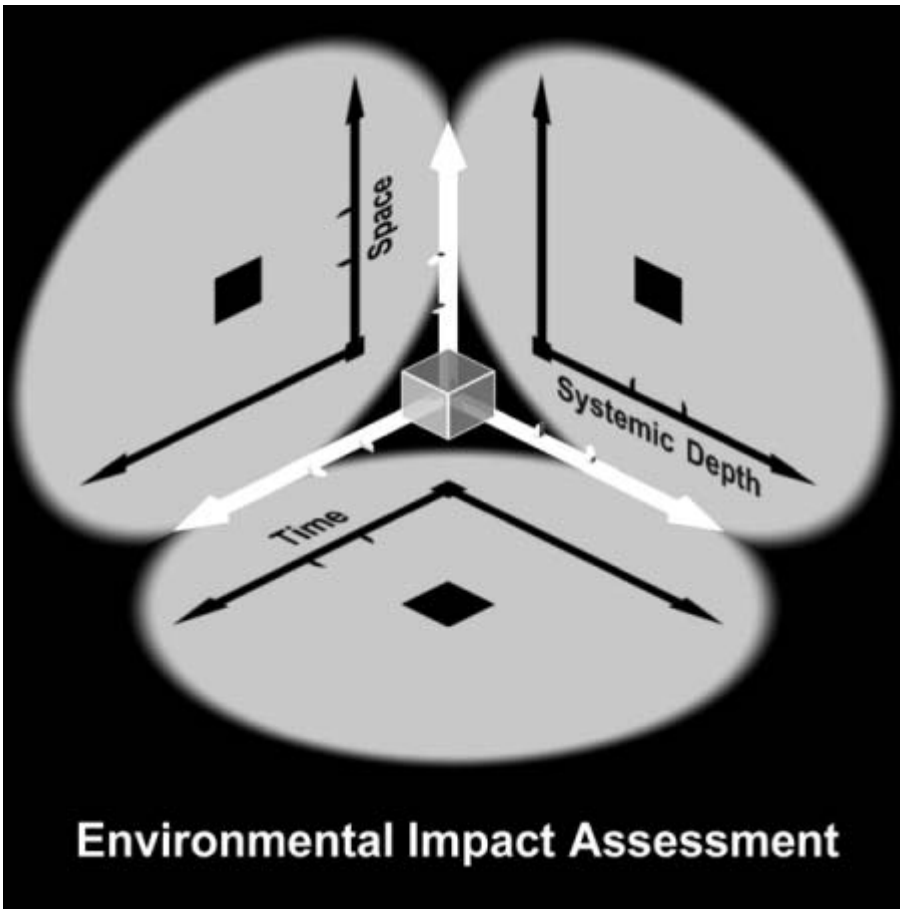
121. Consequence analysis (AirQUIS (http://tarantula.nilu.no/airquis/impact.htm))



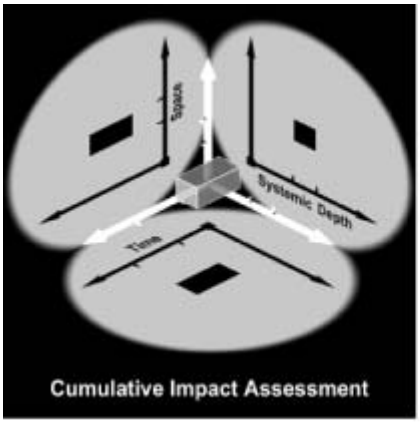
(http://tarantula.nilu.no/airquis/aq_images/airquis_system2.jpg)

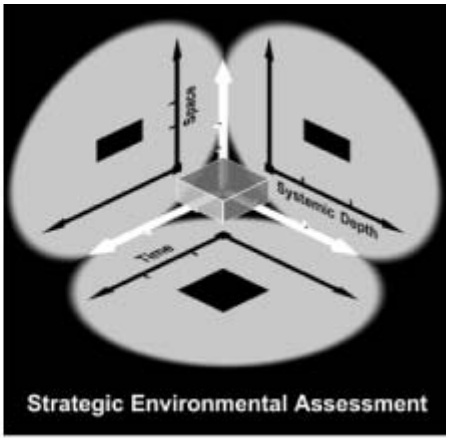
122. Dimensions (Canadian Environmental Assessment Agency (http://www.ceaa-acee.gc.ca/015/001/016/1_e.htm))

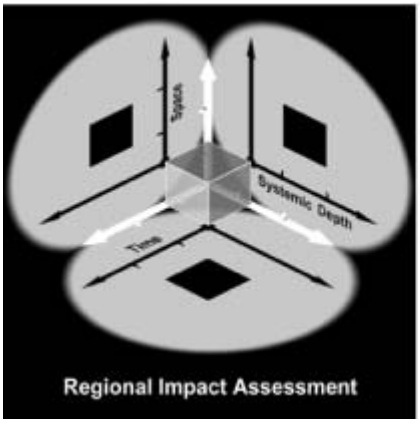
> *Evolution in environmental decision-making have defined circumstances in which more time (CIA) more space (RIA) or more systemic depth (SEA) is required. With each increase, the task (shown by the box) gets bigger and more cumbersome.* ***Sustainable development requires ongoing, integrated and systemically complex analyses, and the task is both large and complex***

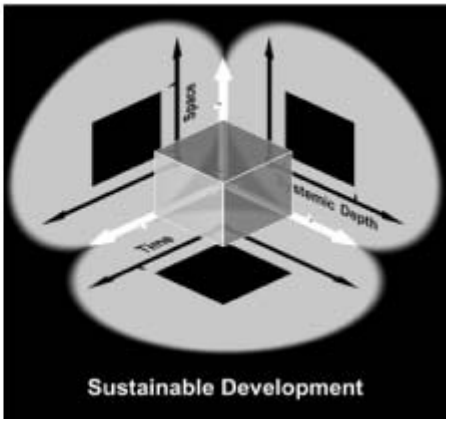


(http://www.ceaa-acee.gc.ca/015/001/016/images/Fig-1_e.jpg)



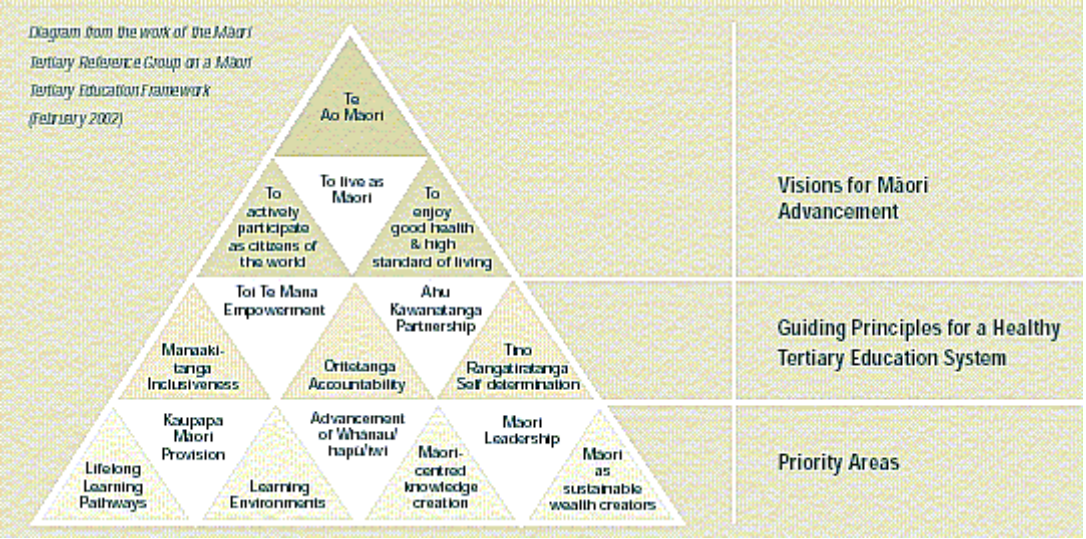






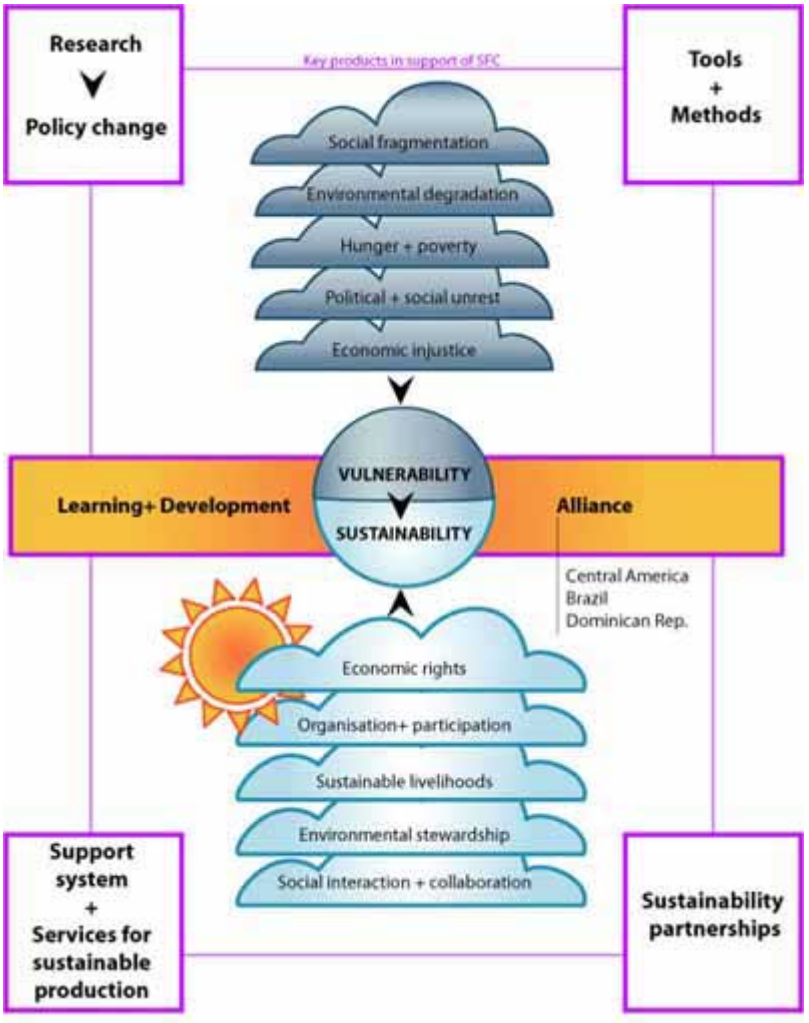
(http://www.ceaa-acee.gc.ca/015/001/016/images/Fig-2_e.jpg)

123. Maori Tertiary Framework (NZ Minstry of Education (http://wiki.tertiary.govt.nz/~TESMon/Framework1/Strategy2))



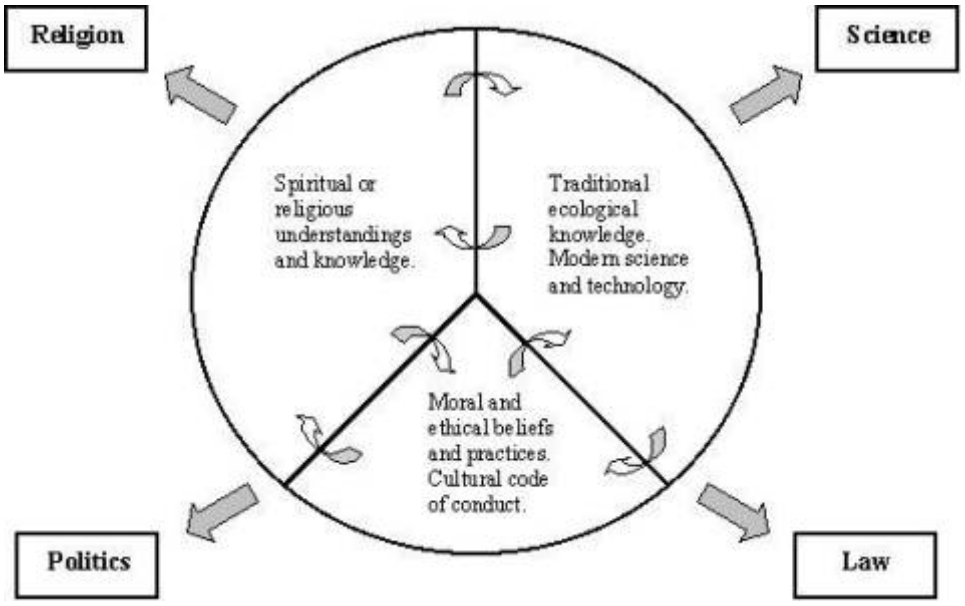
(http://wiki.tertiary.govt.nz/tertiary/wikifarm/TESMon/uploads/Framework1/MaoriTertiaryFramework.g

124. Sustainability/Vulnerability (google caches to here, http://www.sustainablefoodlab.org (http://www.sustainablefoodlab.org) but traced beyond that).



(http://www.sustainablefood.org/sitedesign/collegedata/glifood.org/i/sustainability.jpg)

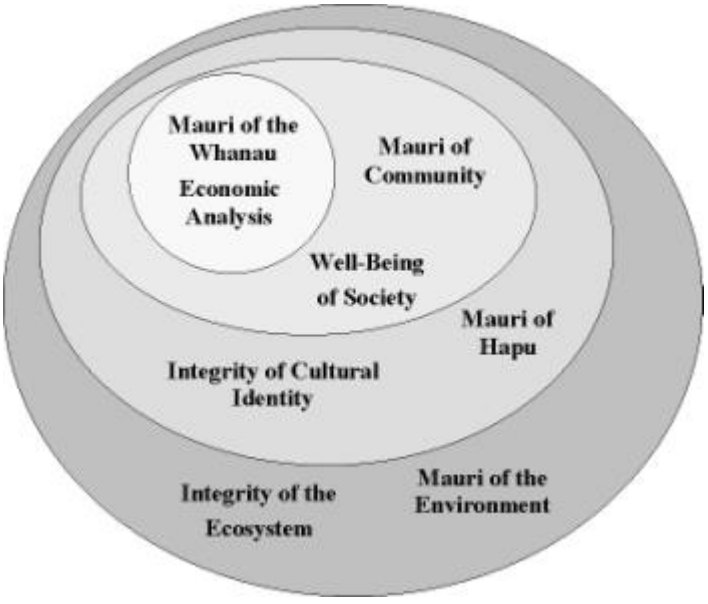
125. Holistic and fragmented worldviews (from Morgan, 2004b after Roberts, 2001, src: David Rei Miller, Western and Mäori Values for Sustainable Development) (http://www.firstfound.org/david%20miller.htm)



(http://www.firstfound.org/david%202.jpg)

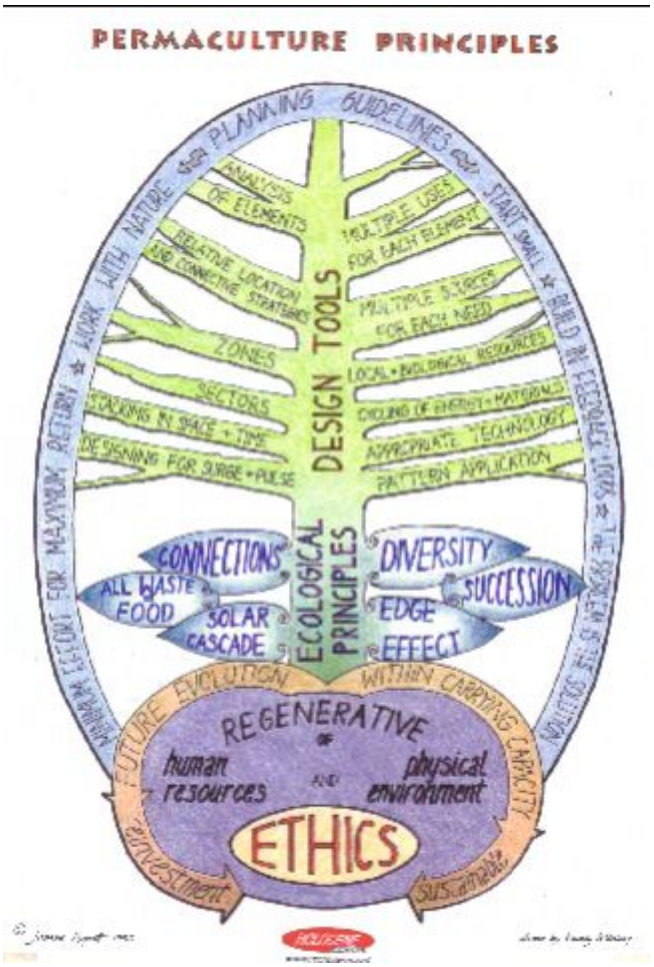
126. Mauri model (Morgan, 2004a src: David Rei Miller, Western and Mäori Values for Sustainable Development) (http://www.firstfound.org/david%20miller.htm)

> *There is thus a need for a decision-making tool that can be used at the Western-Māori interface, which is where most local government projects are developed. The mauri model developed by Kepa Morgan of Mahi Maioro Professionals is a set of assessment criteria similar to the Hellström model. It uses terms from Western science and mātauranga Māori that may be considered analogous. Corresponding to the four aspects of sustainability (environment, culture, society and economy) are four levels or spheres: the environment, hapu, community and whānau*



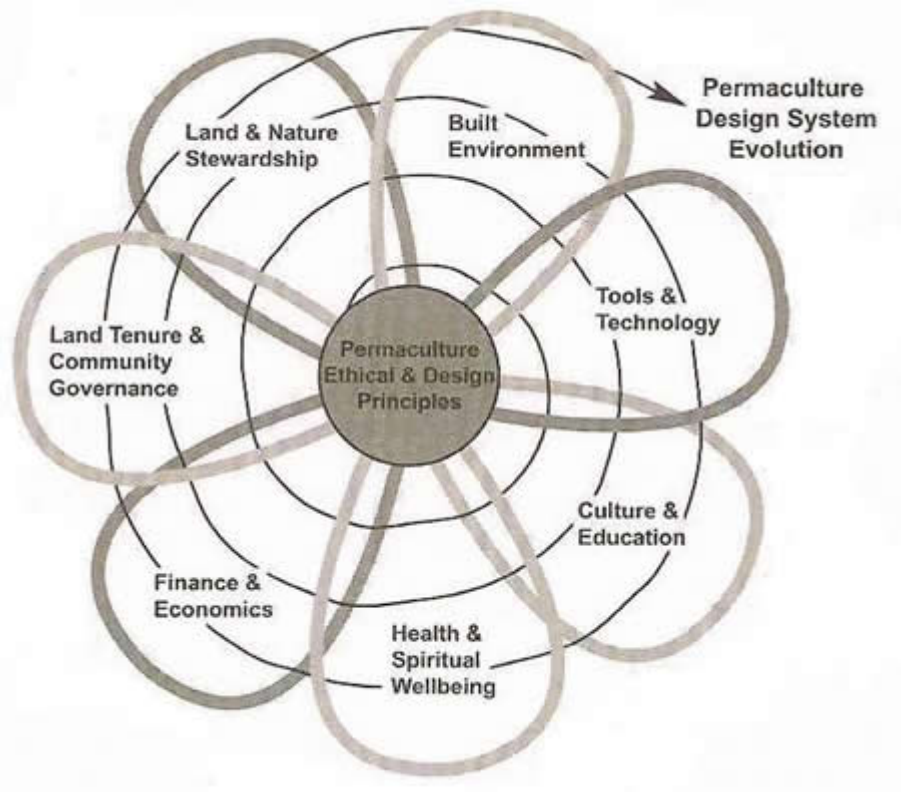
(http://www.firstfound.org/david%209.jpg)

127. Permaculture design principles (Tippett, Holocene (http://www.holocene.net/permaculture.htm))



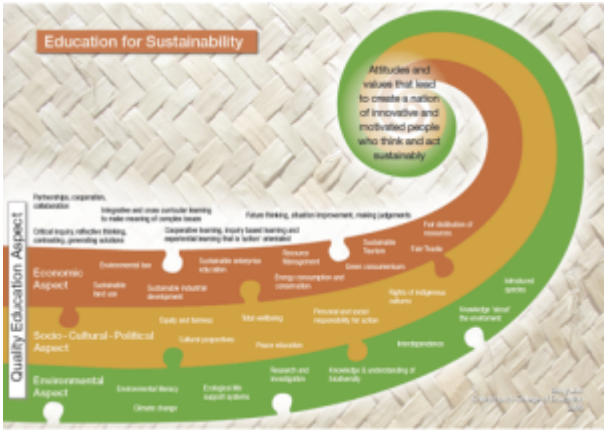
(http://www.inspiredeconomies.com/intelligibleecosystems/images/permaculture_poster_-_holocene.net.jpg)

128. Permaculture design principles (widely used…here, (http://www.centerforsustainablecommunity.org/Events/Permaculture/PermWorkshops2005.html)also here) (http://www.holmgren.com.au/Images/GIFs/PCflower3.gif)

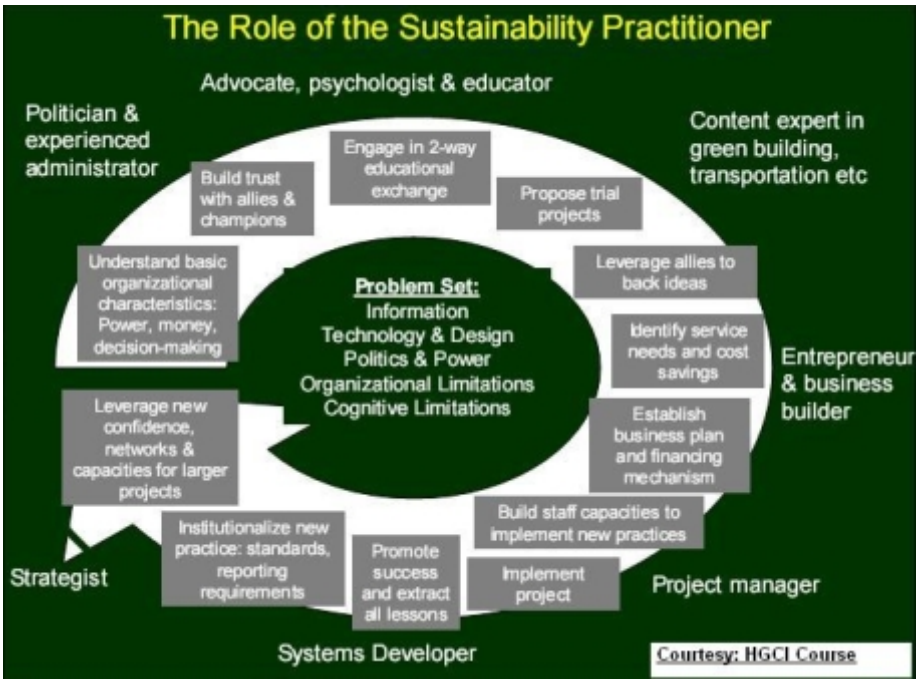


(http://www.centerforsustainablecommunity.org/images/Permaculture%20Flower%20CLEAN.jpg)

129. (http://www.e4s.org.nz/efs/about)**Barry Law's waka prow** (http://www.e4s.org.nz/efs/about)



130. Sustainability Practitioner (Leith Sharp – ex Harvard? via World is Green (http://worldisgreen.com/2007/06/28/environmental-management-as-a-business-service/))

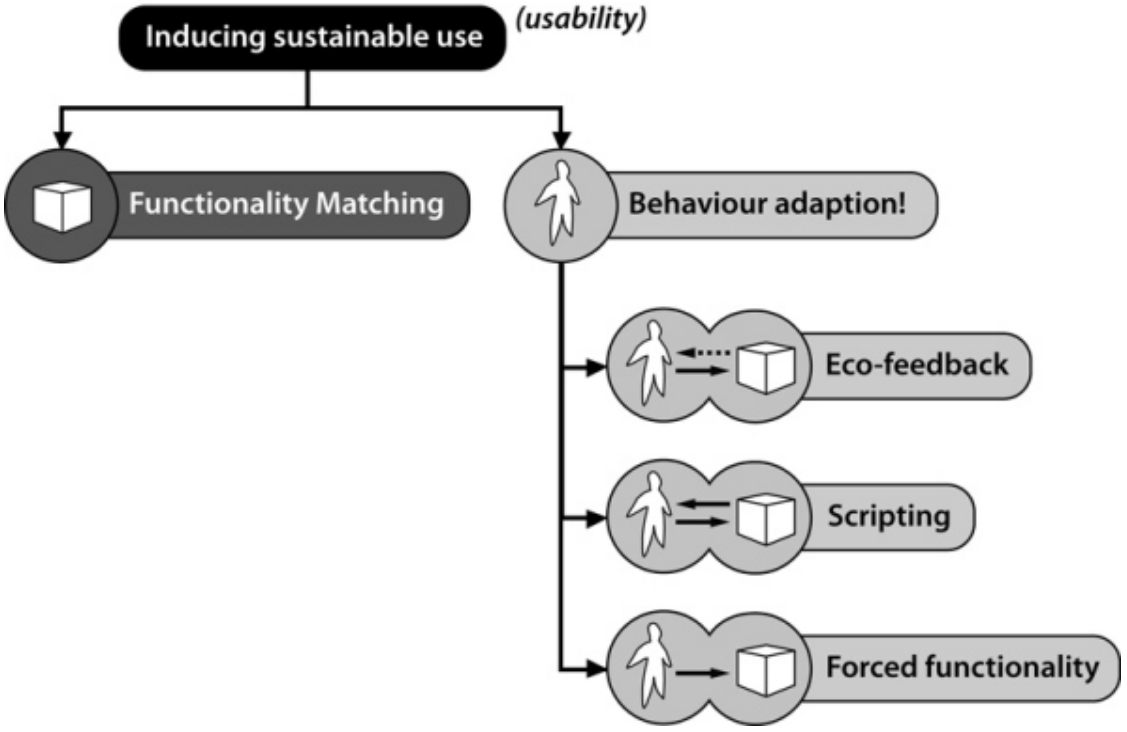


131. Deisgn process Wever and vanKuijk (http://studiolab.io.tudelft.nl/static/gems/vankuijk/WeverKuijkBoksIJSE.pdf)

Four design strategies
We provide a typology of four user-centered design strategies for inducing sustainable behavior.

- *Functionality matching: adapt a product better to the actual use by consumers and thereby try to minimize negative side effects;*
- *Eco-feedback: the user is presented with specific information on the impact of his or her current behavior, and it is left to the user to relate this information to his or her own behaviour, and adapt this behaviour, or not;*
- *Scripting: creating obstacles for unsustainable use, or making sustainable behaviour so easy, it is performed almost without thinking about it;*
- *Forced functionality: making products adapt automatically to changing circumstances, or to design-in strong obstacles to prevent unsustainable behaviour.*

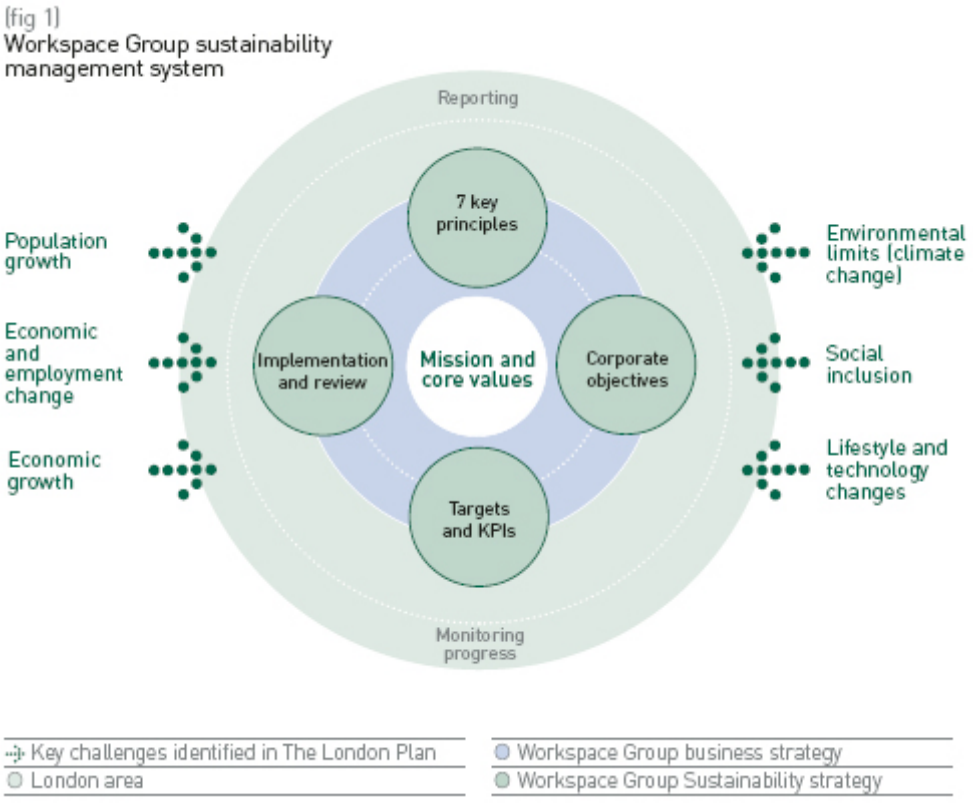
The four strategies are supported with examples from packaging, automotive and consumer electronics.



132. sustainability governance and reporting from Maggie Lawton (http://www.landcareresearch.co.nz/publications/annualreport_0506/sustainability_reporting.asp).

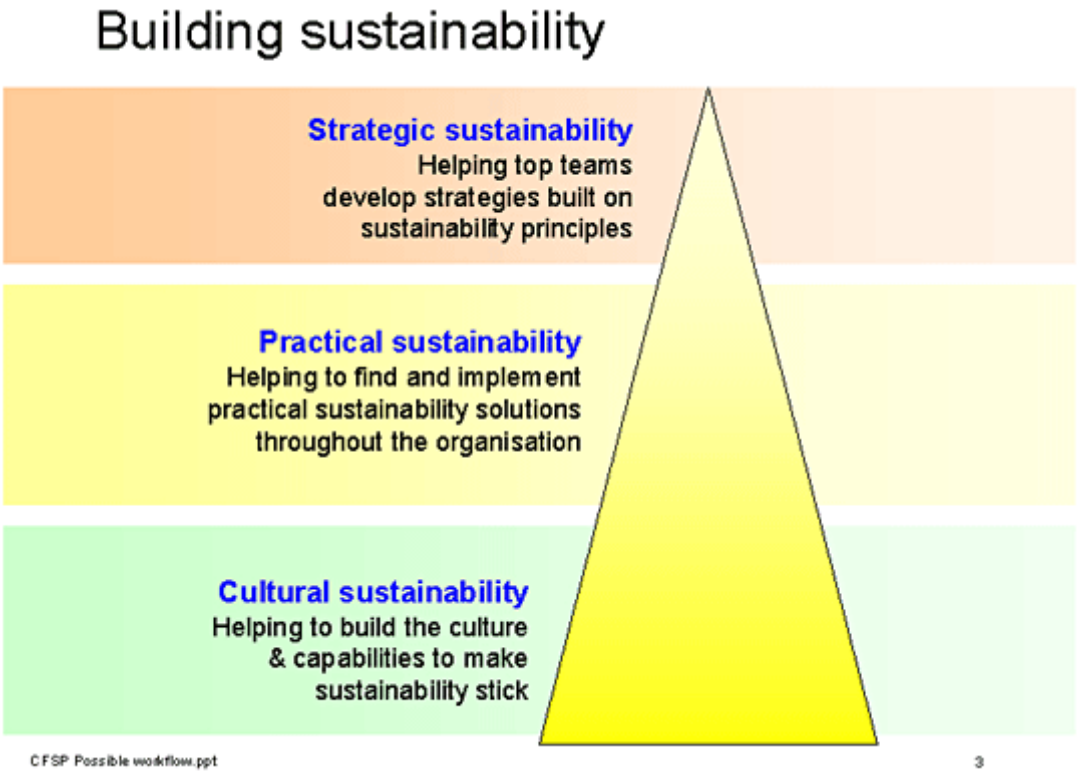
(http://www.landcareresearch.co.nz/publications/annualreport_0506/images/diagram_governance.jpg)

133. similar space from Workspace (http://www.workspacegroup.co.uk/investors/?pageID=4.24.75.318) (pdf of seven key principles (http://www.workspacegroup.co.uk/UserFiles/File/7%20Key%20Principles%20in%20full%20210606.pdf))



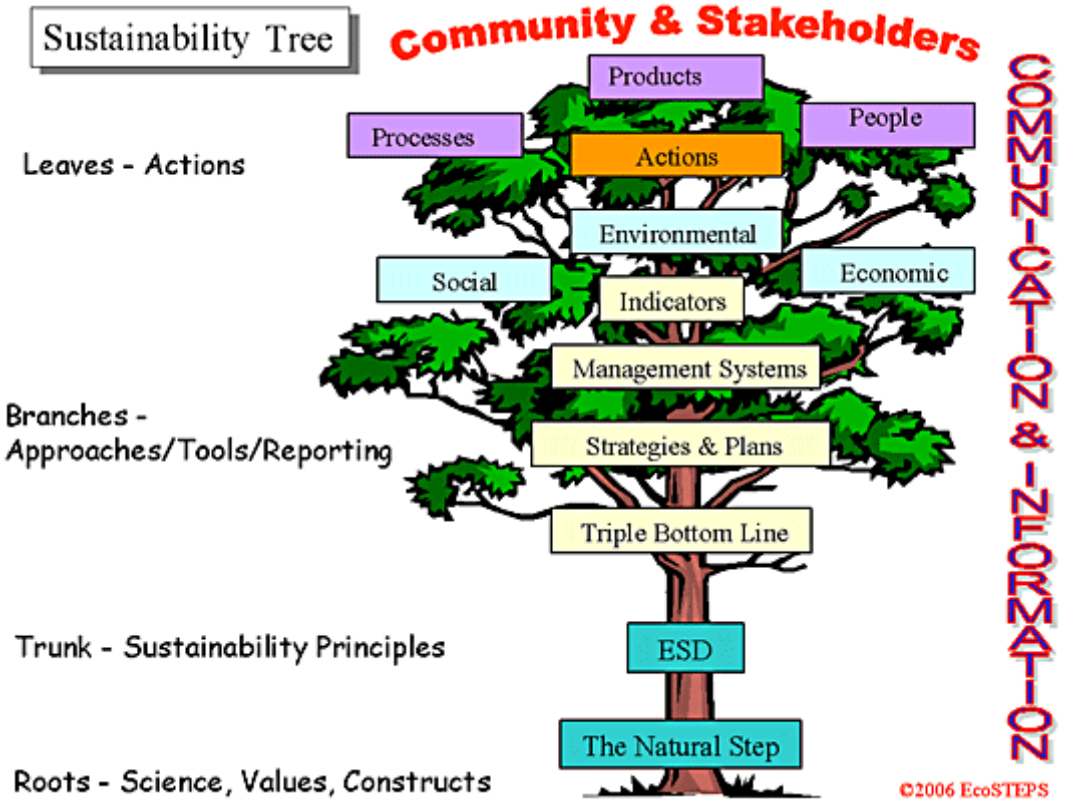
(http://www.workspacegroup.co.uk/UserFiles/Image/Sustainability%20Management%20System.jpg)

134. Sustainability on different dimensions (Ecosteps (http://www.ecosteps.com.au/content.asp?id=65))



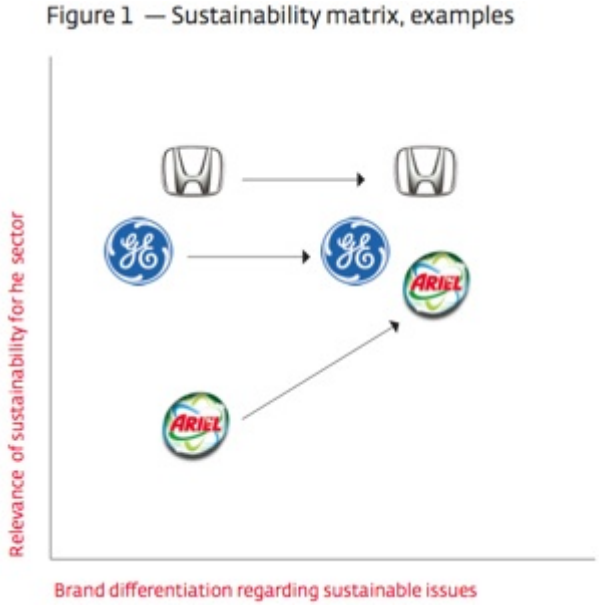
(http://www.ecosteps.com.au/imagesDB/webPages/Building_Sustainability.gif)

135. Sustainability Tree (Ecosteps (http://www.ecosteps.com.au/content.asp?id=58))



(http://www.ecosteps.com.au/imagesDB/webPages/Sustainability_Tree(1).gif)

136. Sustainability related to brand value (Oliveira and Sullivan reported on Environmental Leader (http://www.environmentalleader.com/2008/09/28/sustainability-and-its-impact-on-brand-value/))



(http://www.environmentalleader.com/wp-content/uploads/2008/09/interbrandchart1.jpg)

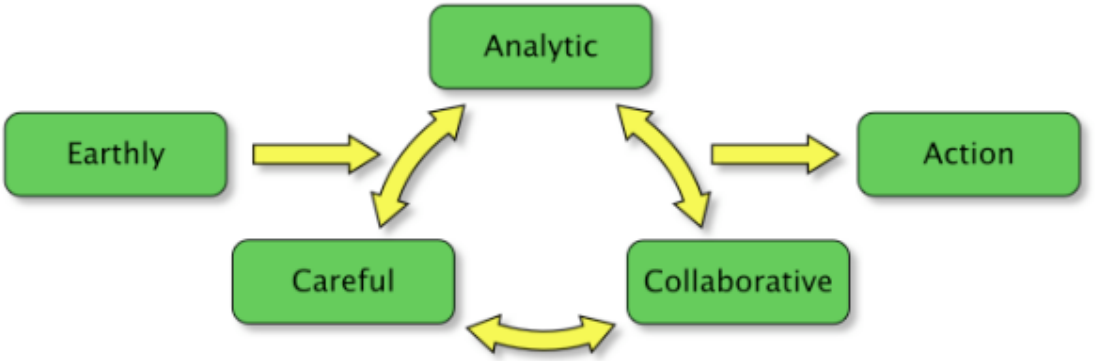
137. Mindmap from Natarajan Ishwaran and Rob Bernard (http://blogs.msdn.com/elf08/archive/2008/07/08/endnotes-e-technology-an-ally-of-the-planet.aspx)

(http://blogs.msdn.com/blogfiles/elf08/WindowsLiveWriter/EndnoteseTechnologyAnAllyofthePlanet_A0

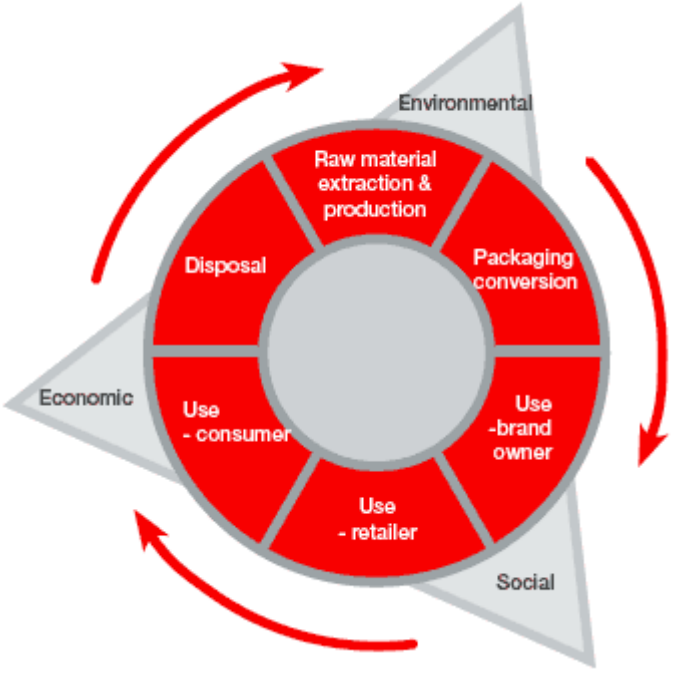
Here's more diagrams to explain sustainability (earlier post (http://), 1-137 (http://)).

138. 5 mindsets (http://5minds.mespom.eu/)

- ***Earthly*** *– focusing on the interplay between environmental and developmental agendas in the short- and long-term both globally and locally;*
- ***Analytic*** *– based on 'systems thinking' and encompassing assessment, planning and management;*
- ***Careful*** *– based on respect for complexity and uncertainty;*
- ***Collaborative*** *– focusing on the interplay of interests, values, cultures and capacities of various actors;*
- ***Action*** *– guiding strategy formation to manage change, continuity and learning for sustainability.*

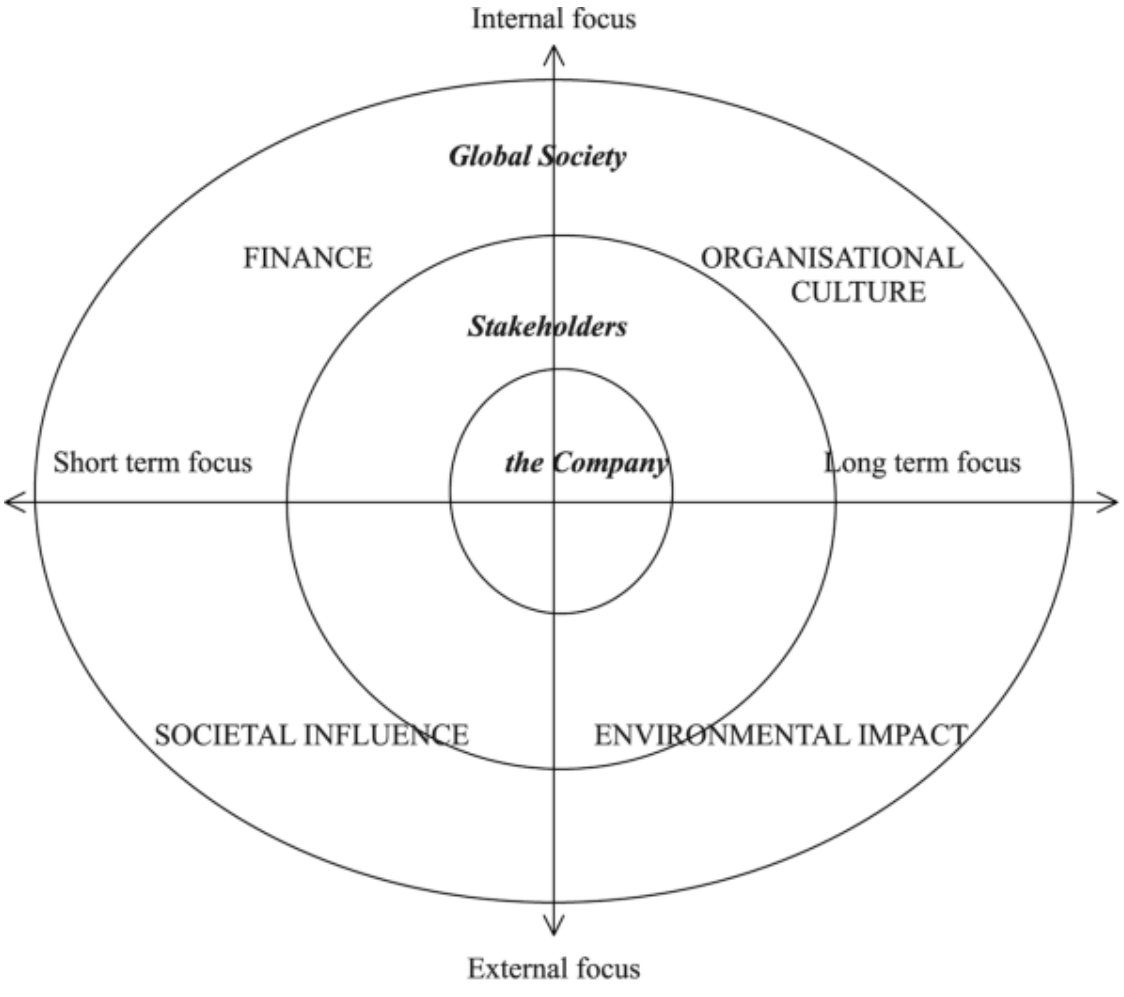


(http://5minds.mespom.eu/files/images/5minds_0.png)**139. 3 aspects mixed with a production cycle** (Huhtamaki) (http://www.huhtamaki.com/AREN/2007/eng/sustainability/index.html)



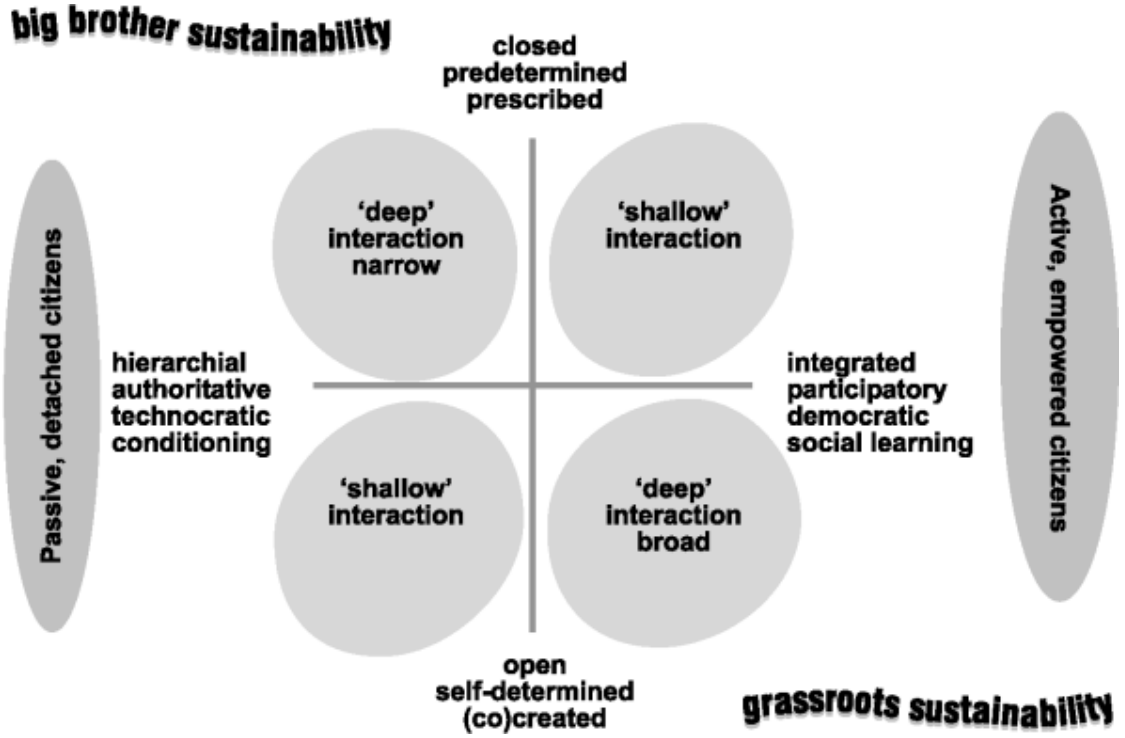
(http://www.huhtamaki.com/AREN/2007/img/sustainability_opportunities+risks.gif)

140. Governance and sustainability (Aras and Crowther (http://www.emeraldinsight.com/Insight/viewContentItem.do?contentType=Article&hdAction=lnkhtml&contentId=1718463&dType=SUB&history=false))



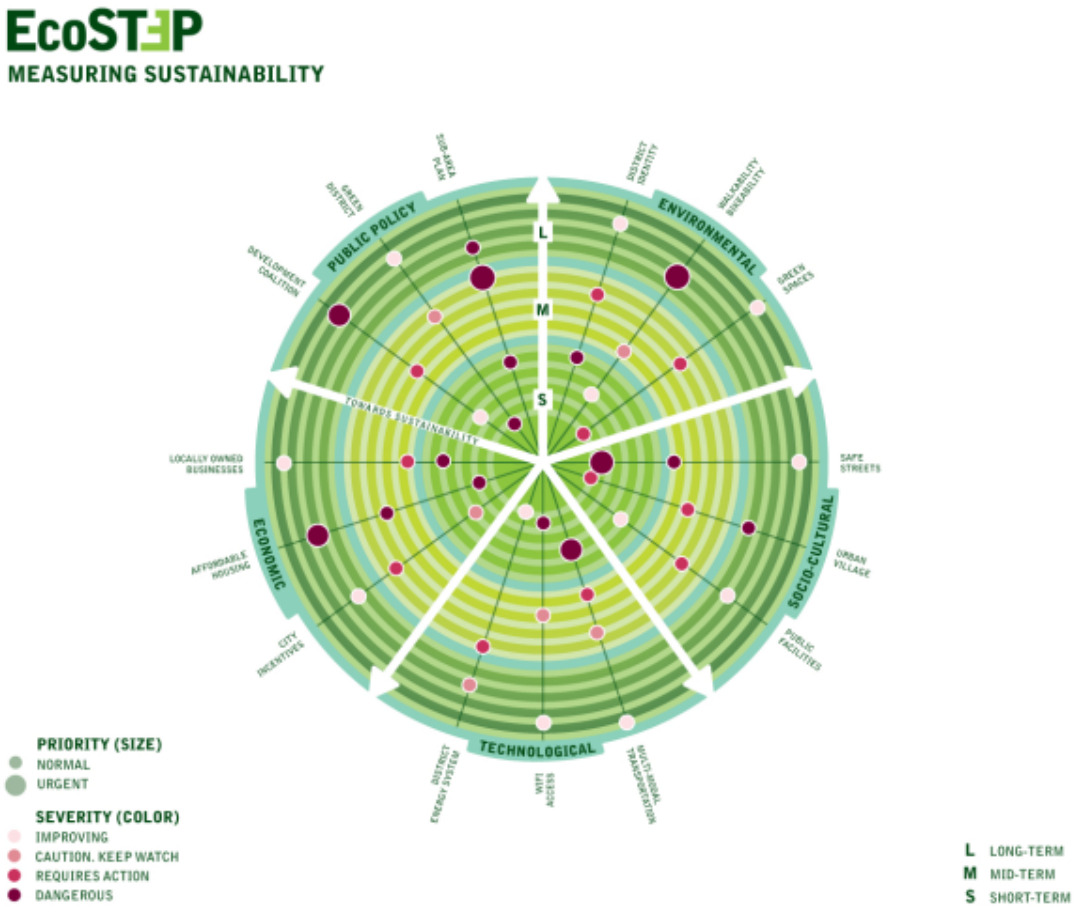
(http://www.emeraldinsight.com/fig/0010460305001.png)

141. Education for *sustainable* development without the participatory element as "*big brother sustainability*" Wals and Jickling (http://www.emeraldinsight.com/Insight/ViewContentServlet?Filename=Published/EmeraldFullTextArticle/Articles/2490030302.html)



(http://www.emeraldinsight.com/fig/2490030302001.png)

142. Assessment tool for cities (Ecostep (http://nslw.org/resources.html))

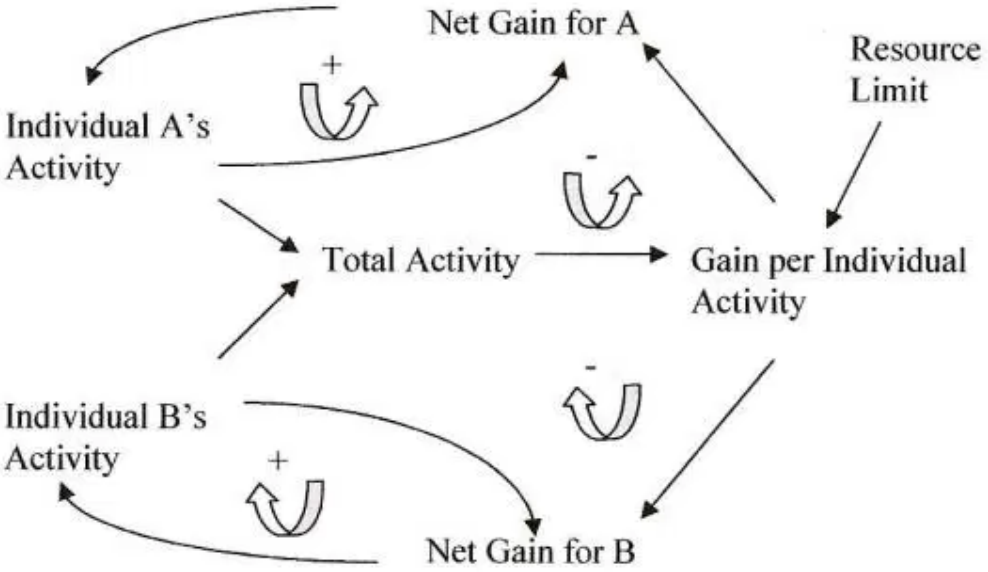


(http://nslw.org/images/ecostep_large.png)

143. Sustainability leadership principles (Mary Ferdig, Sustainability Leadership Institute (http://www.sustainabilityleaders.org/resource/sli.php) via Nebraska Sustainability Leadership Workshop (http://nslw.org/resources.html))

(http://nslw.org/images/leadership_principles_large.png)

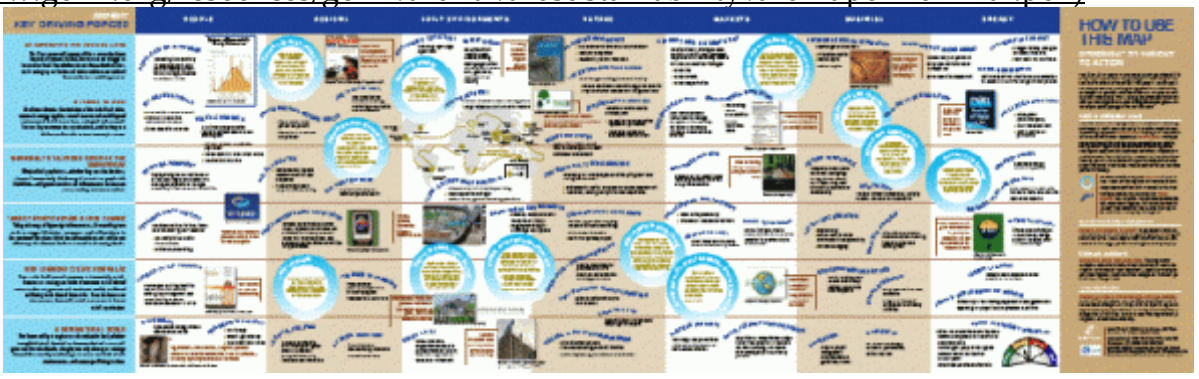
144. Tragedy of the Commons depicted in system terms (Senge via Warwick (http://www.aug.edu/dvskel/Warwick2006B.htm)).



(http://www.aug.edu/dvskel/Warwic4.jpg)

145. Map of Future Forces Affecting Sustainability (http://www.gemi.org/resources/gemi%20iftf%20sustainability%20map8-2-07final.pdf) (Global Environmental Management Initiative (http://www.gemi.org/sustainabilitymap/))

(http://www.gemi.org/resources/gemi%20iftf%20sustainability%20map8-2-07final.pdf)

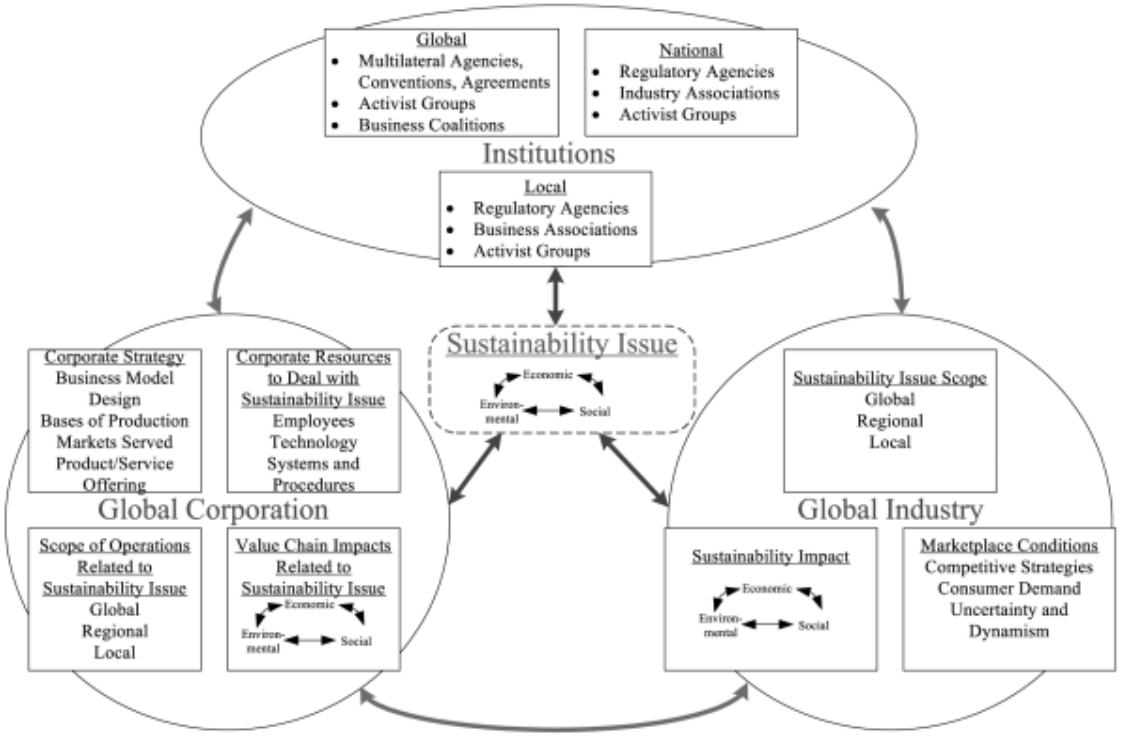


(http://www.gemi.org/sustainabilitymap/images/header.gif)

An Imperative for Looking Long: The 21st century will test our ability to grasp the future impacts of present choices, but even as we struggle to incorporate future knowledge into our day-to-day decisions, we're tuning up our bodies and minds and even our cultural frameworks for a much longer view.

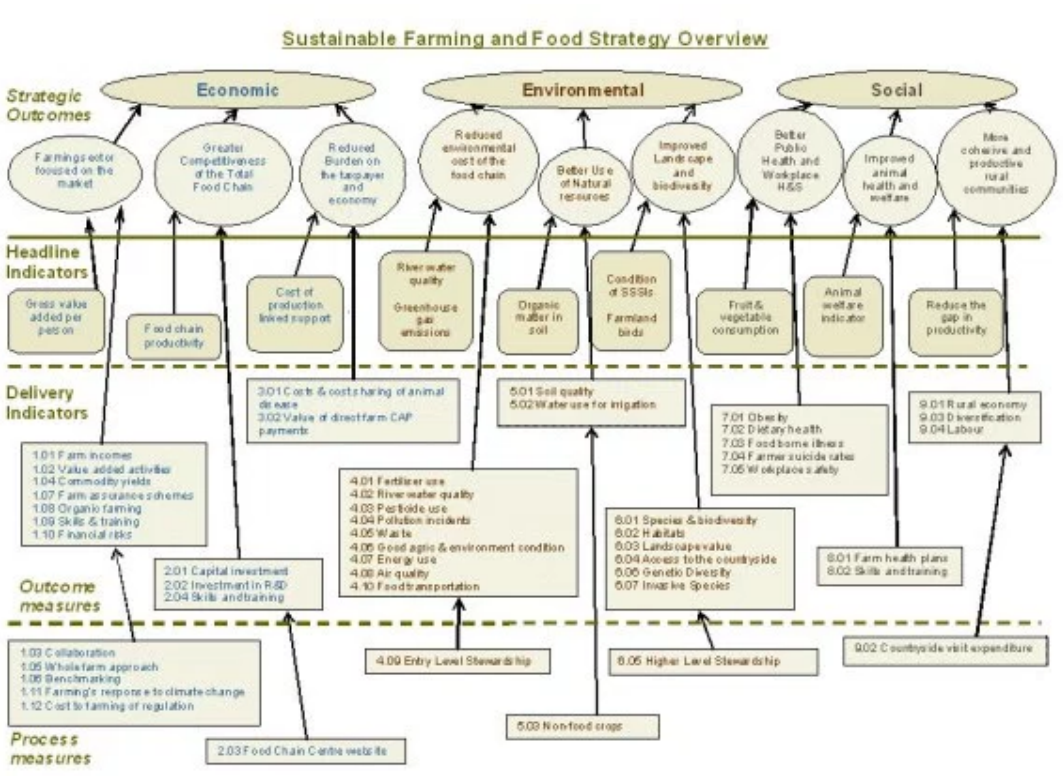
146.

Global sustainability related to international business



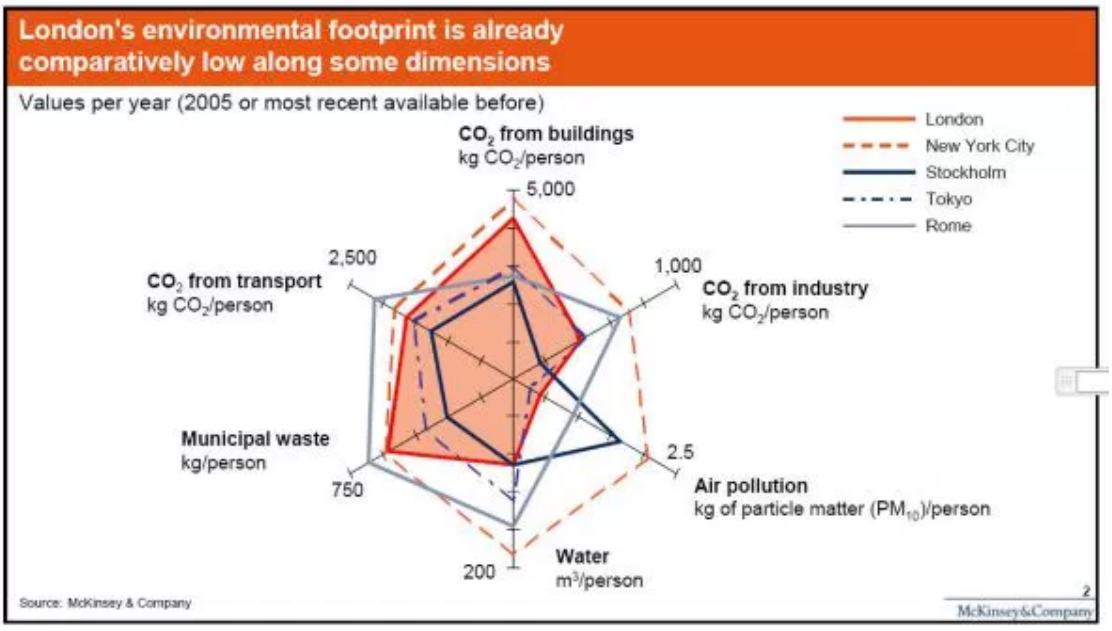
(http://www.emeraldinsight.com/fig/2490060206002.png)

147. Sustainable farming (DEFRA (https://statistics.defra.gov.uk/esg/indicators/overview.htm))

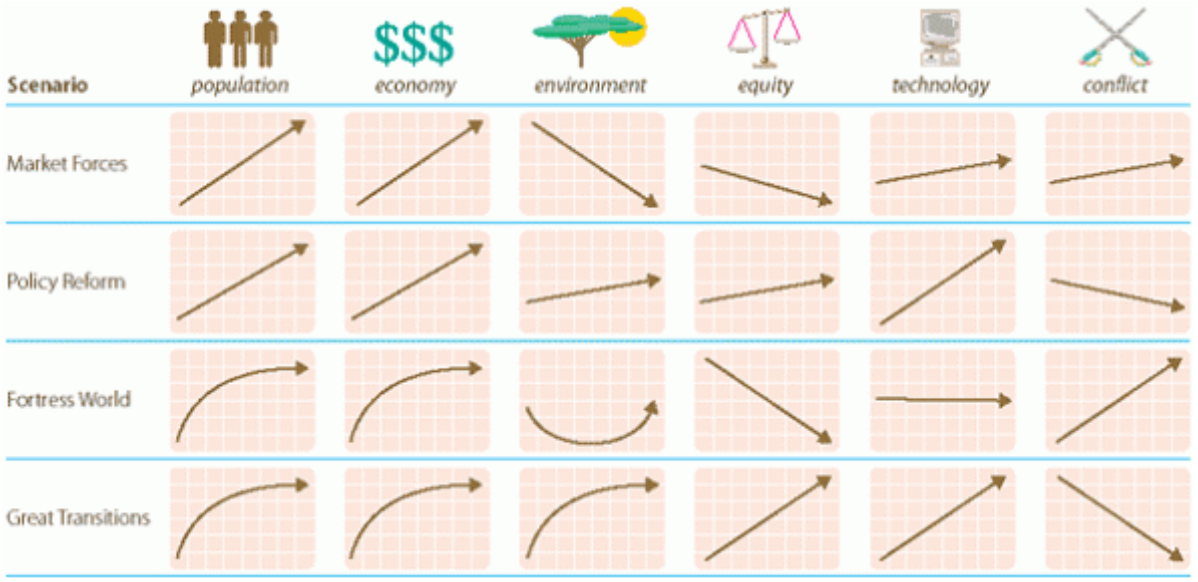


(https://statistics.defra.gov.uk/esg/indicators/images/SFFS_chart_lrg.jpg)

148. City comparison (McKinsey company, in a study on the transition to sustainability for the greater London area (GLA) (http://w1.siemens.com/press/pool/de/events/media_summit_2008/SiemensMediaSummit_Presentation_M

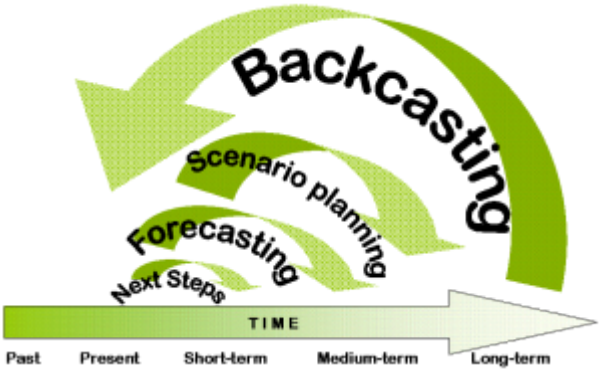


149. Scenarios (Gallopin et al via Africa Outlook (http://www.unep.org/dewa/Africa/publications/AEO-1/264.htm)UNEP)



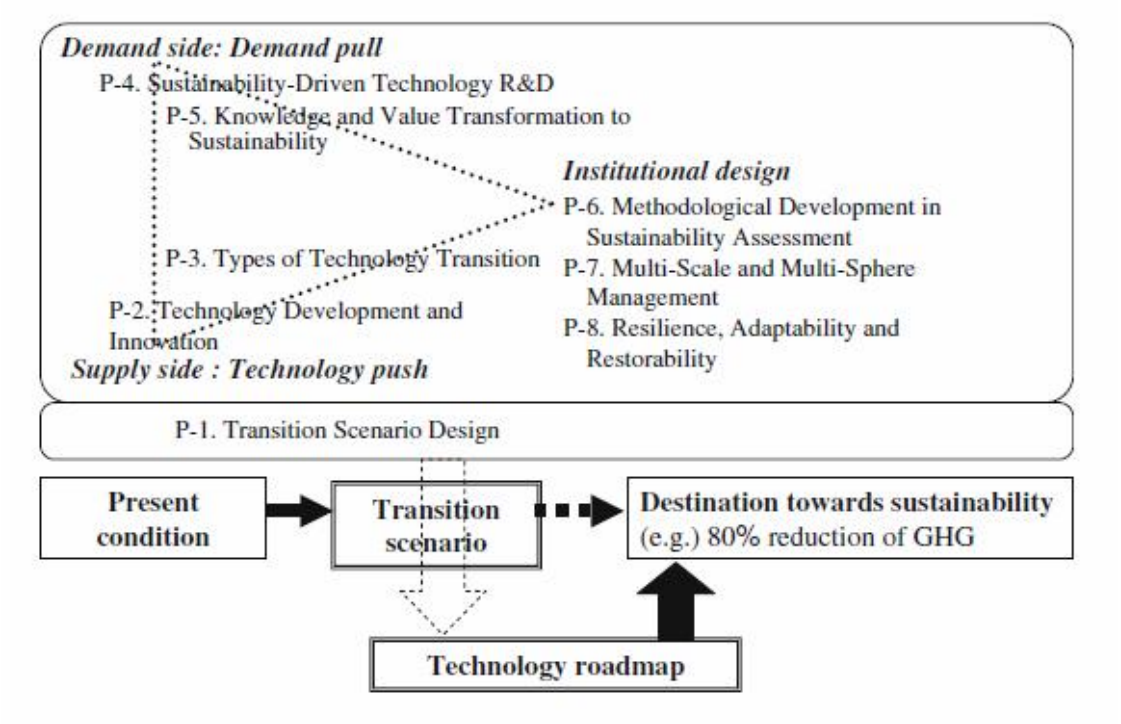
(http://www.unep.org/dewa/Africa/publications/AEO-1/images/fig43.gif)

150. Backcasting (Arising (http://wearearising.org/2009/01/13/backcasting/)) (see also TNS framework (http://www.naturalstep.org.nz/tns-f-implementation.asp), backcasting process (http://kauaian.net/blog/wp-content/themes/default/images/sushi/backcasting.jpg))



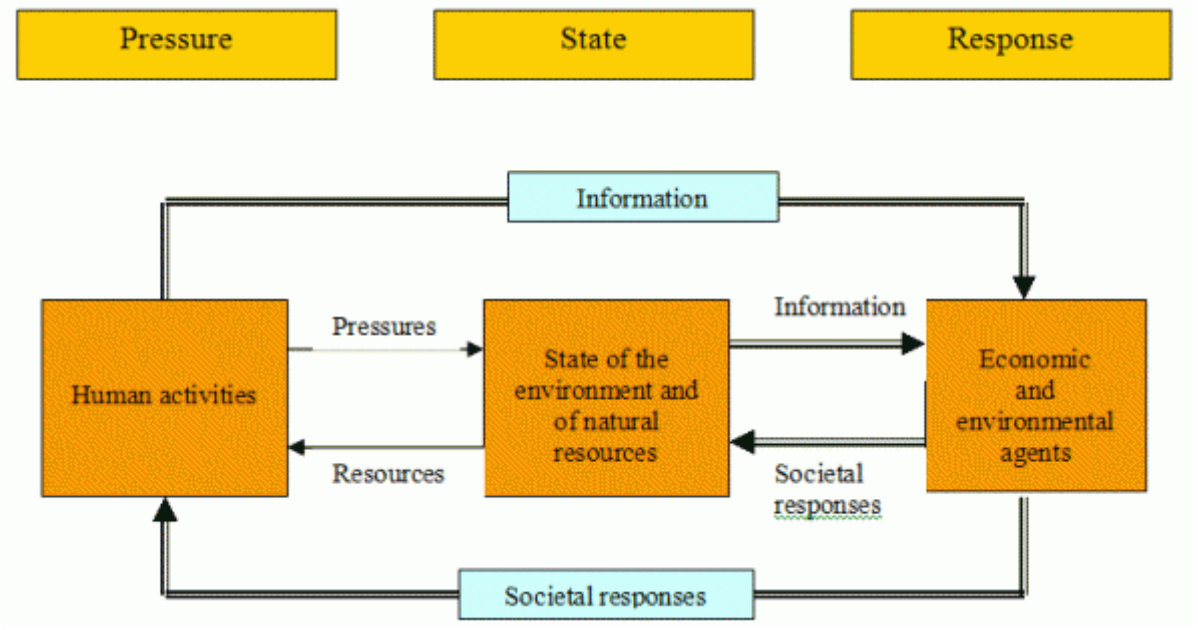
(http://arising.files.wordpress.com/2009/01/backcasting_arising.png?w=300&h=188)

151. Pathways to sustainable industrial societies (http://www.eoearth.org/article/Pathways_to_sustainable_industrial_societies) Osamu Saito (http://www.eoearth.org/contributor/Osamu.saito) , Encyclopedia of the Earth (see also principles from Morioka (http://www.eoearth.org/image/Osamu_table_1.JPG))



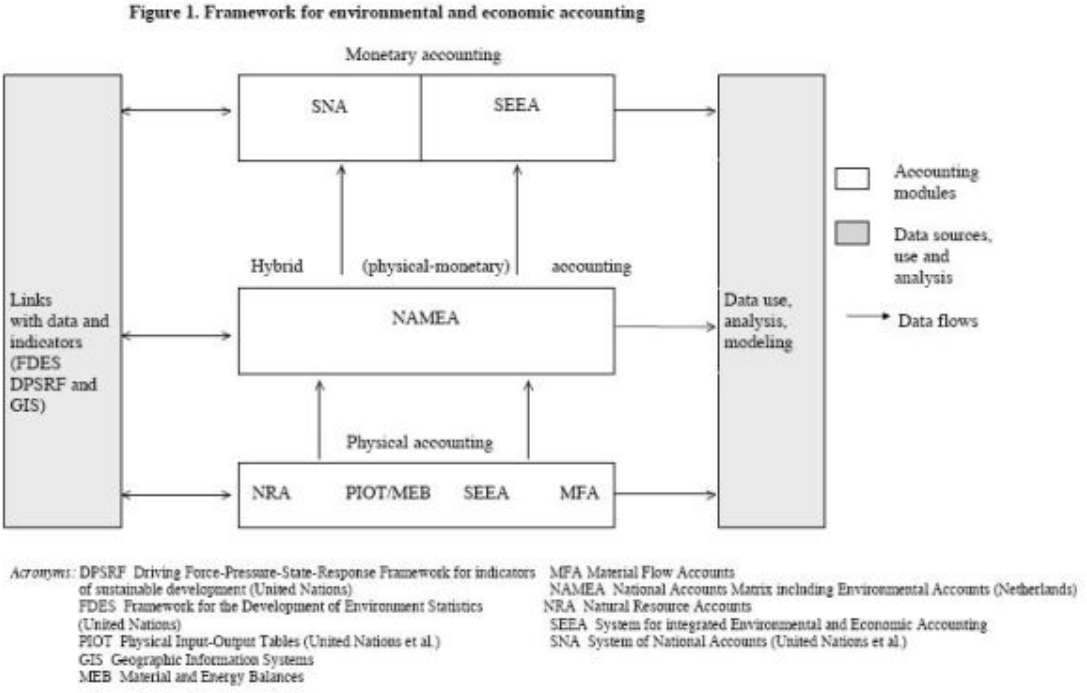
(http://www.eoearth.org/media/draft/c/c0/Fig._1_Conceptual_model_of_technology_transition_process_a

152. Pressure state response framework (OEDC via EoE) (http://www.eoearth.org/article/Indicators_of_sustainable_development).



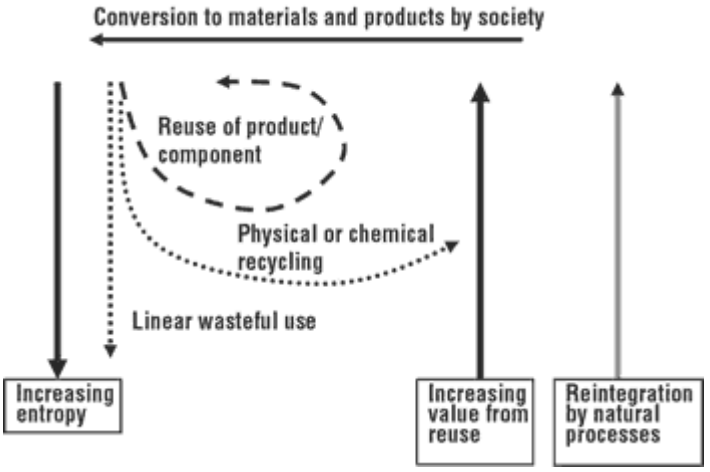
(http://www.eoearth.org/media/draft/f/f7/Pressure-state-response_framework.gif)

153. Framework for environmental and economic accounting (http://www.eoearth.org/article/Measuring_sustainable_economic_growth_and_development) (Peter Bartelmus (http://www.eoearth.org/contributor/Peter.bartelmus))



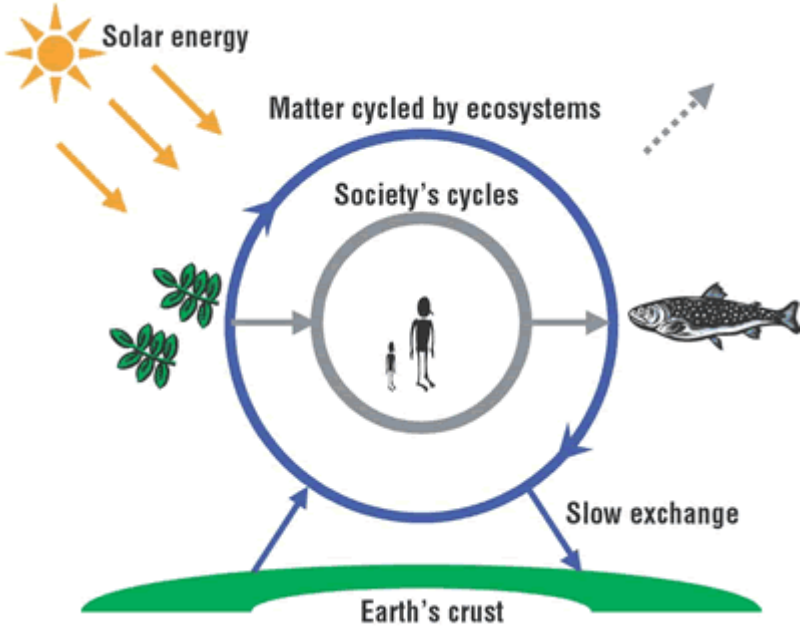
(http://www.eoearth.org/media/draft/3/39/Framework_for_environmental_and_economic_accounting.jpg

154. Resource flows across society set in the context of entropy (Everard (http://www.waste-management-world.com/display_article/273033/123/ARTCL/none/THERT/1/Hot-stuff!/))



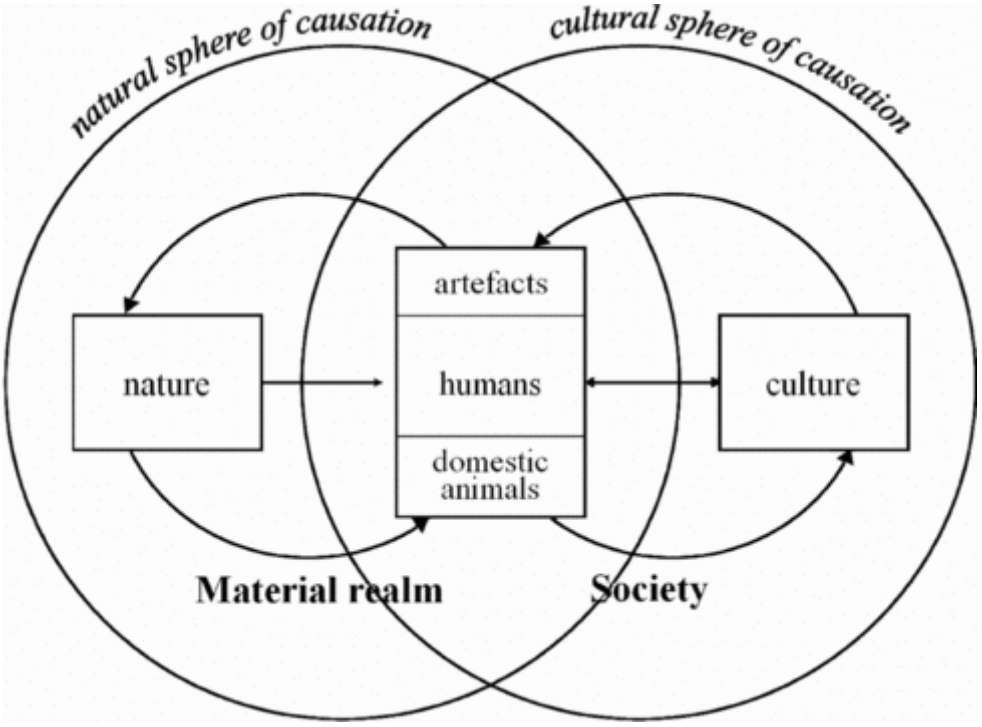
(http://images.pennnet.com/articles/seg/archive/hot_stuff_01_350.gif)

155. Resource and energy flows within nature's sustainable cycles and within a theoretical sustainable society (Everard (http://www.waste-management-world.com/display_article/273033/123/ARTCL/none/THERT/1/Hot-stuff!/) TNS?)



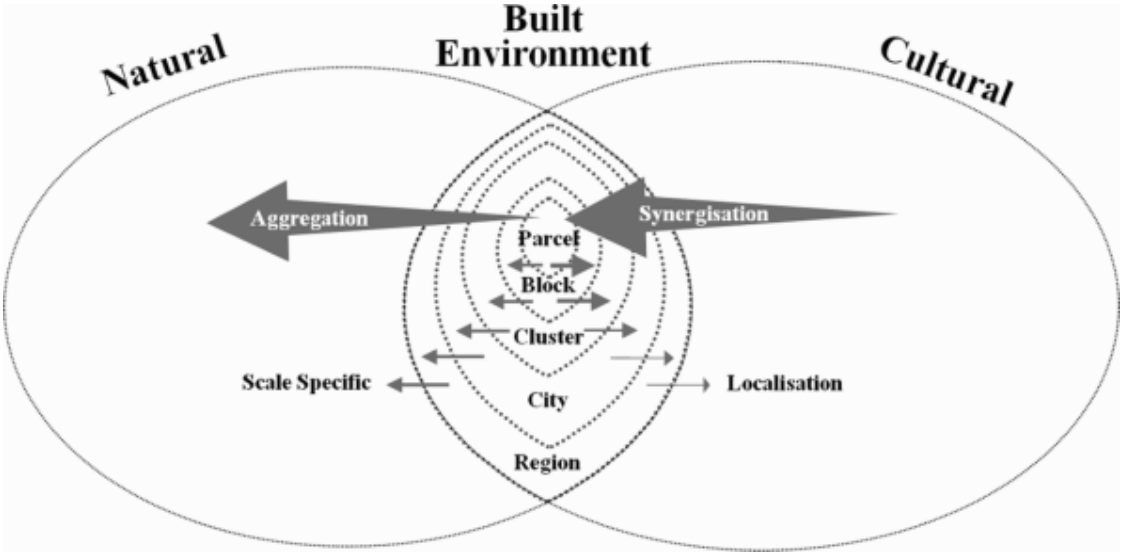
(http://images.pennnet.com/articles/seg/archive/hot_stuff_02_400.gif)

156. Social-ecological system that places the built environment (an artefact) in an overlapping zone between culture and nature, with causation occurring in both directions (Fischer-Kowalski and Weisz in Moffat and Kohler (http://www.informaworld.com/smpp/section~fulltext=713240928~dontcount=true~content=a792099903~c)



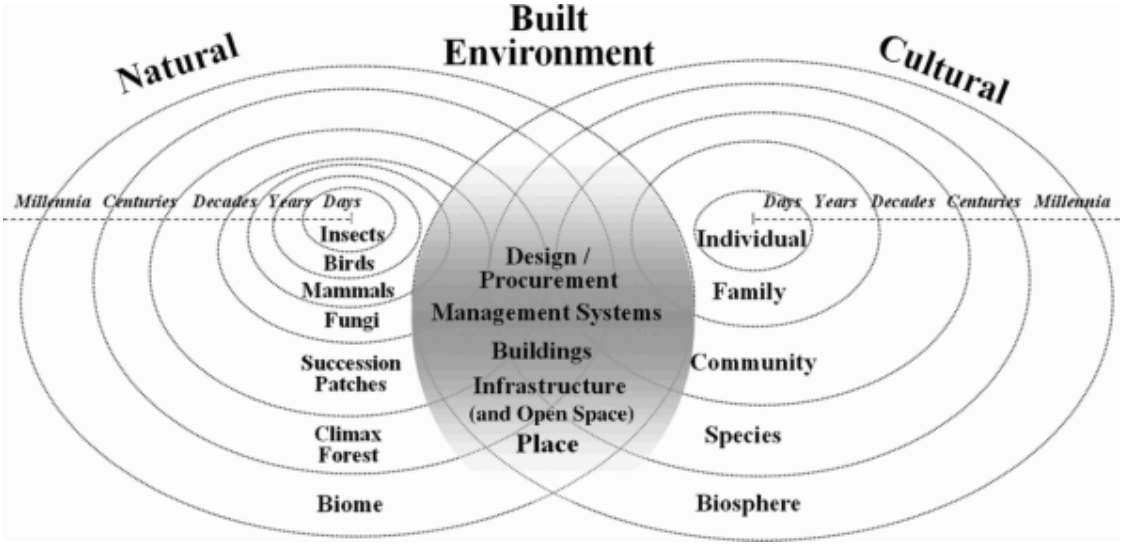
(http://www.informaworld.com/cache/images/compress/0_0_0_486_0_0_0_0_1_0/home/mpp/docserver_r

157. Spatial scales, aggregation and specific effects (Moffat and Kohler)
(http://www.informaworld.com/smpp/section~fulltext=713240928~dontcount=true~content=a792099903~c



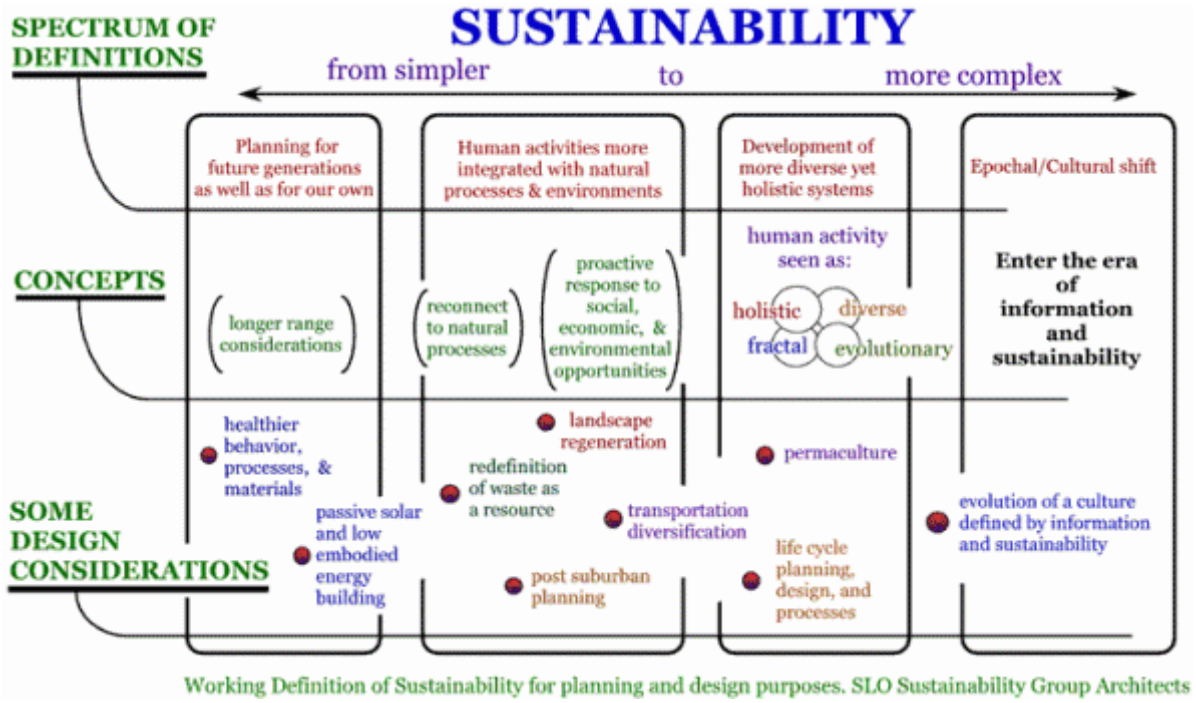
(http://www.informaworld.com/cache/images/compress/0_0_0_1400_0_0_0_0_1_0/home/mpp/docserver_

158. Cultural, natural and material realms over spatial and temporal scales (Moffat and Kohler)
(http://www.informaworld.com/smpp/section~fulltext=713240928~dontcount=true~content=a792099903~c



(http://www.informaworld.com/cache/images/compress/0_0_0_1400_0_0_0_0_1_0/home/mpp/docserver_

159. Spectrum of definitions Ken Haggart (http://www.slosustainability.com/Definition%20page/definition_ra.html)



(https://computingforsustainability.files.wordpress.com/2009/05/sustgraph-kenhaggard.gif)

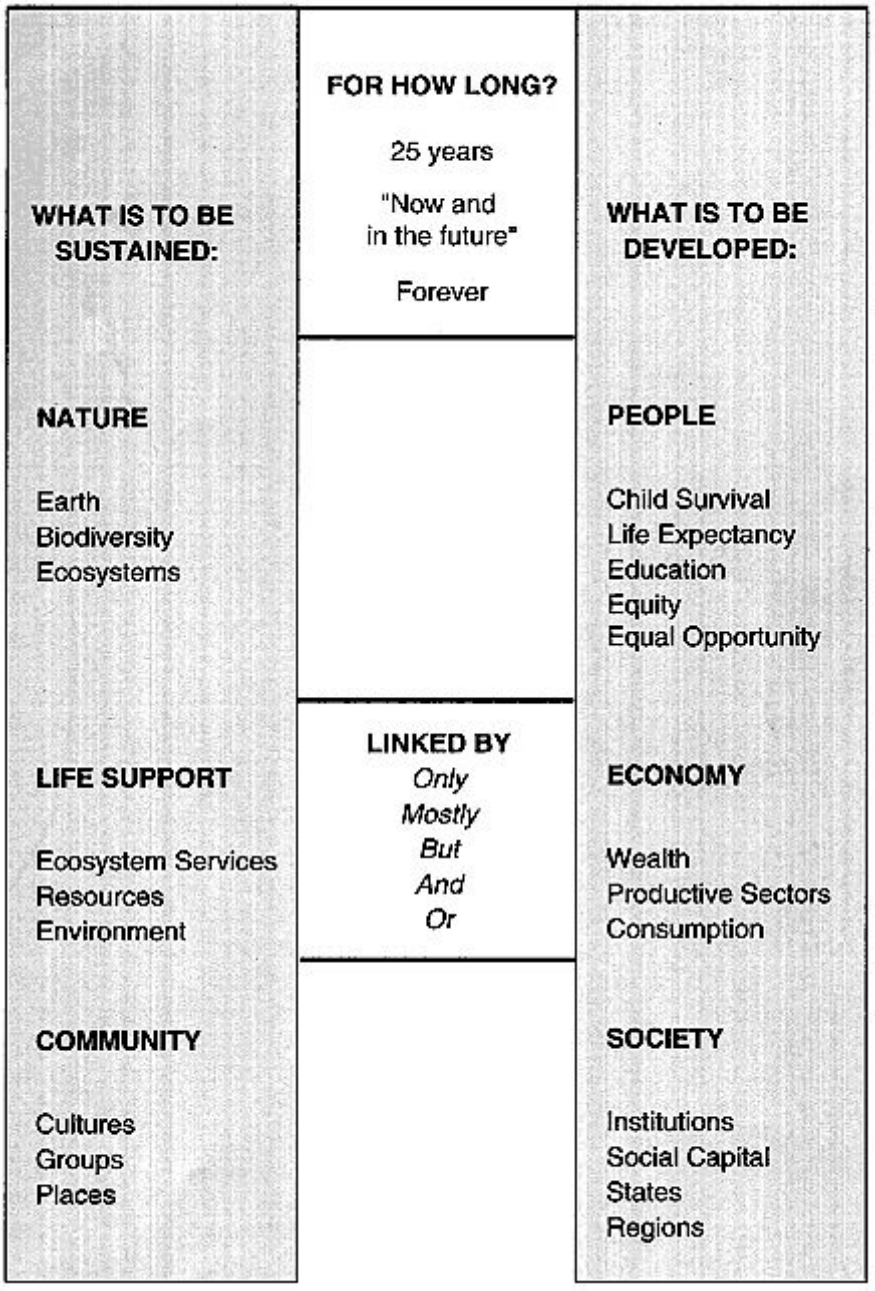
160. Balance (Earth Illustrated (http://www.earth-illustrated.co.uk/)) (see also Altran (http://www.fondation-altran.org/Files/Divers//05236403.jpg))

(https://computingforsustainability.files.wordpress.com/2009/05/in_the_balance.jpg)

161. 5 capitals (Sigma project (http://www.projectsigma.co.uk/Guidelines/Principles/))

(https://computingforsustainability.files.wordpress.com/2009/05/guidingprinciples_sigma.gif)

162. What, for how long? (National Academy of Sciences 1999 (http://www.nap.edu/catalog.php?record_id=9690#toc))

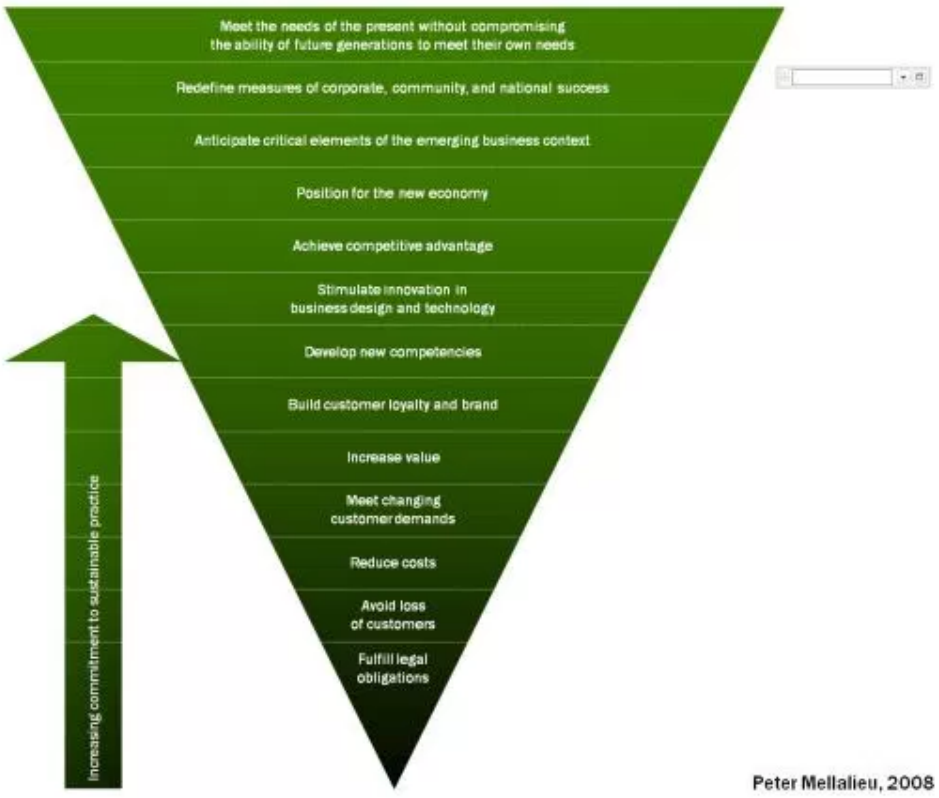


(https://computingforsustainability.files.wordpress.com/2009/05/nas_aspectssustdev.jpg)

163. Handprint (Action towards sustainability (http://www.handsforchange.org/))

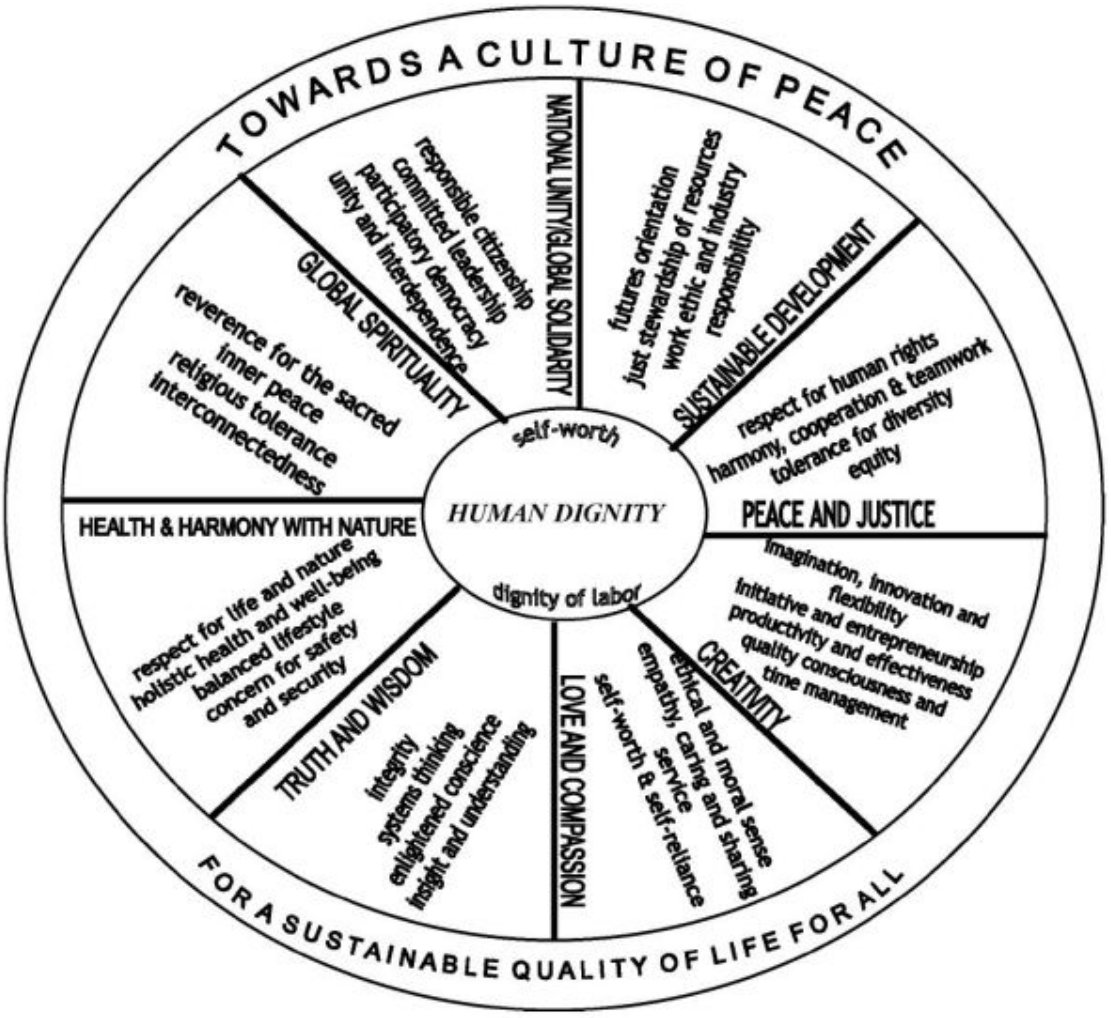
(https://computingforsustainability.files.wordpress.com/2009/05/handprint.jpg)

164. Increasing commitment Peter Mellalieu (http://web.mac.com/petermellalieu/Teacher/Home.html)



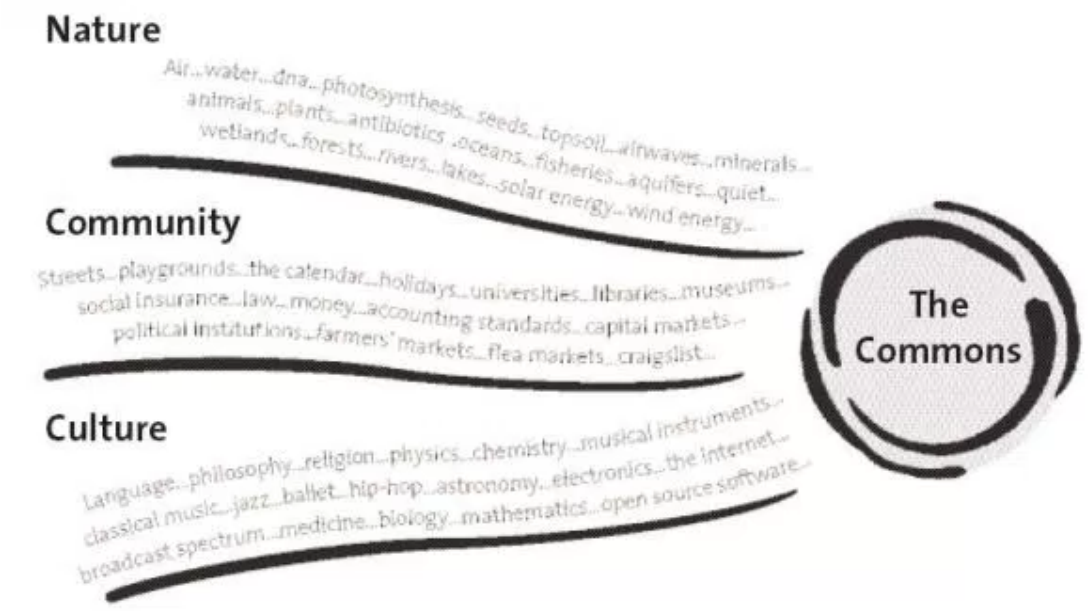
(https://computingforsustainability.files.wordpress.com/2009/05/petermellalieu_triangle.jpg)

165. Learning to do values framework (UNEVOC (http://www.unevoc.net/fileadmin/user_upload/pubs/LearningToDo.pdf))



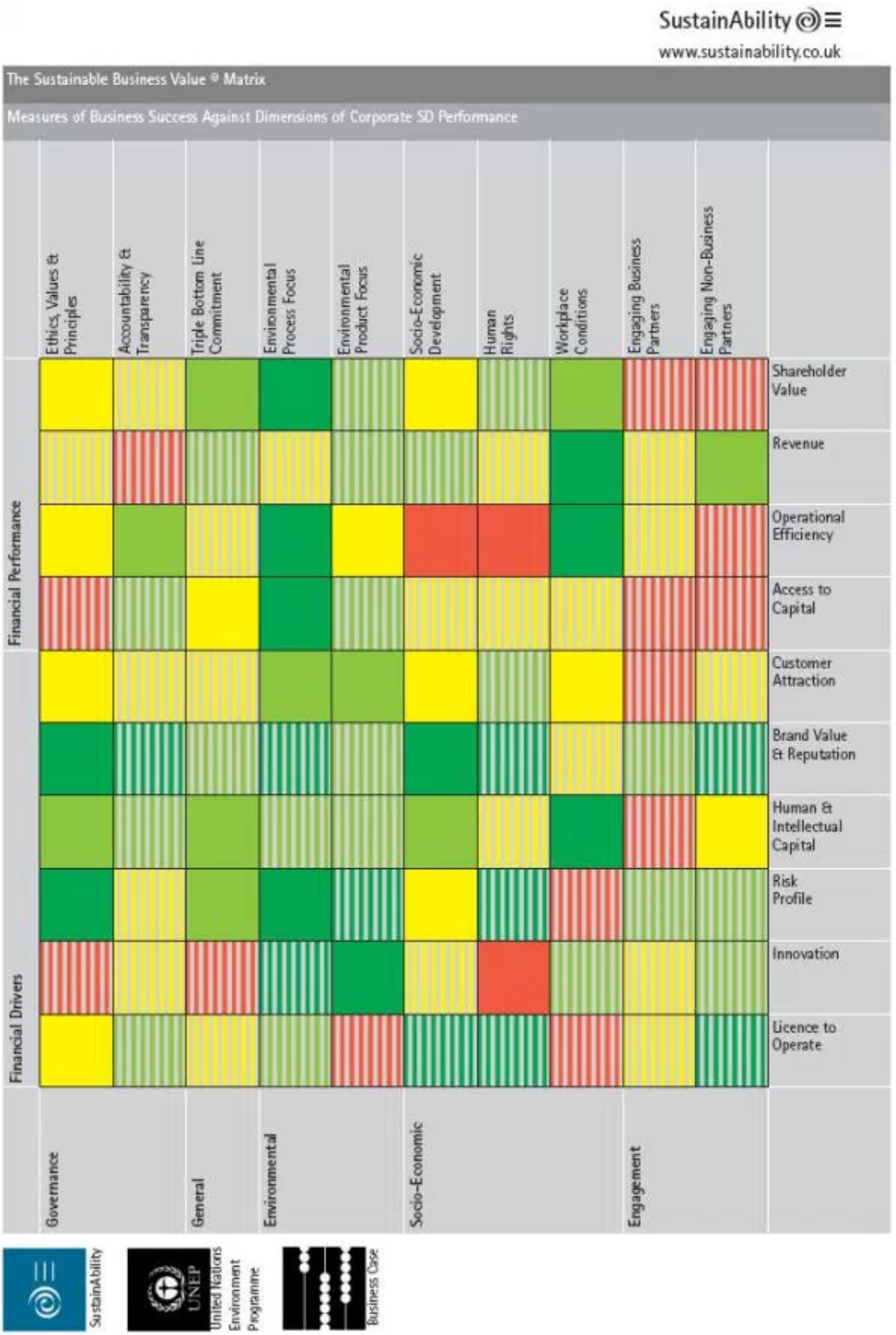
(https://computingforsustainability.files.wordpress.com/2009/05/learningtodovaluesframework.jpg)

166. Commons river (from Barnes' Capitalism 3.0 (http://capitalism3.com/files/Capitalism_3.0_Peter_Barnes.pdf))



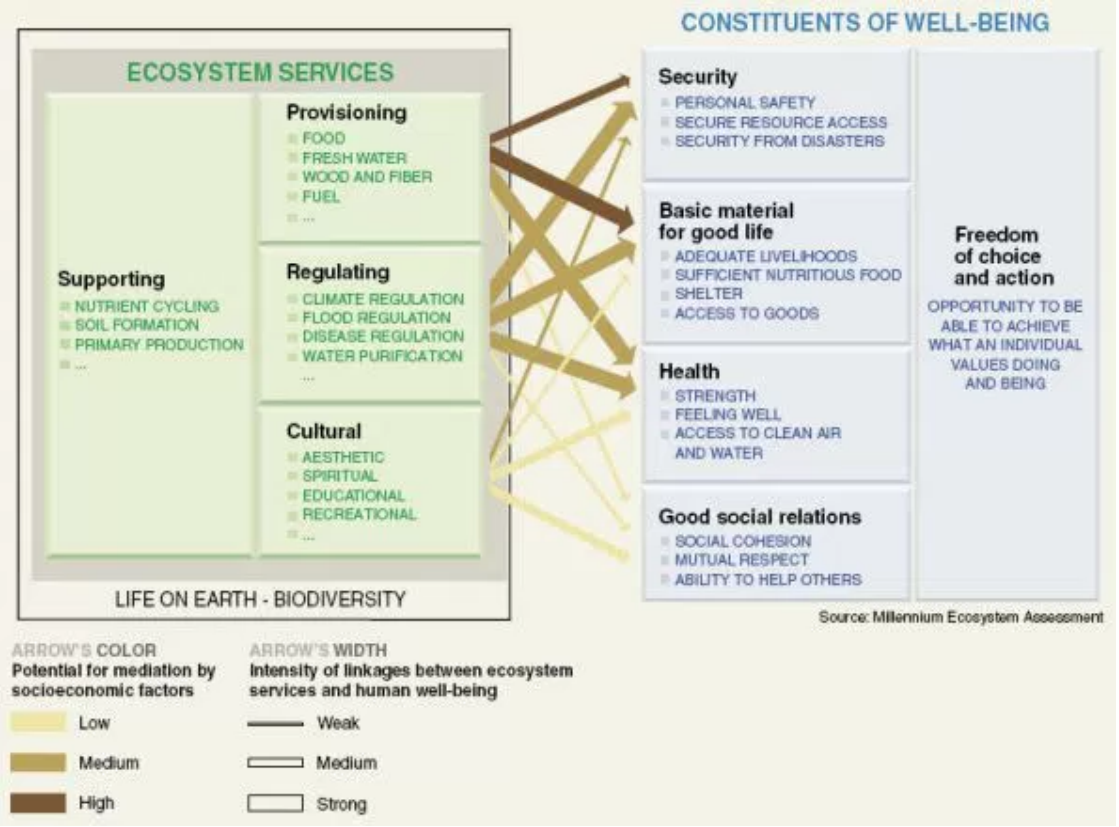
(https://computingforsustainability.files.wordpress.com/2009/05/barnes_commonsriver.jpg)

167. Sustainable business value matrix (SustainAbility and UNEP 2001 (http://www.sustainability.com/researchandadvocacy/reports_article.asp?id=141), used in simplified form here (http://www.sustainability.com/researchandadvocacy/reports_article.asp?id=142)).



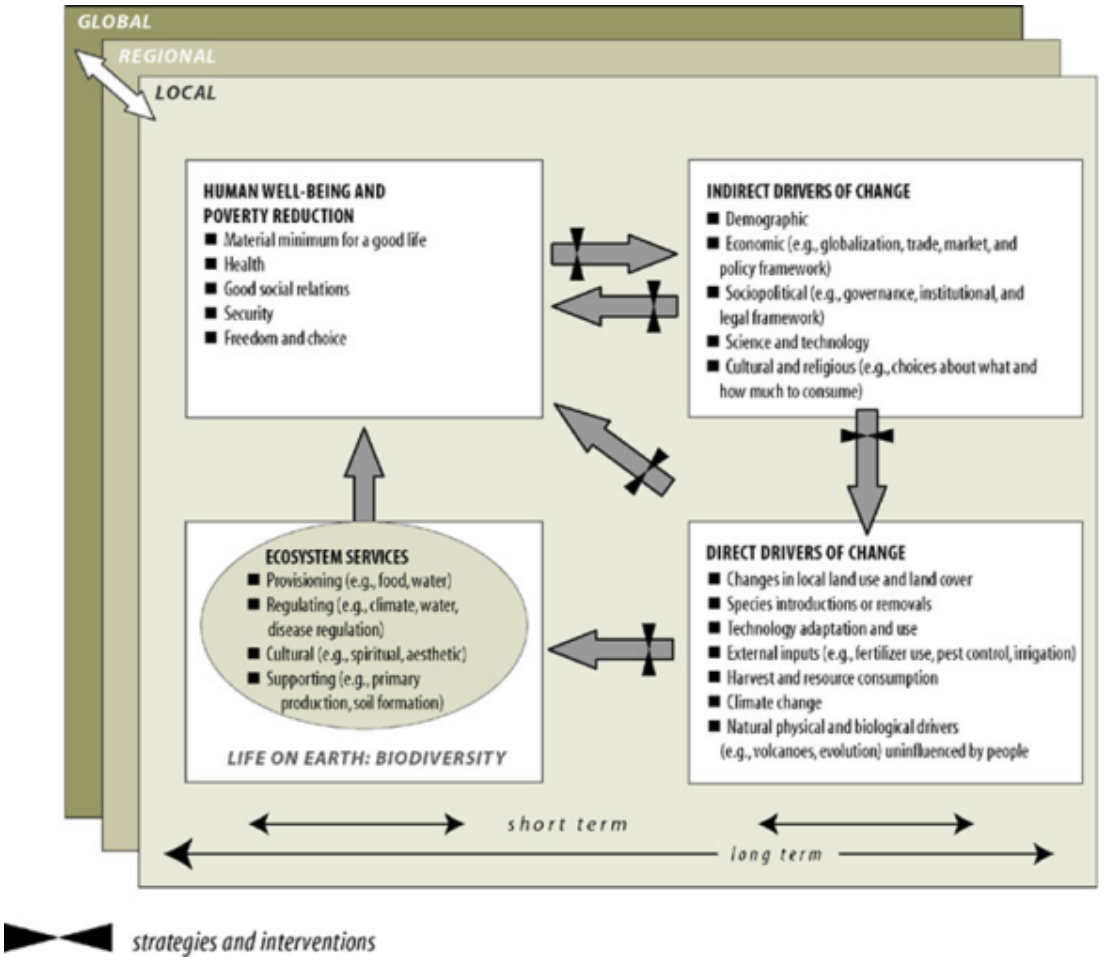
(https://computingforsustainability.files.wordpress.com/2009/05/sustainablebusinessvaluematirx.jpg)

168. Ecosystem services (from Millenium Ecosystem Assessment (http://www.millenniumassessment.org/en/index.aspx), pdf (http://www.maweb.org/documents/document.301.aspx.pdf), used in scenarios (http://www.ecologyandsociety.org/vol11/iss1/art28/figure4.html))



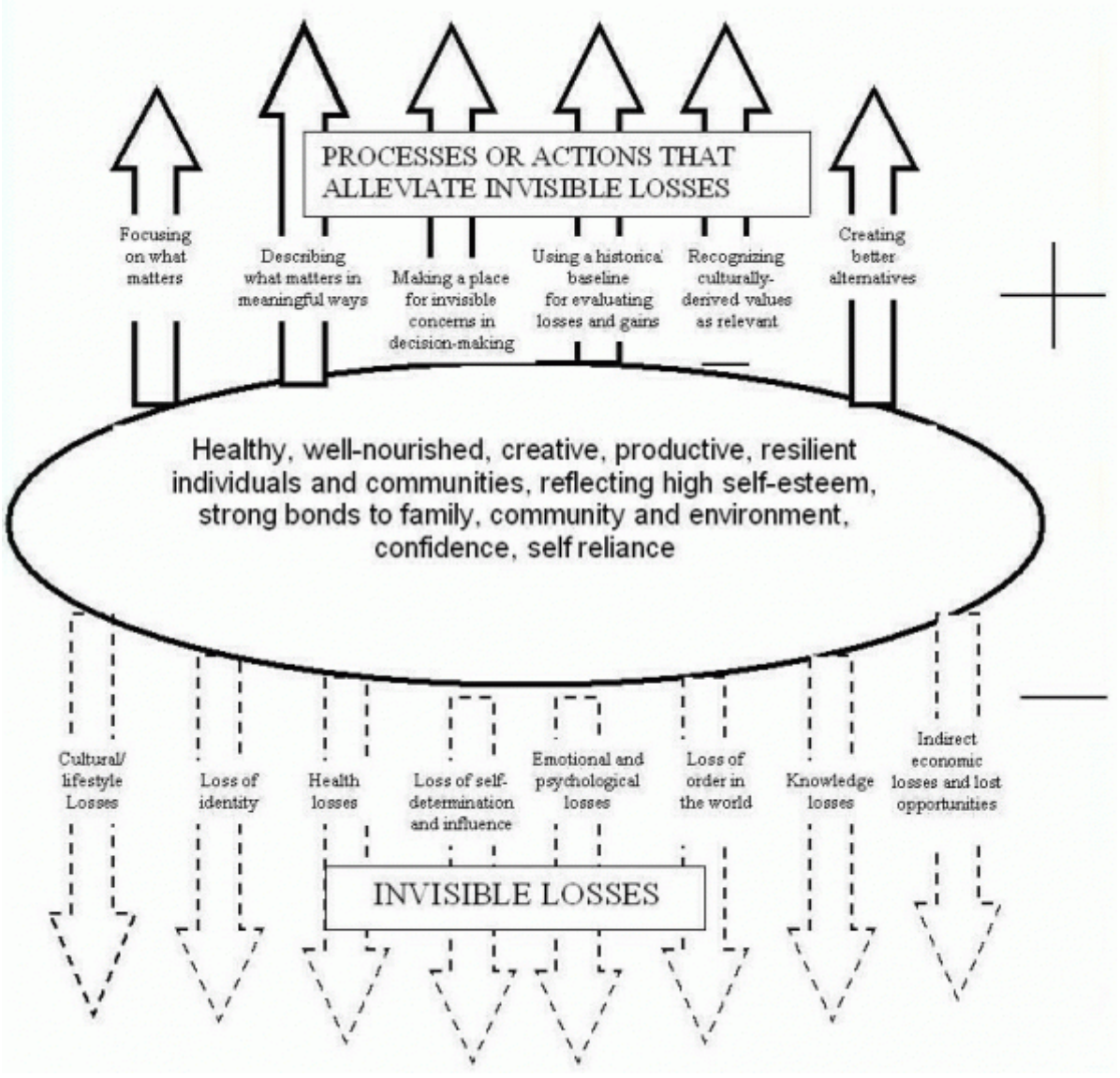
(https://computingforsustainability.files.wordpress.com/2009/05/ecosystem_servicesma.jpg)

169. The maintenance of Ecosystem services with time, space and interventions (MEA (http://www.ecologyandsociety.org/include/getdoc.php?articleid=1353&type=figure1), applied by Pereira to Sistel Portugal (http://www.ecologyandsociety.org/include/getdoc.php?attachment=880))



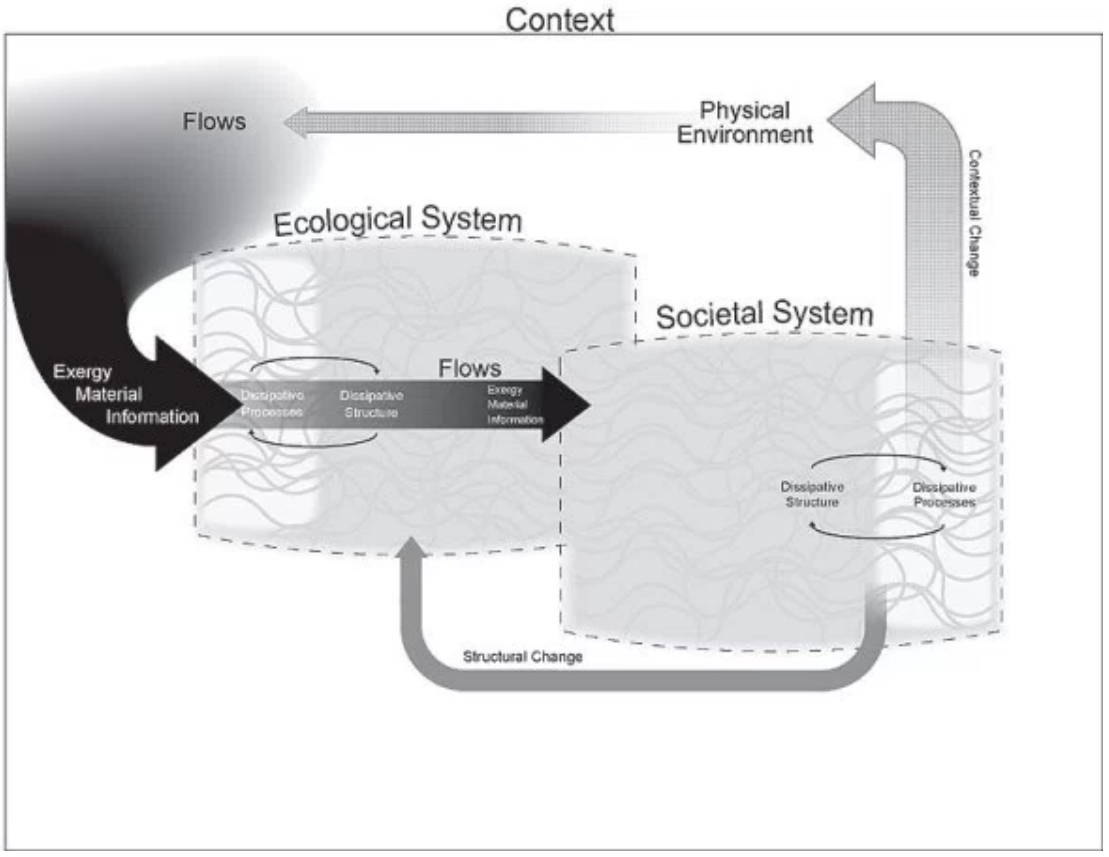
(https://computingforsustainability.files.wordpress.com/2009/05/ma-conceptual_framework.png)

170. Invisible losses (Turner (http://www.ecologyandsociety.org/vol13/iss2/art7/), in relation to Canadian aboriginal perspective).



(https://computingforsustainability.files.wordpress.com/2009/05/turner_invisiblelosses.gif)

171. Self-organising holarchic eco-social systems (Waltner-Toews (http://www.ecologyandsociety.org/vol10/iss1/art38/), see also scale effects (http://www.ecologyandsociety.org/include/getdoc.php?articleid=1214&type=figure5)).

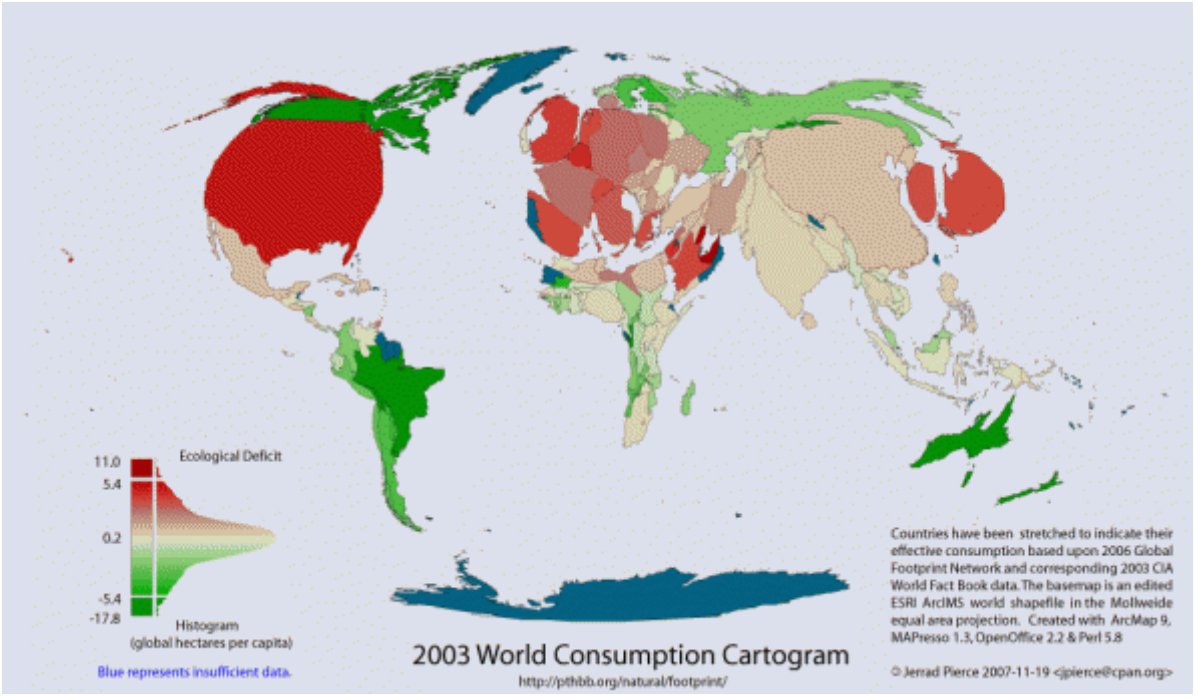


(https://computingforsustainability.files.wordpress.com/2009/05/waltner-toews_soho_ecosocialsystems.jpg)

172. 3 Venn and Strong seen as stages along a continuum (Engineering for Sustainable Development (http://www.raeng.org.uk/events/pdf/Engineering_for_Sustainable_Development.pdf))

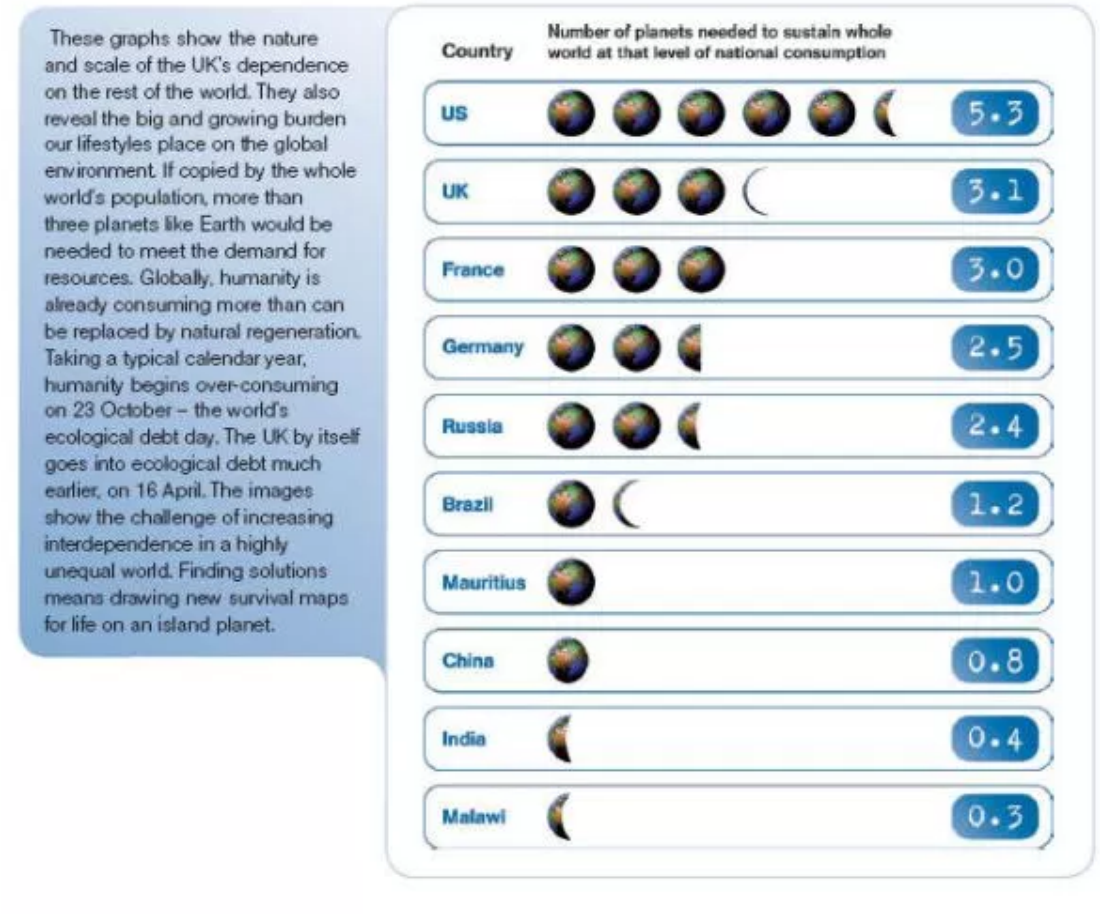
(https://computingforsustainability.files.wordpress.com/2009/05/engineering_for_sustainable_developme

173. Ecological footprint/deficit map (Pierce (http://pthbb.org/natural/footprint/2003/cartogram.gif))



(https://computingforsustainability.files.wordpress.com/2009/05/cartogram.gif)

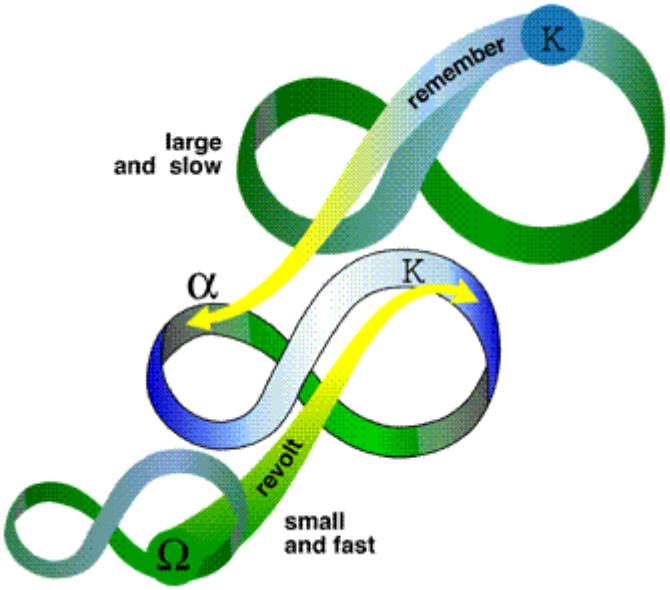
174. How many planets? (from UK Interdependence Report (http://www.neweconomics.org/gen/uploads/f2abwpumbr1wp055y2l10s5514042006174517.pdf)) See also WWF One Planet Living (http://www.panda.org/what_we_do/footprint/one_planet_living/)



(https://computingforsustainability.files.wordpress.com/2009/05/planets.jpg)

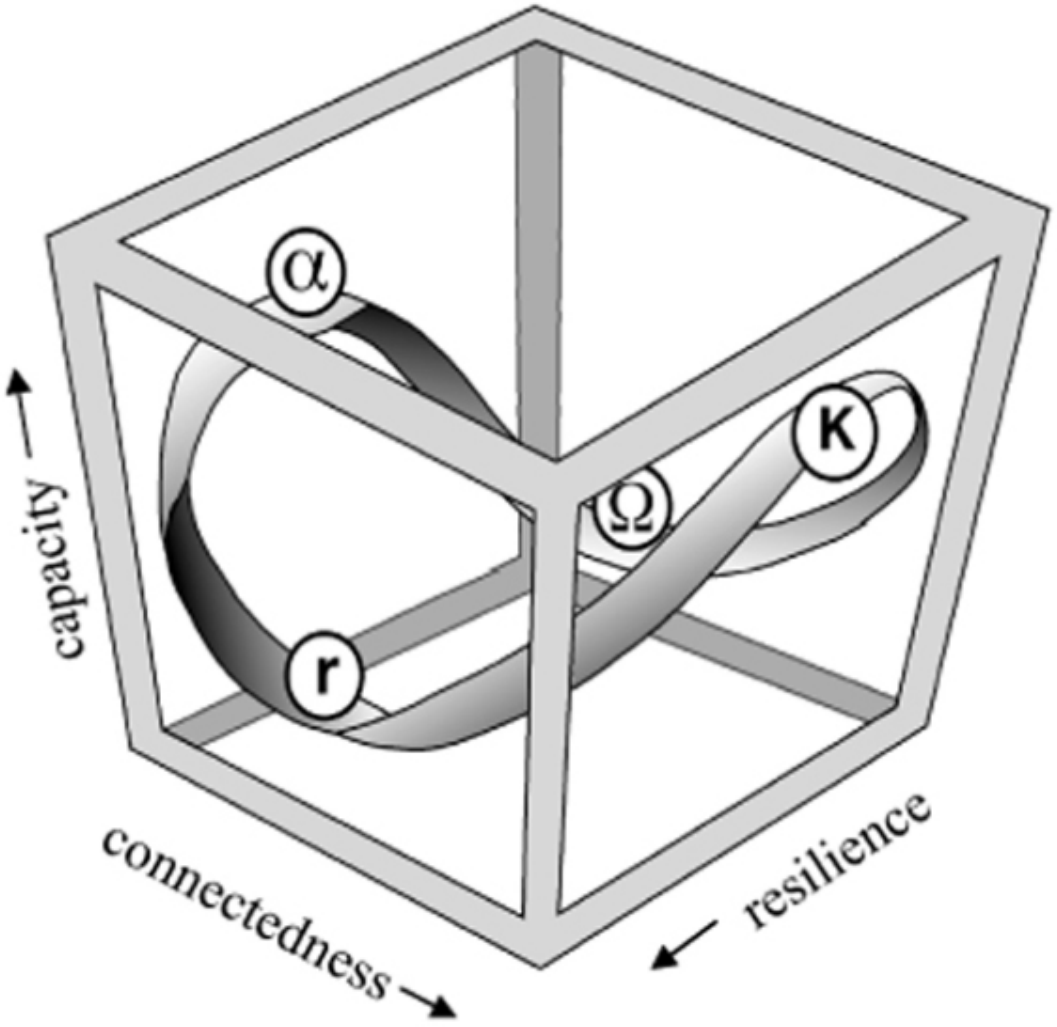
175. Nested adaptive cycles (Holling)

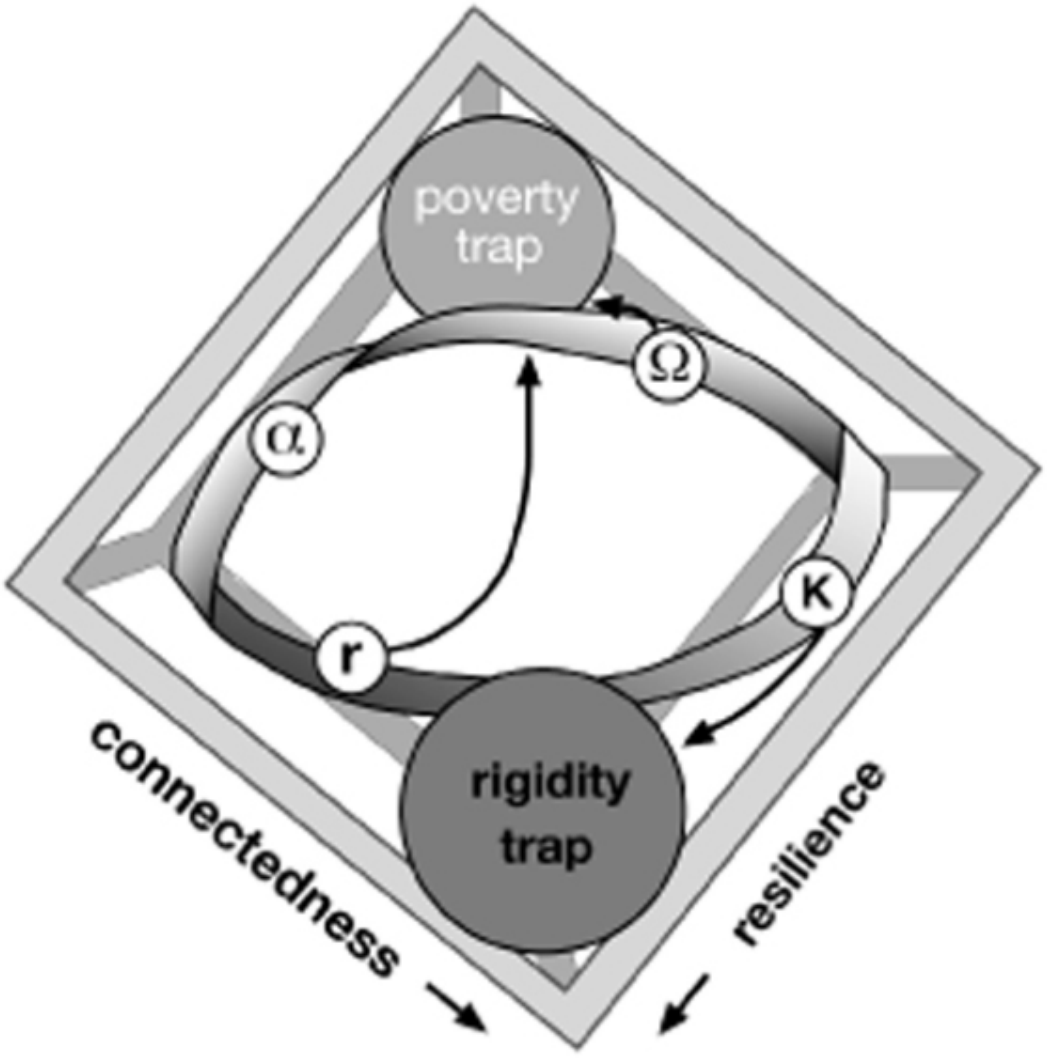
> *The growth phase we're in may seem like a natural and permanent state of affairs-and our world's rising complexity, connectedness, efficiency, and regulation may seem relentless and unstoppable-but ultimately it isn't sustainable…*
>
> *I think rapidly rising connectivity within global systems-both economic and technological-increases the risk of deep collapse. That's a collapse that cascades across adaptive cycles-a kind of pancaking implosion of the entire system as higher-level adaptive cycles collapse, which causes progressive collapse at lower levels." (Holling in Worldwatch (http://www.worldwatch.org/node/6008))*



(https://computingforsustainability.files.wordpress.com/2009/05/revoltrem-color-lg.gif)

(applied to Western Australian agriculture by Allison and Hobbs (http://www.ecologyandsociety.org/vol9/iss1/art3/inline.html))


α
K
Ω
r
capacity
connectedness
resilience



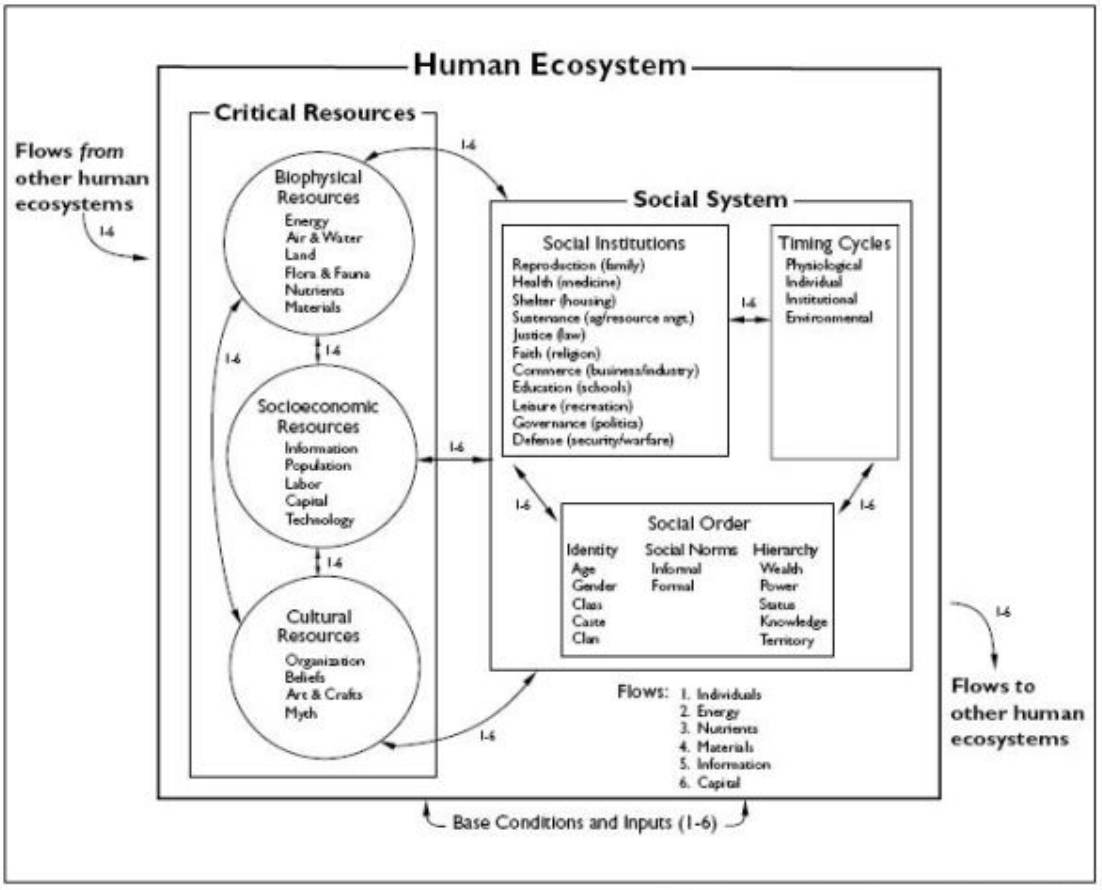
(https://computingforsustainability.files.wordpress.com/2009/05/panarchy3.jpg)

176. Human ecosystem model (Machlis (http://www.uiweb.uidaho.edu/hesg/model.html))

> *The human ecosystem is defined asa coherent system of biophysical and social factors capable of adaptation and sustainability over time. Human ecosystems rest upon a foundation of abiotic and biotic factors taken as base conditions: a solar-driven energy system obeying thermodynamic properties, biogeochemical cycles of high constancy, landforms and geological variation of great complexity, the full genetic structure of life including biophysical properties of homo sapiens. The base conditions limit, constrain, influence and occasionally direct many human ecosystem processes. Boundaries can be spatially identified through ecological transition zones, administrative and political boundaries, or more fine-scaled analysis of sharp perturbations in system flows*

(https://computingforsustainability.files.wordpress.com/2009/05/machlis_human_ecosystem_model.jpg)

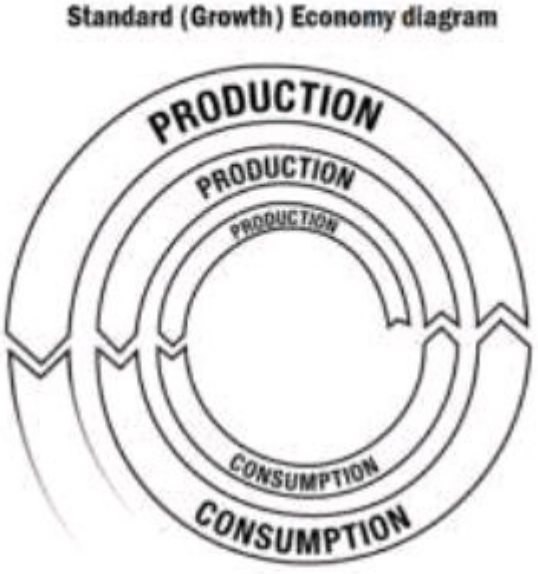
(https://computingforsustainability.files.wordpress.com/2009/05/machlis_human_ecosystem_model.jpg)

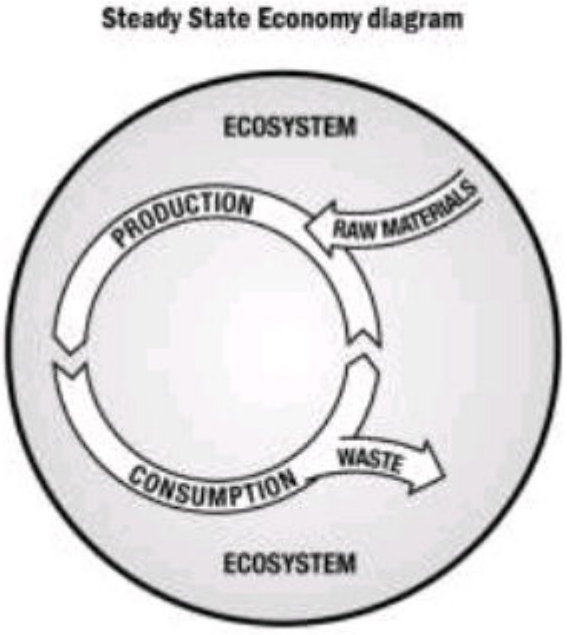


(https://computingforsustainability.files.wordpress.com/2009/05/machlis_human_ecosystem_model.jpg)

177. Steady state economy (in comparison with standard growth model) Herman Daly (http://www.sd-commission.org.uk/publications/downloads/Herman_Daly_thinkpiece.pdf). Summary from SANZ (http://www.phase2.org/).

> *The Standard (Growth) Economy diagram is equivalent to the Triple Bottom Line and Mickey Mouse models. It assumes the possibility of evergrowing cycles of production and consumption without considering the role of the supporting ecosystem, thus establishing the belief that there are no biophysical limits to growth of the economy.*
>
> *By comparison, the Steady State Economy diagram represents stabilised population and consumption. Resource throughput and waste disposal remain roughly constant, the scale of economic activities fits within the capacity provided by ecosystems, there is fair distribution of wealth, and allocation of resources is efficient.*





(https://computingforsustainability.files.wordpress.com/2009/05/daly_steadystateeconomy.jpg)

178. Integral framework (Wilber's integral quadrats, used by Barrett Brown (http://multiplex.integralinstitute.org/Public/cs/files/43/sustainability/entry19624.aspx)) applied by Winton (https://computingforsustainability.files.wordpress.com/2009/05/winton_using_wilber_quadrat_in_brown (in Br0wn).

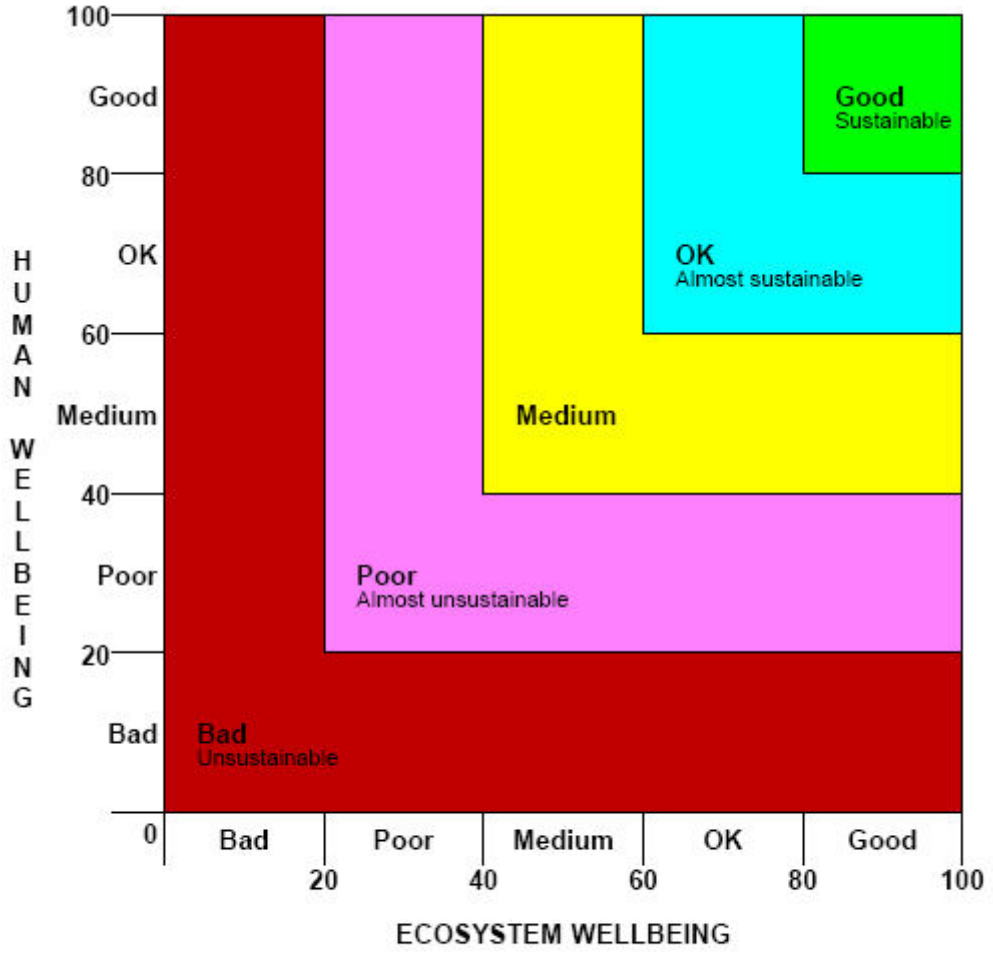
(https://computingforsustainability.files.wordpress.com/2009/05/wilberquadrats_in_brown.jpg)

179. Brown's 15 elements of Ecovillage living
(http://multiplex.integralinstitute.org/public/cs/files/43/sustainability/entry19624.aspx)

(https://computingforsustainability.files.wordpress.com/2009/08/brown_15elements_ecovillage_integral.j

180. The Barometer of Sustainability (ICUN (http://cmsdata.iucn.org/downloads/resource_kit_a_eng.pdf)**)**

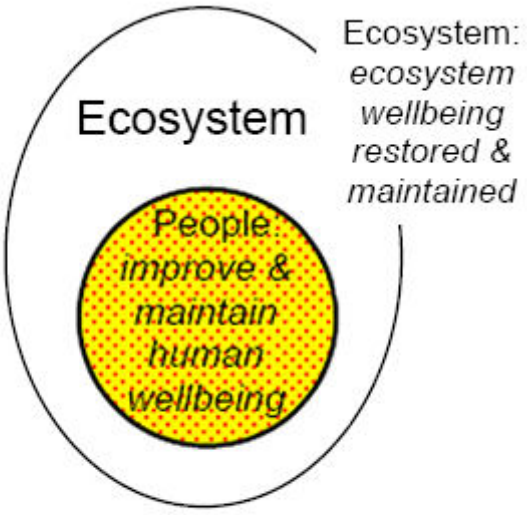
The Barometer of Sustainability is the only performance scale that measures human and ecosystem wellbeing together without submerging one in the other. The Barometer's key features are:
• Two axes, one for human wellbeing, the other for ecosystem wellbeing. This enables each set of indicators to be combined independently, keeping them separate to allow analysis of people-ecosystem interactions.
• The axis with the lower score overrides the other axis in the analysis. This prevents a high score for human wellbeing from offsetting a low score for ecosystem wellbeing, or vice versa. This approach reflects the view that people and the ecosystem are equally important and that sustainable development must improve and maintain the wellbeing of both.



A18. The Barometer of Sustainability

(https://computingforsustainability.files.wordpress.com/2009/08/barometer.jpg)

181. 'The Egg of Sustainability' (Robert Prescott-Allen, in IUCN, 1995 (http://cmsdata.iucn.org/downloads/resource_kit_a_eng.pdf))

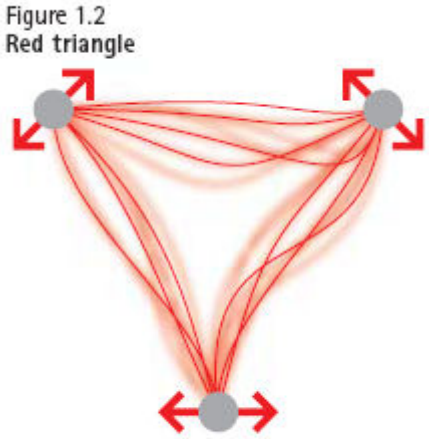


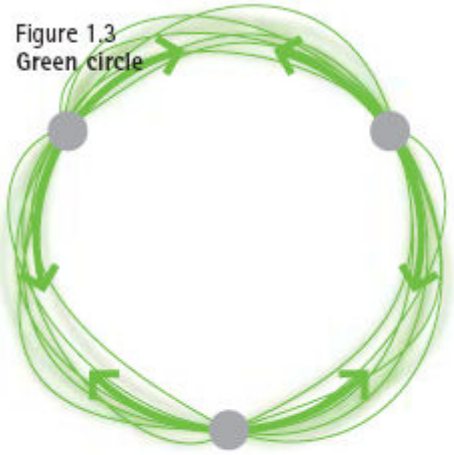
A13. The Egg of Wellbeing

(https://computingforsustainability.files.wordpress.com/2009/09/egg_allen_iucn.jpg)

182. Red triangle/Green Circle (from SustainAbility Gearing Up (http://www.sustainability.com/aboutsustainability/article_previous.asp?id=133)).

These high friction worlds are represented by the red triangle: low levels of trust increase friction in the system, with different sectors fighting (or 'scapegoating') each other.

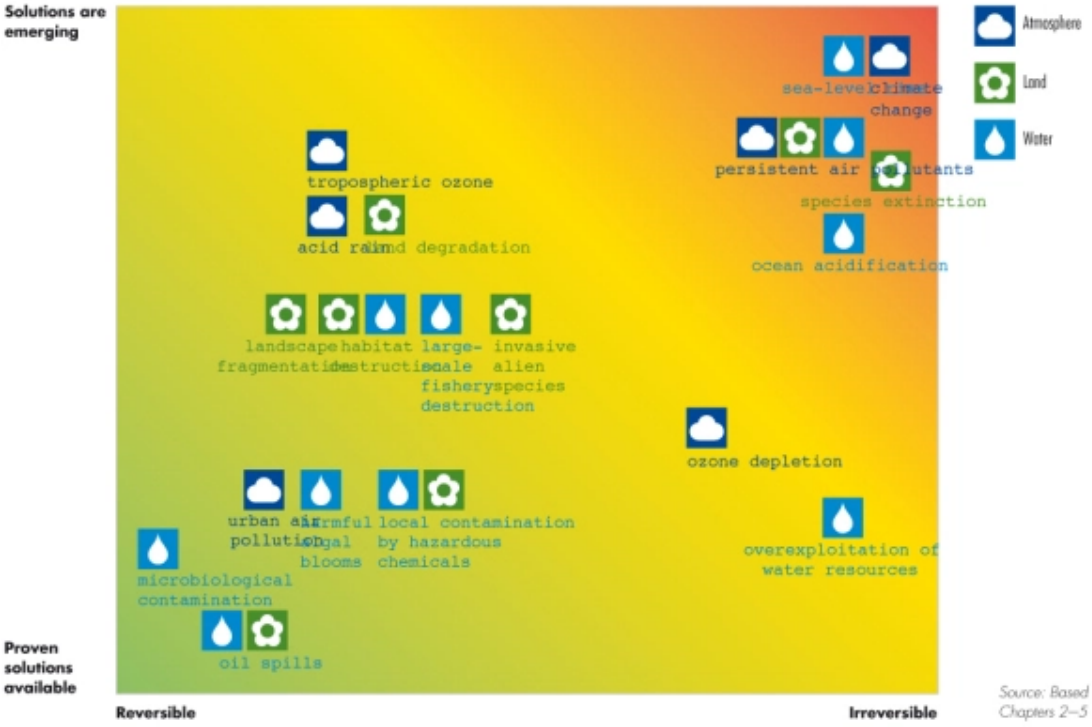




(https://computingforsustainability.files.wordpress.com/2009/09/redtrianglegreencirclesustainability.jpg)

183. Mapping environmental problems by management and revsersibility (UNEP Geo4 (http://www.unep.org/geo/geo4/media/graphics/Zoom/10.02.jpg))

Figure 10.2 Mapping environmental problems according to management and reversibility

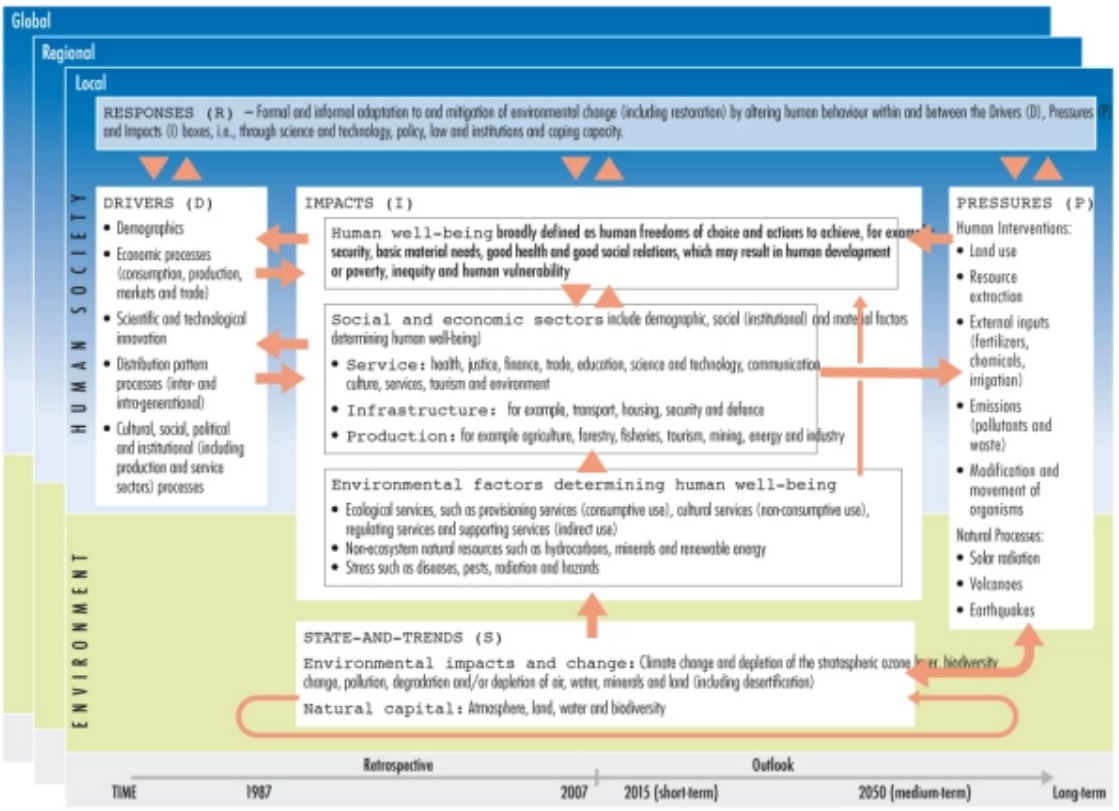


(https://computingforsustainability.files.wordpress.com/2009/09/env_problems_management_reversibilit

184. Global environmental outlook framework (UNEP Geo4 (http://www.unep.org/geo/geo4/media/graphics/Zoom/10.02.jpg))

Net gains in human well-being facilitated by the social and economic sectors have, however, been at the cost of growing environmental changes, and the exacerbation of poverty for some groups of people

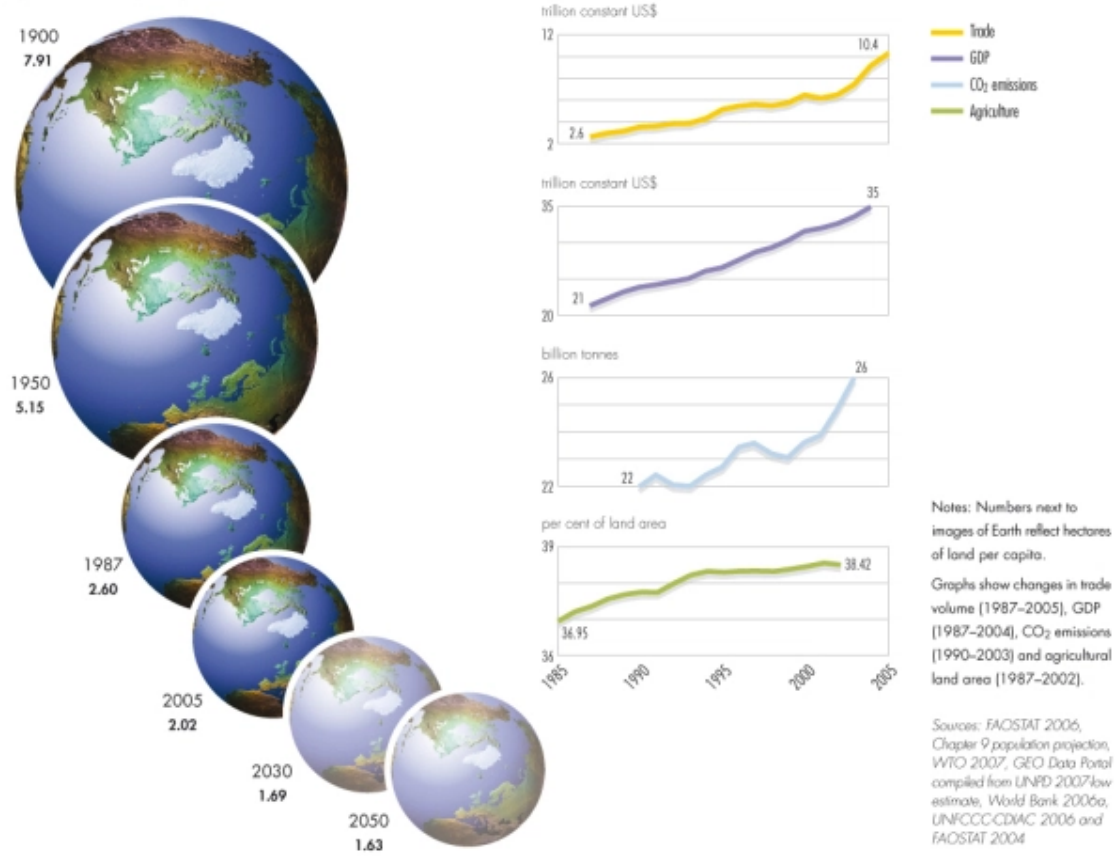
Figure 8.2 A variation of the GEO-4 conceptual framework highlighting the dual role of the social and economic sectors



(https://computingforsustainability.files.wordpress.com/2009/09/geo-4_framework1.jpg)

185. Shrinking Earth (UNEP Geo4 (http://www.unep.org/geo/geo4/media/graphics/Zoom/10.02.jpg))

Figure 8.1 Our "shrinking" Earth



(https://computingforsustainability.files.wordpress.com/2009/09/shrinkingearth_geo41.jpg)

186. Sustainability Asymptogram (Onwueme and Borsari (http://proquest.umi.com/pqdweb?RQT=569&curl=http%3A%2F%2Fproquest.umi.com%2Fpqdweb%3Fdid%3D1185346531%26sid%3D1%26 – Proquest link)

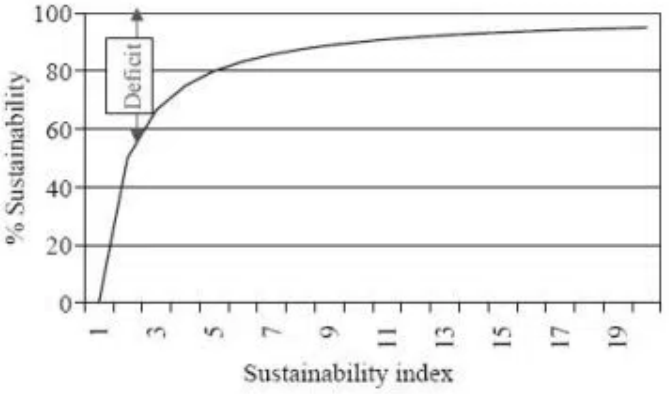


Figure 1.
The sustainability asymptogram. In the graph, $y = (1 - 1/x)100$, where x is the sustainability index and y is the percentage sustainability

If we designate a system's score for the environmental, economic, and social factors as a, b, and c, respectively, each with a minimum value of 1, then the combined product of all three can be called the sustainability index (x), where:

$$x = (a)(b)(c).$$

In a near-to-perfect sustainable context, x is very large, resulting almost in 100 percent sustainability. Thus, sustainability (the relationship between the sustainability index, x, and the percentage sustainability, y), can be represented by the following equation:

$$y = (1 - 1/x)100.$$

In our mathematical expression, y represents the percentage sustainability, and x (with a minimum value of 1), is a composite index of environmental, economic, and social factors that contribute to sustainability.

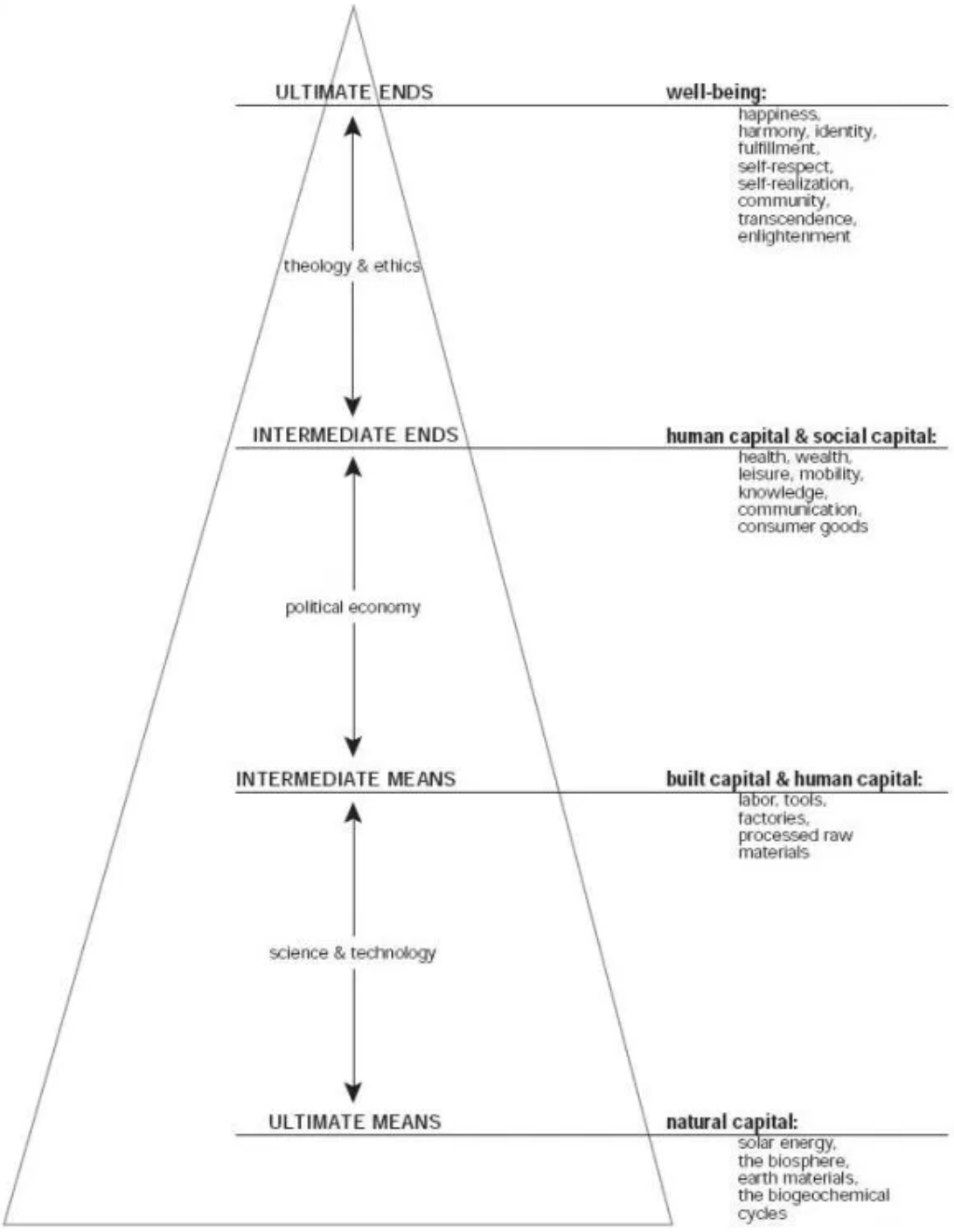
A graph of this equation (Figure 1) illustrates our model, which is asymptotic and, therefore, we designate it as the sustainability asymptogram. As x increases, y also increases. However, no matter how large the value of x becomes, y will always fall short of 100 percent. The difference between y and 100 percent is named the sustainability deficit, an indication of how far away the system under study is from perfect sustainability.

(https://computingforsustainability.files.wordpress.com/2009/10/onwueme_sustainabilityasymptogram.jp

> *100 percent sustainability is a perfect state that is practically unattainable by anybody or any system. No matter how good a person or system is, there is always a sustainability deficit that cannot be overcome, as entropy affects living systems and their physical habitats without exceptions. This means that there is always room for improvement. Different persons or systems are located at different levels on the curve, with larger or smaller sustainability deficits, but with deficits all the same.*

187. Meadows' framework (after Daly). (Balaton Group (http://sustainabilityinstitute.org/pubs/Indicators&Information.pdf))

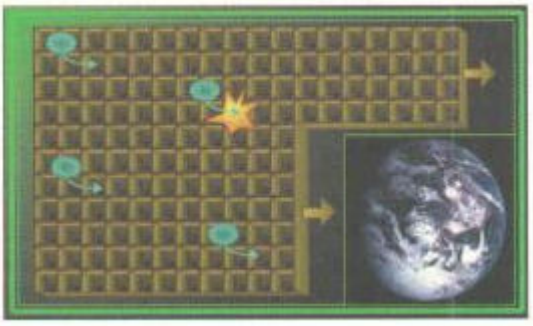
> *I see the triangle as saying there's no way human ends can be realized without healthy, functioning natural and economic systems*



(https://computingforsustainability.files.wordpress.com/2009/10/meadowsdaly_triangle.jpg)

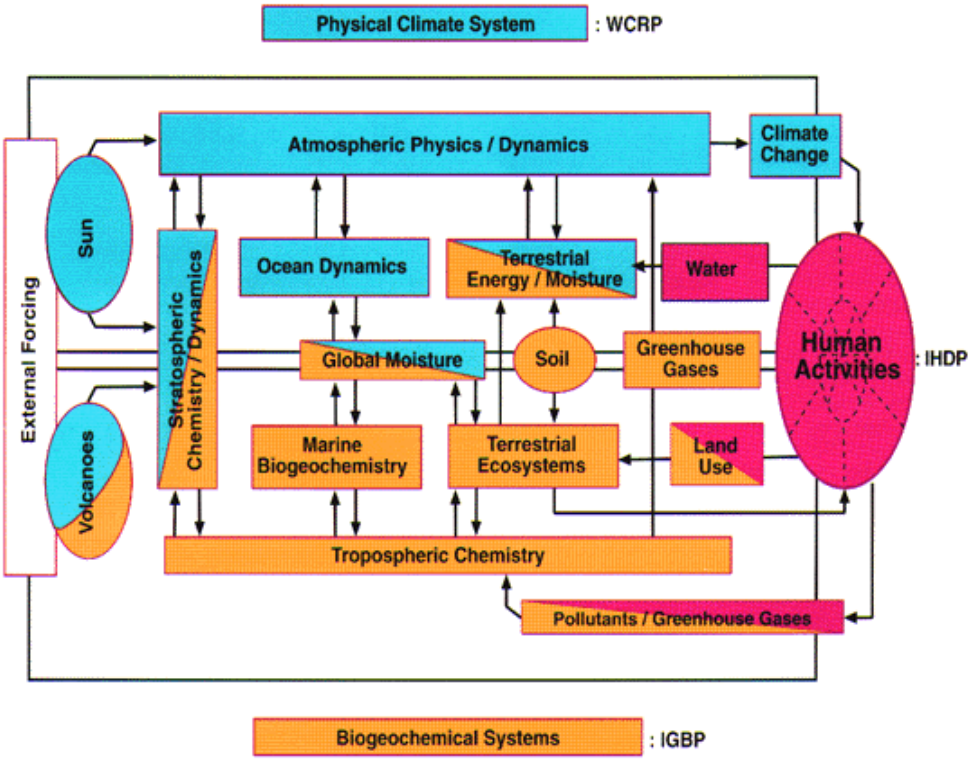
188. Ecosphere as a mail sorter (Collins (http://proquest.umi.com/pqdweb?RQT=569&curl=http%3A%2F%2Fproquest.umi.com%2Fpqdweb%3Fdid%3D66799910%26sid%3D3%26Fr

Imagine all of Earth's chemistry as a mail sorter's wall of letter slots in a post office, with the network of compartments extending toward infinity (see the bottom figure, next page). Each compartment represents a separate chemistry so that, for example, thousands of compartments are associated with stratospheric chemistry or with a human cell. An environmentally mobile persistent pollutant can move from compartment to compartment, sampling a large number and finding those compartments that it can perturb. Many perturbations may be inconsequential, but others can cause unforeseen catastrophes, such as the ozone hole or some of the manifestations of endocrine disruption. Most compartments remain unidentified and even for known compartments, the interactions of the pollutant with the compartment's contents can usually not be foreseen, giving ample reason for scientific humility when considering the safety of persistent mobile compounds.

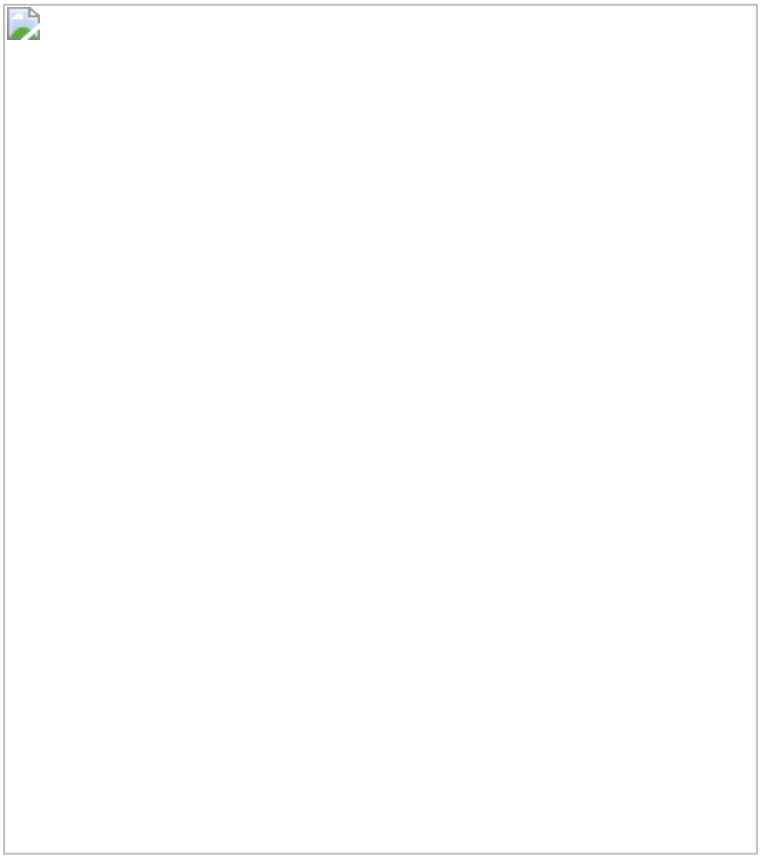


(https://computingforsustainability.files.wordpress.com/2009/10/collins_mailsorter.jpg)

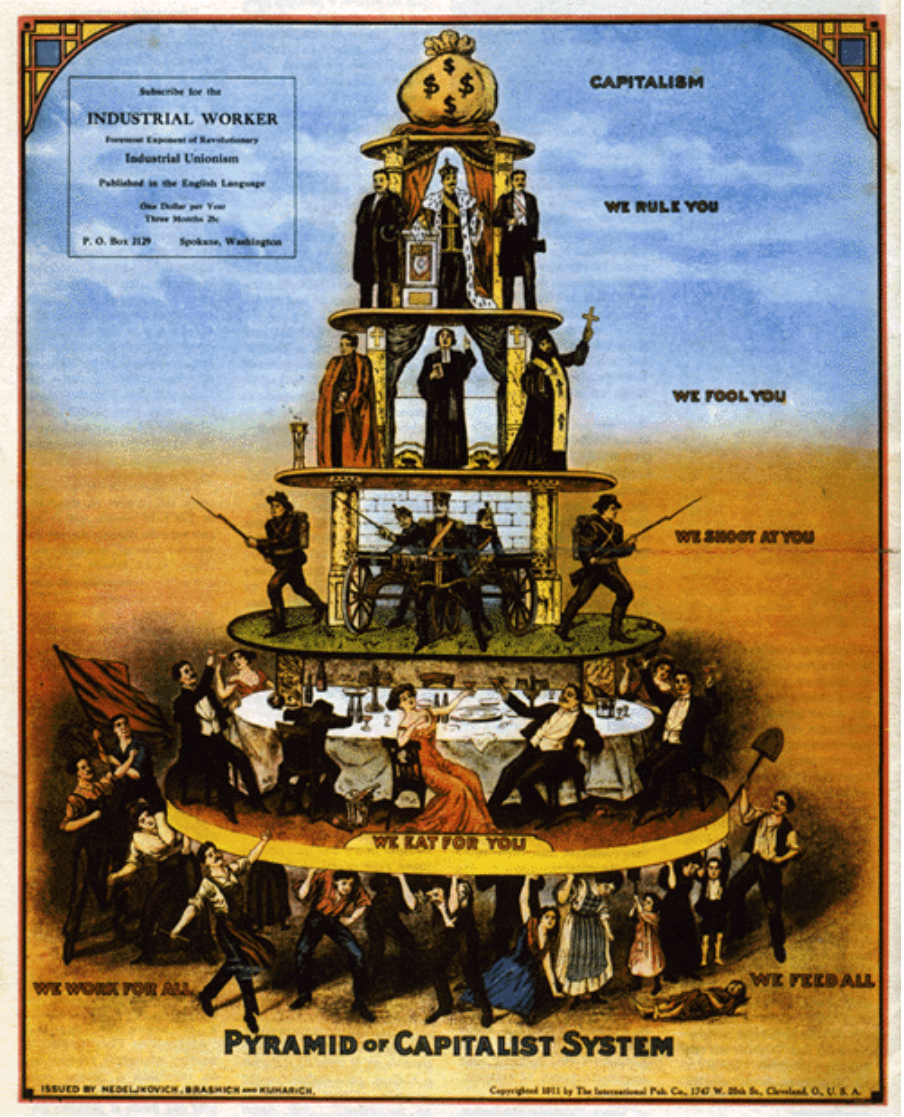
189 "Bretherton diagram" (based on a concept of Francis Bretherton (http://esse21.usra.edu/esse/BrethColor.GIF)) highlighting some of the linkages between social systems, biogeochemical systems, and the physical climate system. (NCAR (http://www.ucar.edu/communications/millennium/vision.html))



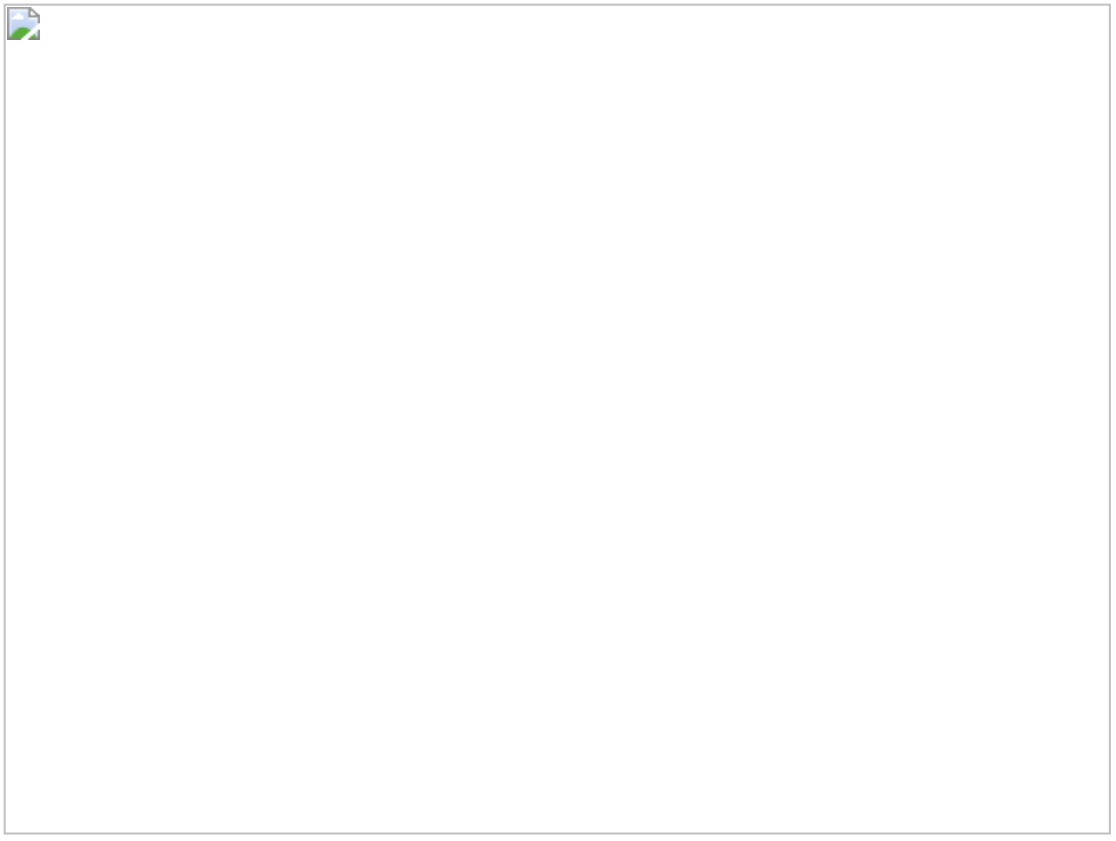
190 Priorities and issues (Gloustershire (https://consultations.southglos.gov.uk/inovem/consult.ti/CSissuesandoptions/printCompoundDoc?docid=109780))



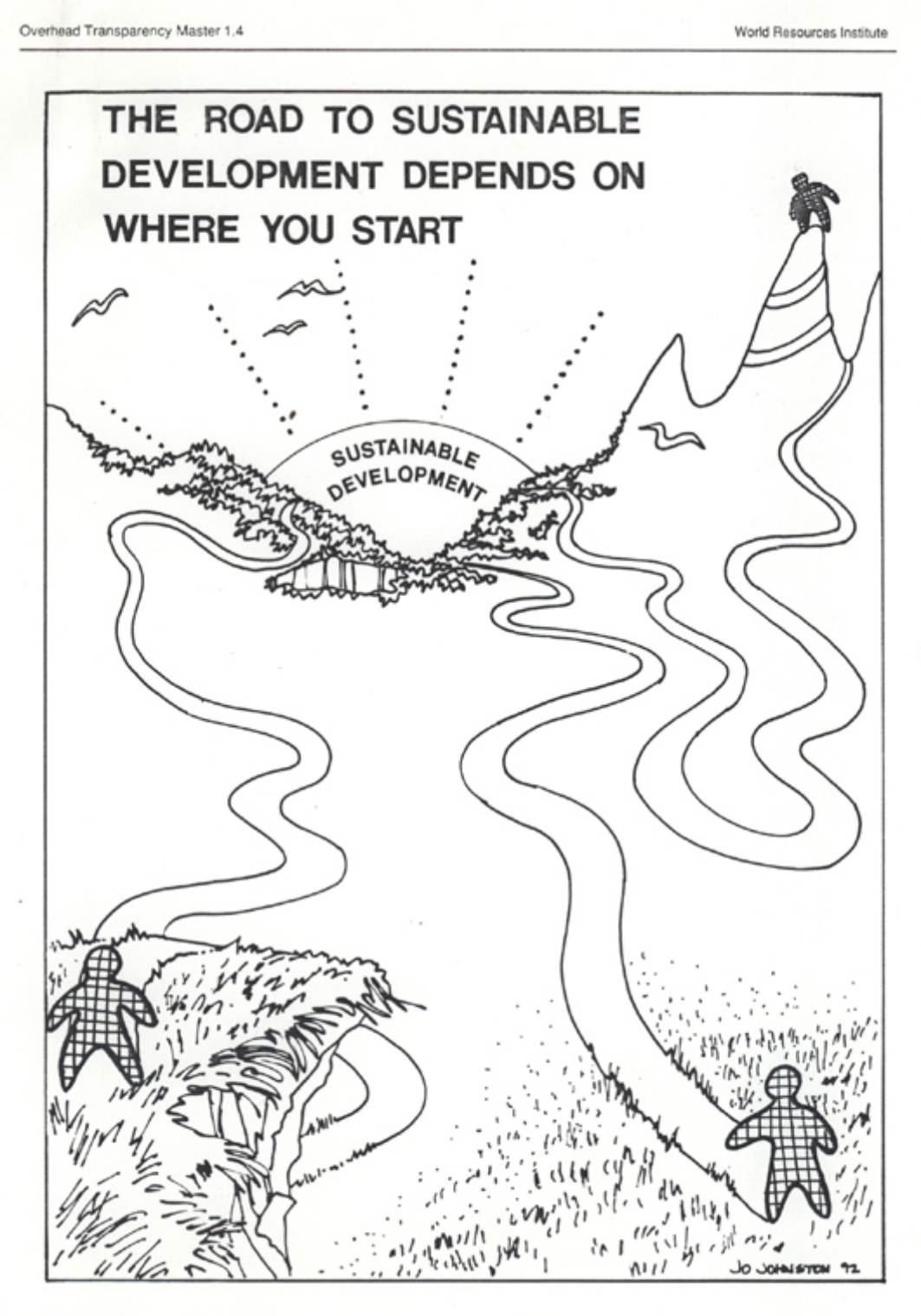
191 Capitalist system (IWW poster (http://commons.wikimedia.org/wiki/File:Anti-capitalism_color.jpg), see also (http://streetknowledge.wordpress.com/2009/12/15/pic-corporate-america/))



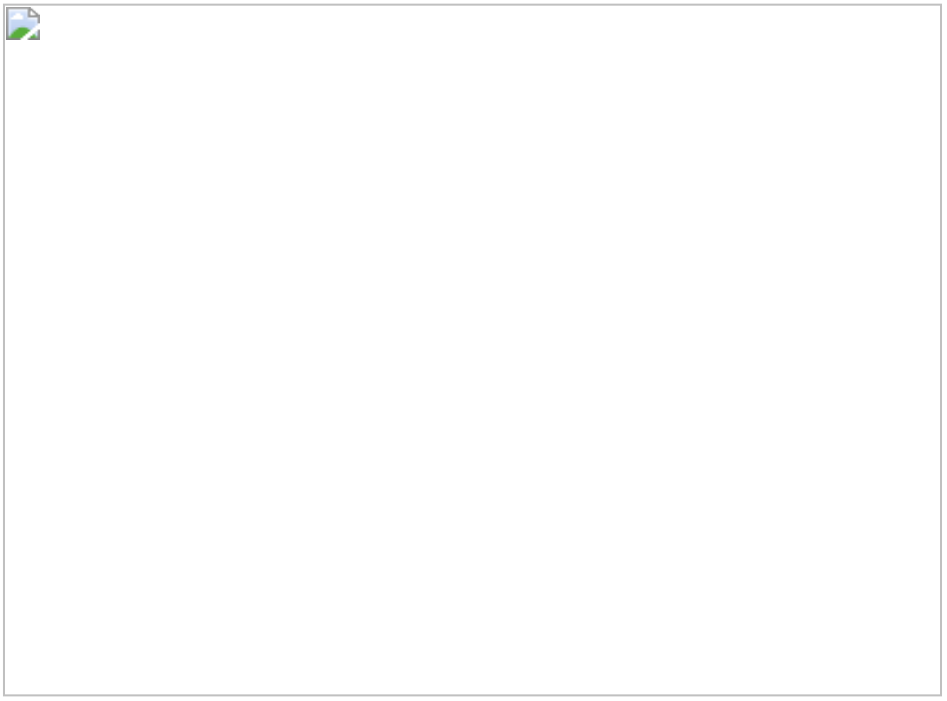
192 Cause and effect diagram (Fishbone or Ishikawa diagram (http://en.wikipedia.org/wiki/Ishikawa_diagram), instructions (http://www.hci.com.au/hcisite5/library/materials/Cause%20and%20effect%20diagrams.htm)). This from Stephen Hinton. (http://avbp.net/?p=466 Stephen Hinton)



193 Road depends on where you start (Jo Johnston (http://resweb.llu.edu/rford/courses/SPOL554/photos/SD-WRI-sm.jpg))

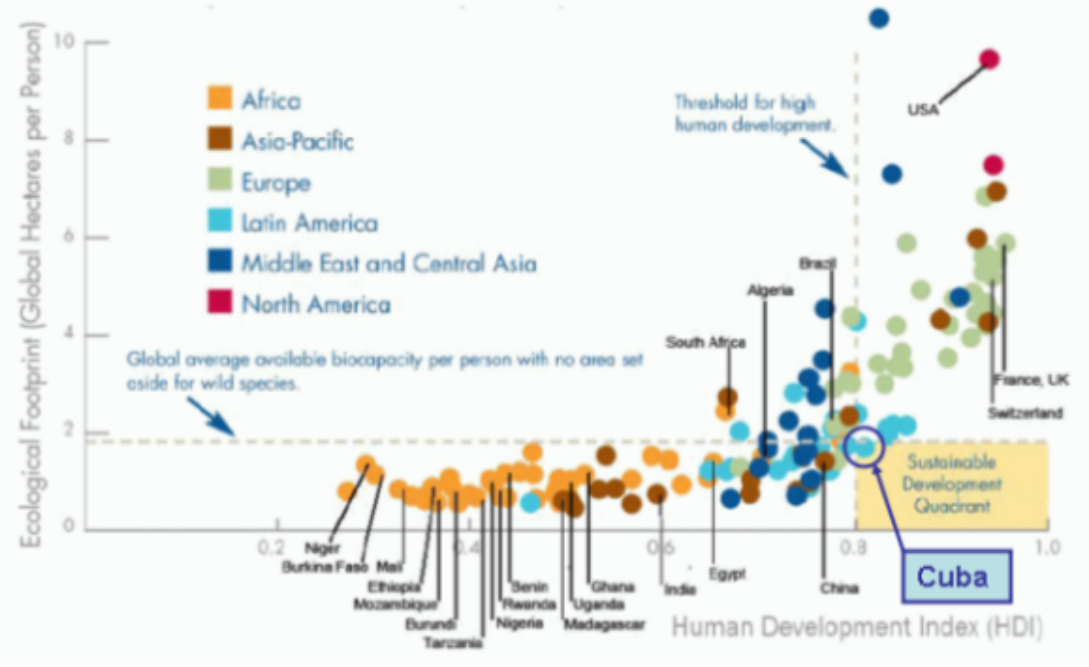


(https://computingforsustainability.files.wordpress.com/2010/03/road.jpg)**194 Realms** (Baudot via Ford (http://resweb.llu.edu/rford/courses/SPOL554/syllabus.html))



195 Global footprint versus Human Development Index (WWF (http://assets.panda.org/downloads/living_planet_report.pdf) via Oildrum (http://www.theoildrum.com/node/5316/))

(https://computingforsustainability.files.wordpress.com/2010/03/footprintvshdi_livingplanet06.png)



(https://computingforsustainability.files.wordpress.com/2010/03/footprintvshdi_livingplanet061.png)

196 Sequence of world systems 1949, 2007, 2030, 2050 (Charles Hall (http://aspo-spain.org/aspo7/presentations/Hall-EROEI-ASPO7.pdf) via Oildrum (http://www.theoildrum.com/node/5316/))


1949


2007

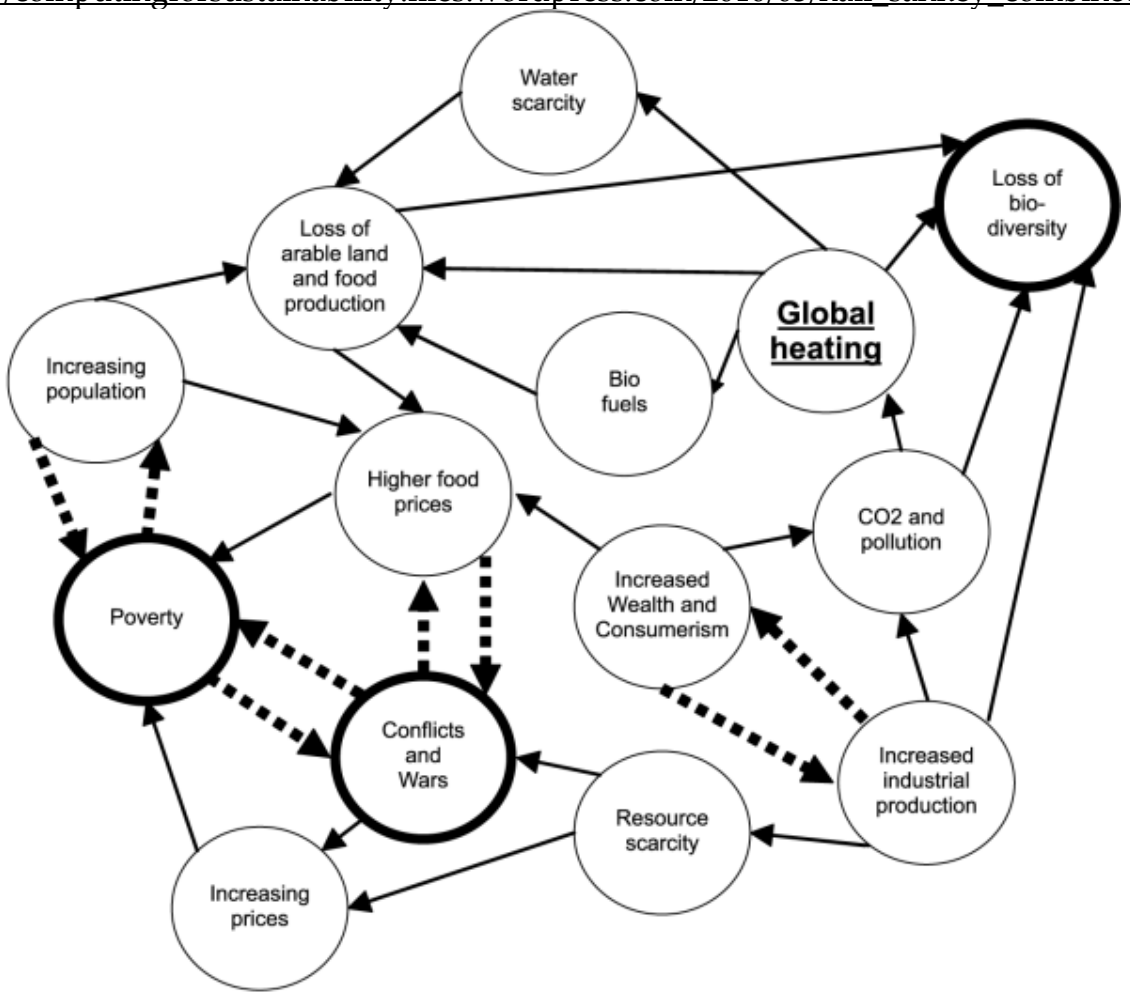

2030


2050

(https://computingforsustainability.files.wordpress.com/2010/03/hall_sankey_combined1.png)

197 Node diagram (Isaksson and Steimle (http://www.emeraldinsight.com/Insight/viewContentItem.do?contentType=Article&hdAction=lnkhtml&contentId=1775064), img (http://www.emeraldinsight.com/fig/1060210205001.png))

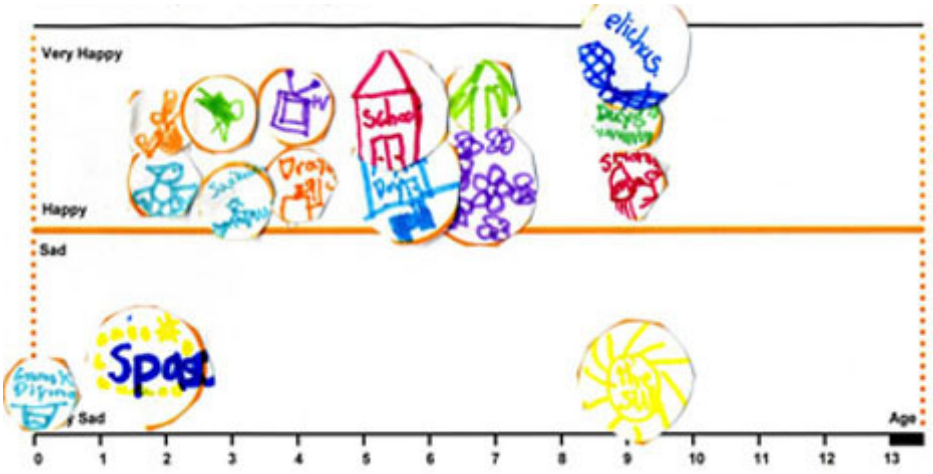
(https://computingforsustainability.files.wordpress.com/2010/03/hall_sankey_combined.png)



Note: The dotted arrows indicate important reinforcing loops

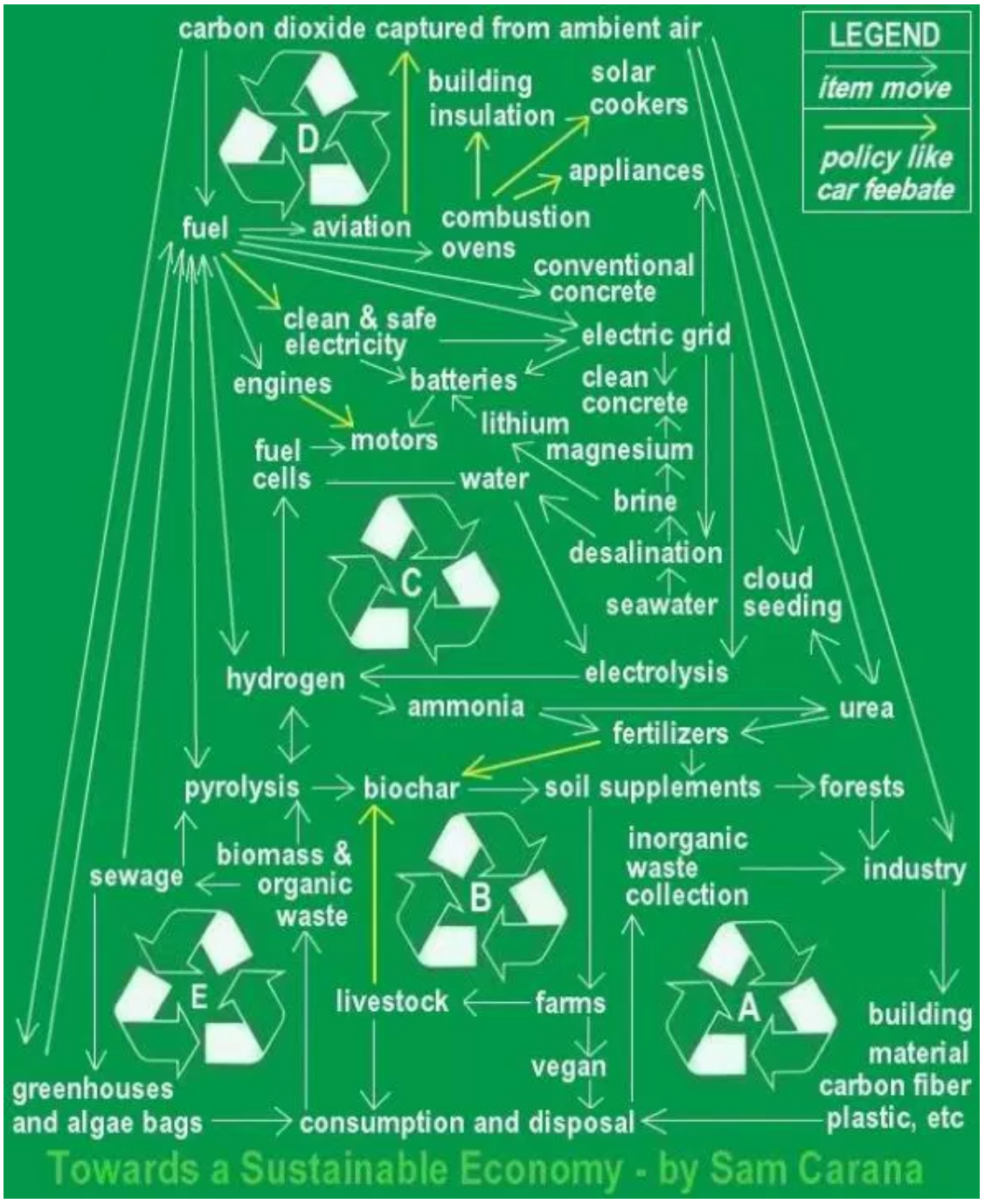
(https://computingforsustainability.files.wordpress.com/2010/03/isaksson.png)

198 Human life project (young child version, also young adult and adult). (Jennifer Ranville (http://humanlifeproject.com/contact.htm), overview (http://humanlifeproject.com/overview.htm))



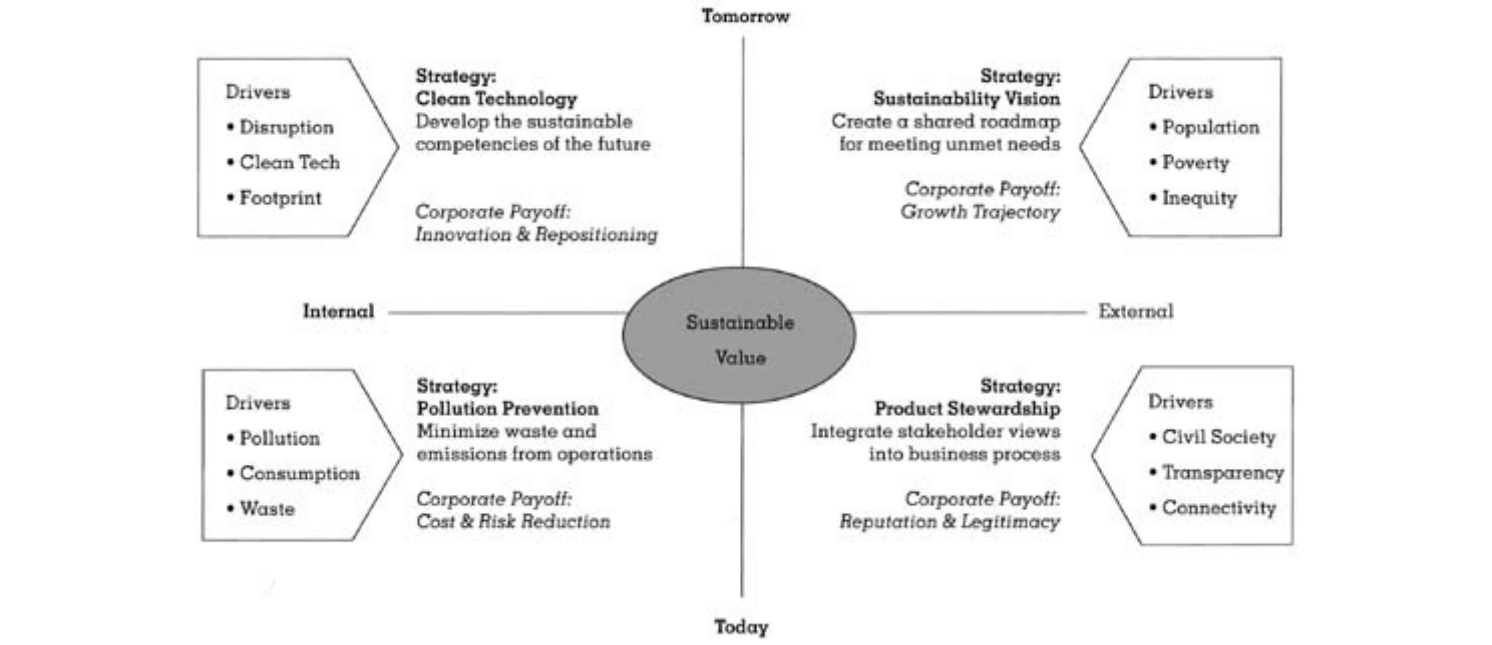
(https://computingforsustainability.files.wordpress.com/2010/03/life_diagrams_2x4_young_child.jpg)

199 Cycles in Sustainable Economy (Carana (http://hydrogeneconomy.gather.com/viewArticle.action?articleId=281474977686238)).



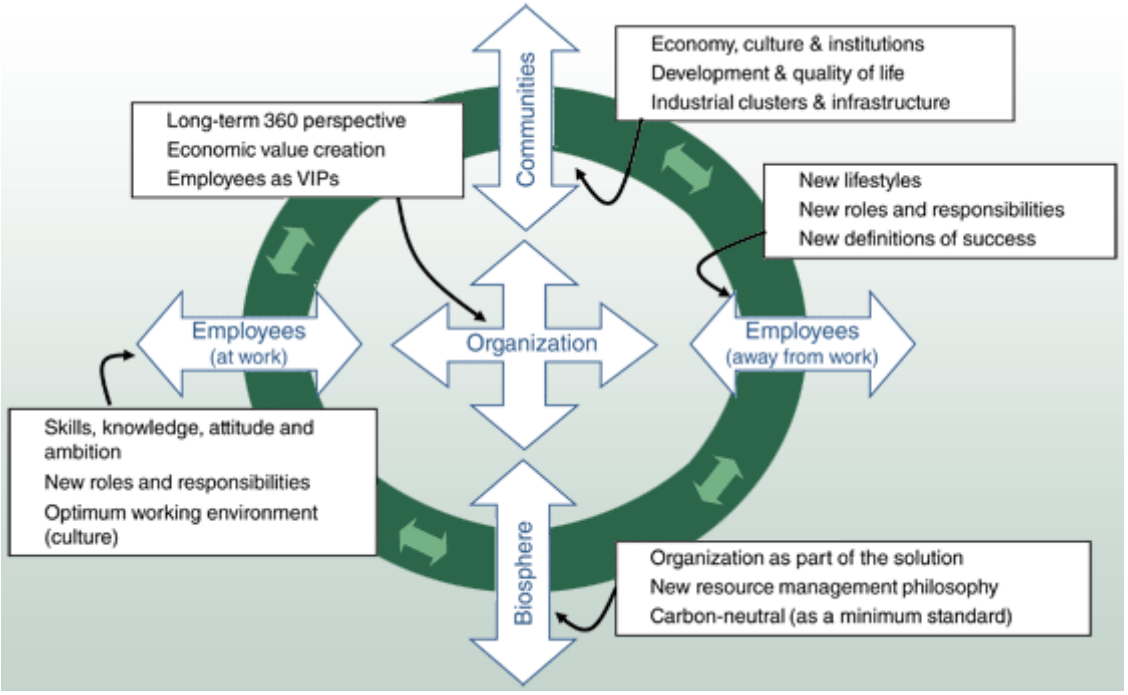
(https://computingforsustainability.files.wordpress.com/2010/03/carana_cyclesinsustainableeconomy.jpg)

200 Creating sustainable value framework (Hart and Milstein (http://aom.pace.edu/AME/archive/2003_may_contents.html) via Brinq (http://www.brinq.com/workshop/archives/2005/04/08/tribal-lingo-defining-sustainability))



(https://computingforsustainability.files.wordpress.com/2010/03/creatingsustainablevalue.jpg)

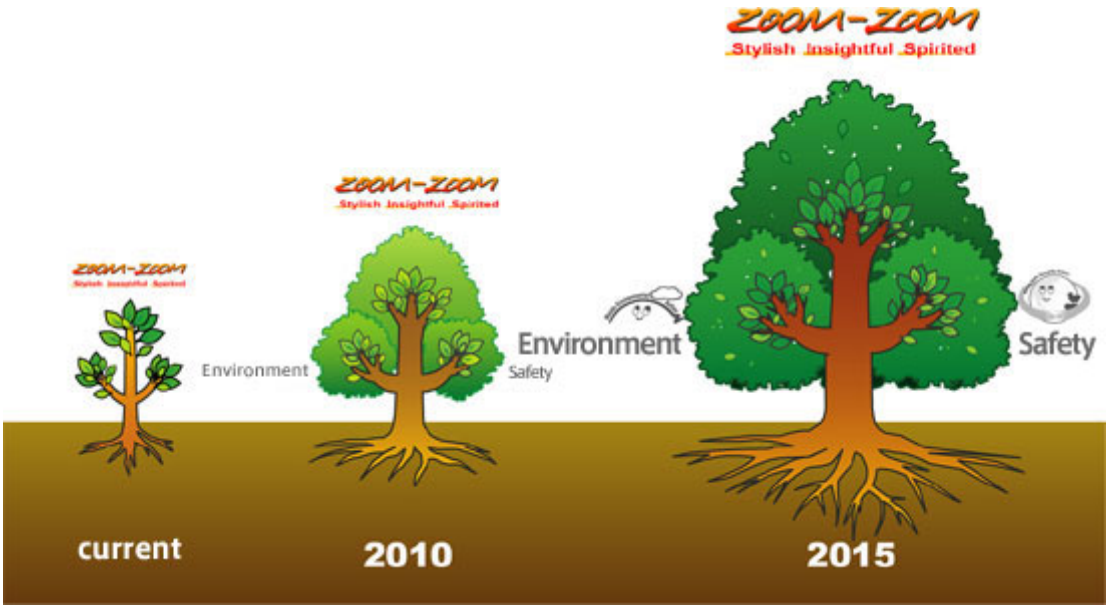
201 360 model (Hollingworth (http://www.iveybusinessjournal.com/article.asp?intArticle_ID=868))



(https://computingforsustainability.files.wordpress.com/2010/03/hollingworth_1.gif)

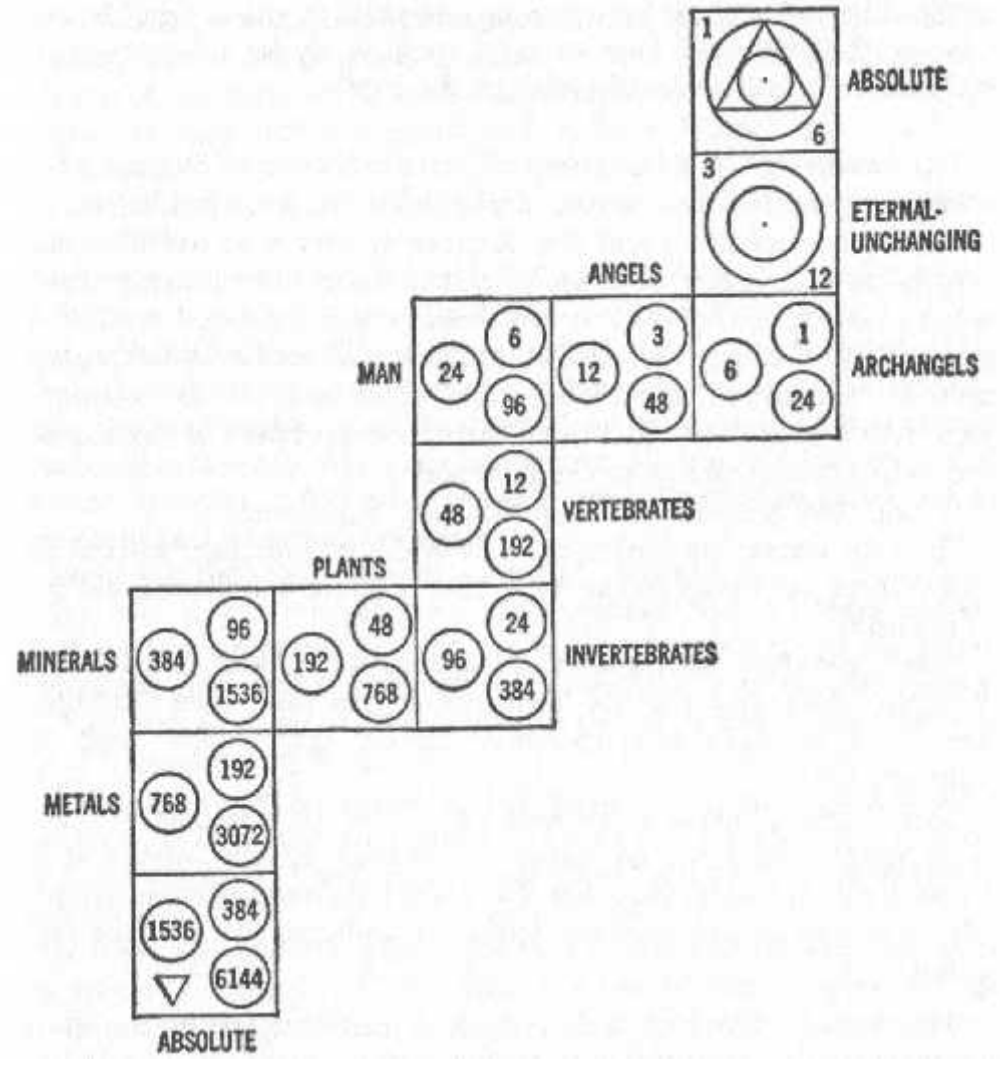
202 Zoom zoom to make the tree grow (Mazda (http://www.mazda.com/investors/policy/technology.html))

> *Mazda is working towards a sustainable future that brings continued happiness and excitement to people in a global society, by developing vehicles that never fail to excite, visually capture the customer's heart, and provide a fun driving experience that keeps bringing them back to Mazda.*



(https://computingforsustainability.files.wordpress.com/2010/03/zoomzoom_mazda_tree.jpg)

203 Diagram of Everything Living (Gurdjieff (http://www.ardue.org.uk/university/system/lect40.html) see also Ray of Creation (http://en.wikipedia.org/wiki/Ray_of_Creation))



(https://computingforsustainability.files.wordpress.com/2010/03/gurdjieff_diagrameverythingliving.jpg)

204 Four capitals (on a tree) University of Vermont (http://www.uvm.edu/giee/?Page=about/history.html&SM=about/about_menu.html)*Gund Institute for Ecological Economics (http://www.uvm.edu/giee/?Page=about/history.html&SM=about/about_menu.html)*

(https://computingforsustainability.files.wordpress.com/2010/03/tree-large.jpg)

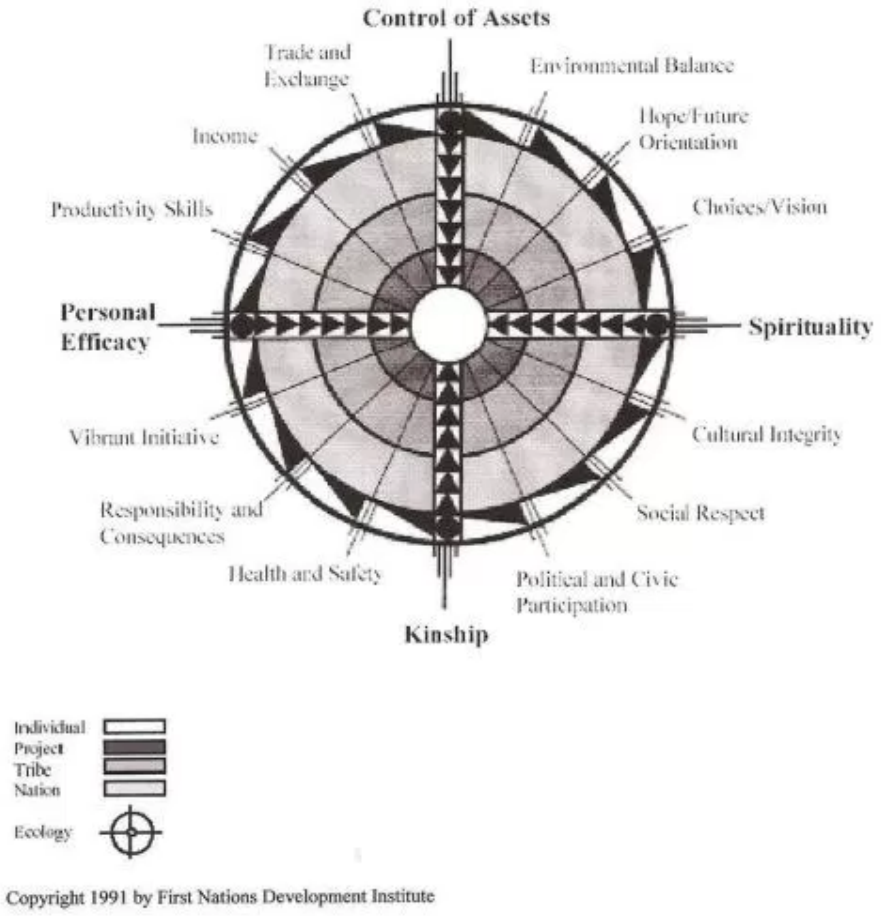
205 Pattern Dynamics (Tim Winton (http://www.patterndynamics.com.au/home))

> *Through his work as a sustainability educator Tim recognised the need for a common 'language' in sustainability. PatternDynamics is a set of symbols representing the organizing principles of the natural world.*

(https://computingforsustainability.files.wordpress.com/2010/03/patterndynamics.jpg)

206 First Nations Ecology (First Nations Development Institute (http://www.firstnations.org/default2.asp?id=69) – can't find original, this via (http://4.bp.blogspot.com/_LbIlP2wfBuY/SpgA_EFFCDI/AAAAAAAAA0Y/ce0b4Og1mwY/s1600-h/FNDImaxenlarged.jpg))

(https://computingforsustainability.files.wordpress.com/2010/03/firstnationsecology.jpg)

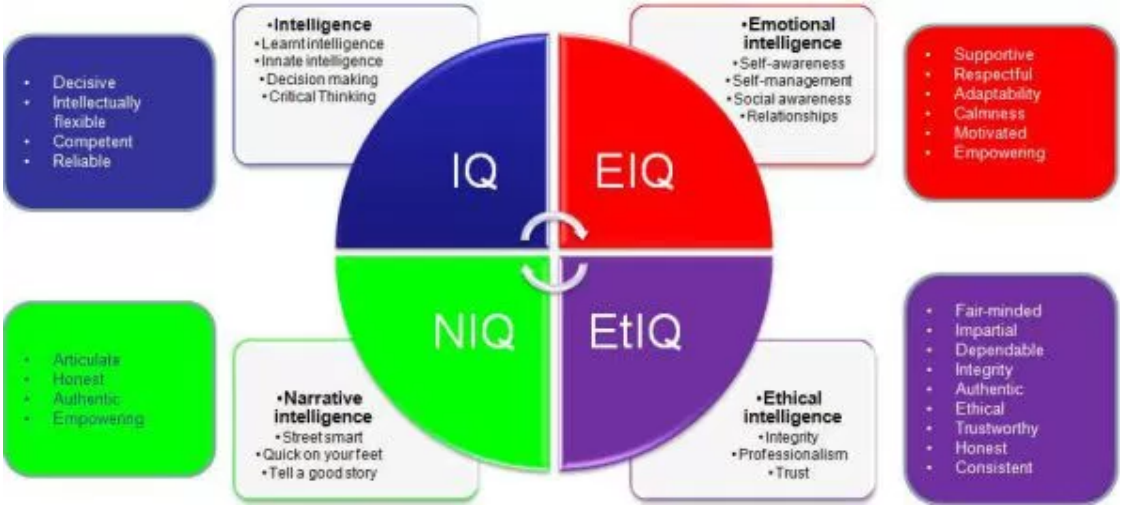


(https://computingforsustainability.files.wordpress.com/2010/03/firstnationsecology1.jpg)
207 Mind map (many variants, this "Intention to sustain" Touchedbyamoose (http://www.zazzle.com/intention_to_sustain_mind_map_poster-228073793115708656), see also (http://www.fieldofmar-e.schools.nsw.edu.au/page7/files/energy-audit-mindmap.jpg))

(https://computingforsustainability.files.wordpress.com/2010/03/intention_to_sustain_mind_map_poster-p228073793115708656tdcp_400.jpg)

208 Four Dimensions of intelligence (TLC Solutions (http://www.tlcsolutions.com.au/OurSolutions/4DSL/tabid/84/Default.aspx))

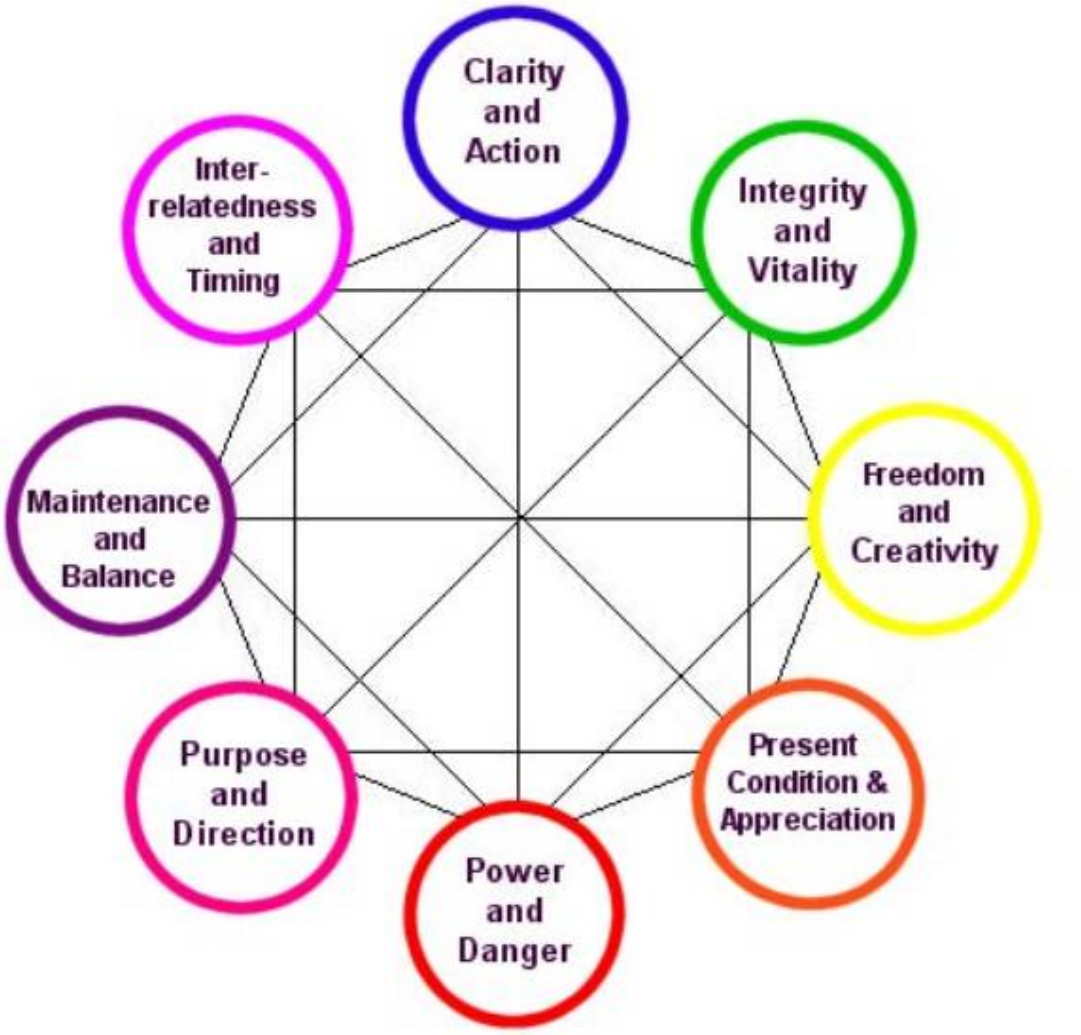
> *The four dimensions are based on the concept of dimensions of space and time, where the use of predominantly one dimension leads to a one-dimensional form of leadership. The more we are able to utilise additional dimensions, the greater depth we develop and implement as leaders. The fourth dimension is absolutely critical – the dimension of time. Most people can be a great leader at a single point in time, but what makes a great leader over time, sustainably, is the fourth dimension.*



(https://computingforsustainability.files.wordpress.com/2010/03/4-dimensional-model-of-sustainable-leadership-jpeg.jpg)

209 Self organising success (Mike Bell, Wisdom Meme (http://www.thewisdommeme.com/Articles1/leadingforss.htm))

All self-organising systems rely on the interconnectedness of eight design elements (or energies) for their survival and growth:

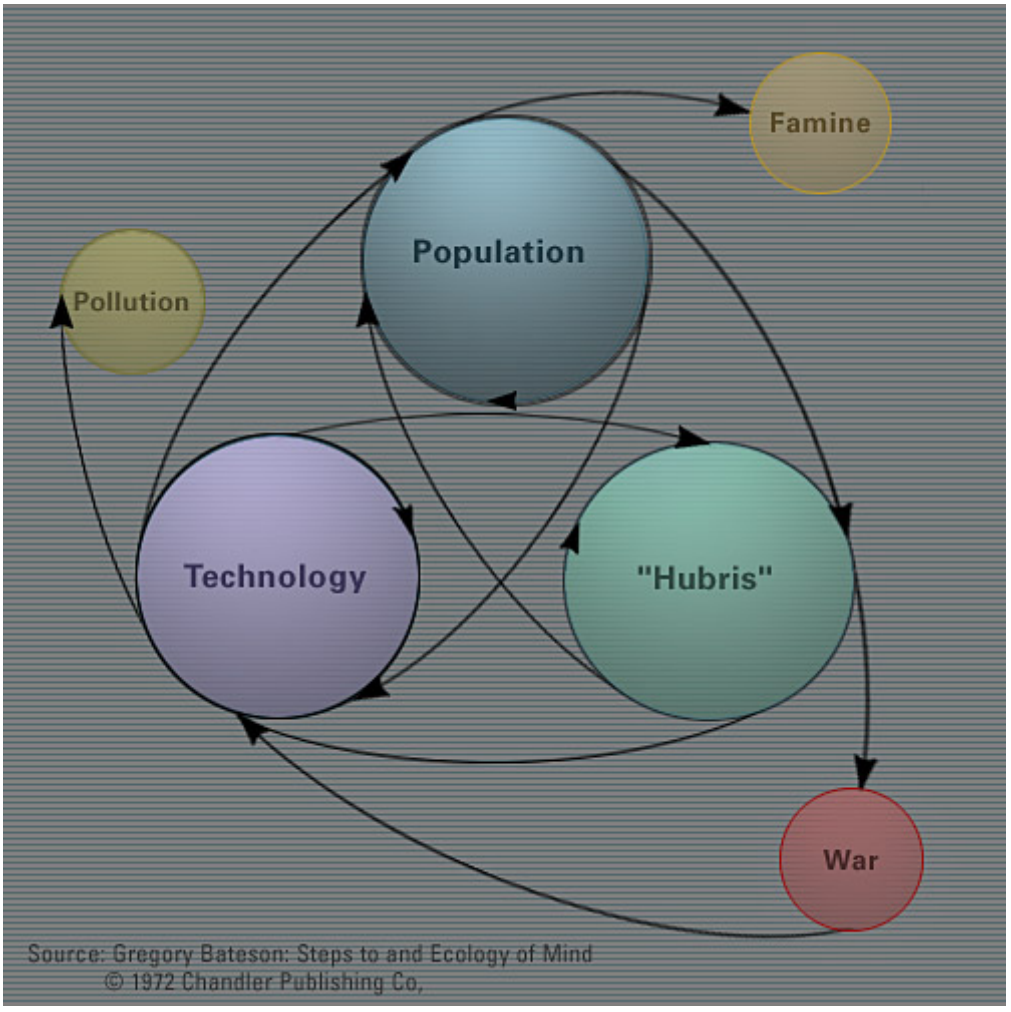


(https://computingforsustainability.files.wordpress.com/2010/03/selforganisingsuccess.jpg)

210 Child rights ecology model (ex UN Convention Rights of the Child, David Ortiz via Open University (http://labspace.open.ac.uk/file.php/4597/formats/print.htm)).

(https://computingforsustainability.files.wordpress.com/2010/03/childrightsmodel.jpg)

211 Steps to Ecology of Mind (Gregory Bateson via Poe (http://www.stevenpoe.com/about/theory.html))

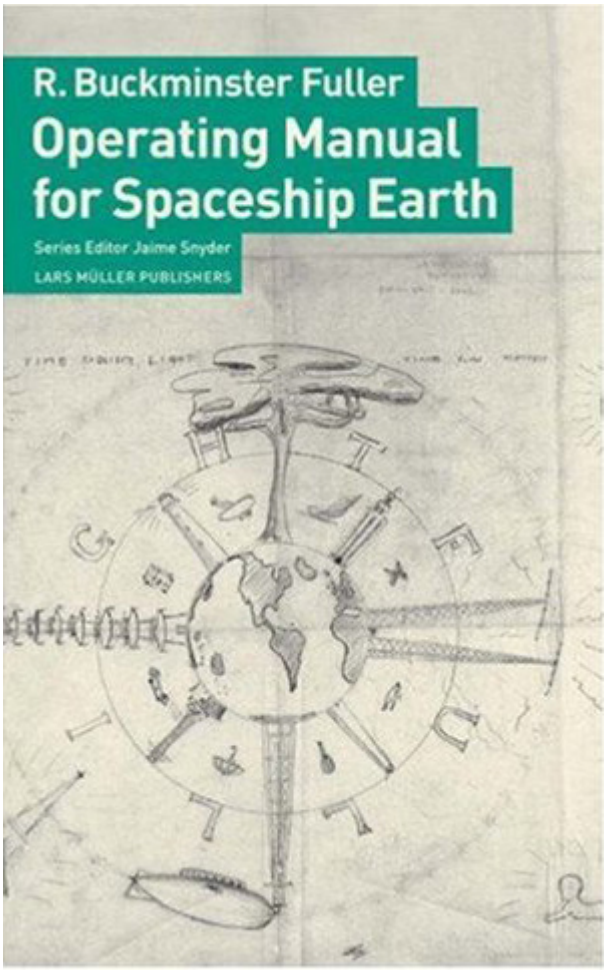


(https://computingforsustainability.files.wordpress.com/2010/03/bateson72_stepstoecologyofworld.jpg)

212 Spaceship

Spaceship Earth was so extraordinarily well invented and designed that to our knowledge humans have been on board it for two million years not even knowing that they were on board a ship

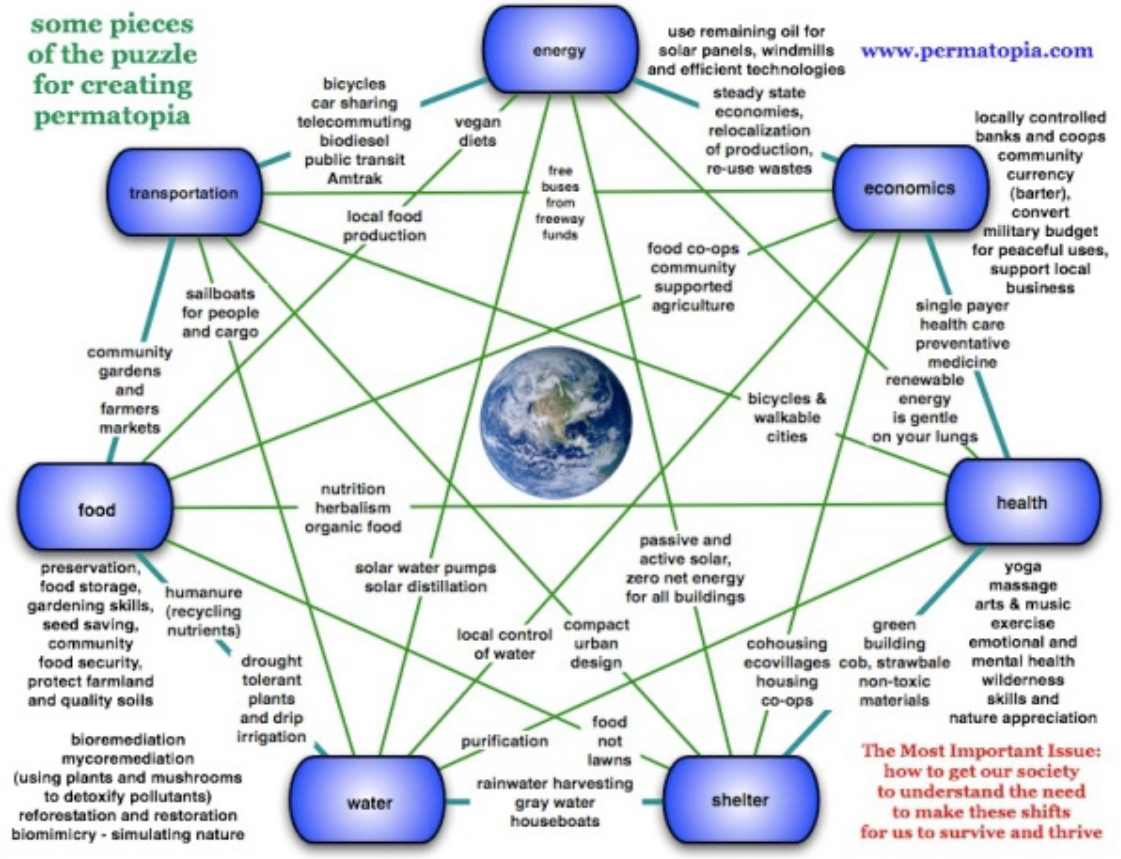
there are no passengers on Spaceship Earth Fuller (1965 in Vallero 2005. 367)



(https://computingforsustainability.files.wordpress.com/2010/03/operating_manual.jpg)

(see also representations of cabin ecology research (http://marukuwato.multiply.com/journal/item/16))

213 Permatopia (Mark Robinowitz (http://permatopia.com/))



(https://computingforsustainability.files.wordpress.com/2010/03/permatopia-issues.jpg)

214 Industrial Bubble (Geoff Brown (http://www.yesandspace.com.au/))

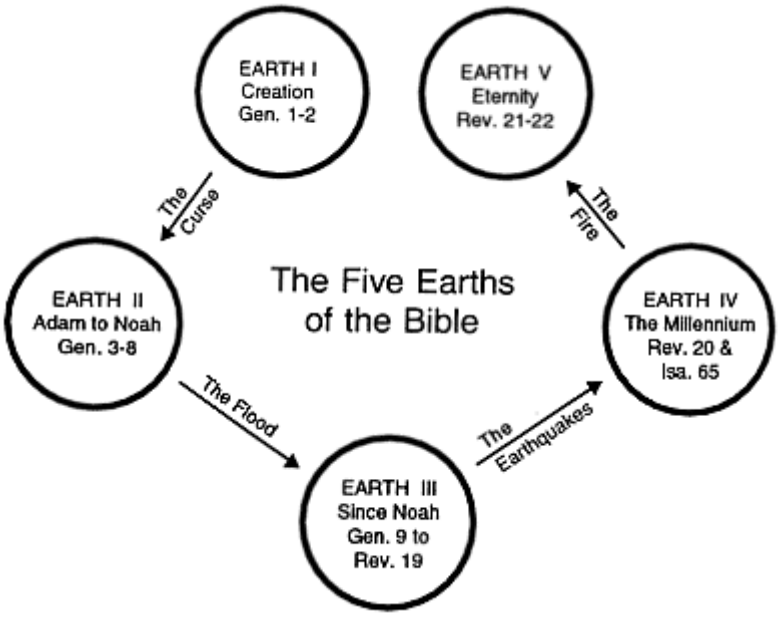
(https://computingforsustainability.files.wordpress.com/2010/03/industrialbubble_geoffbrown.jpg)

215 Five Earths of the Bible (Lamb and Lion Minstries (http://www.lamblion.com/articles/articles_signs12.php))

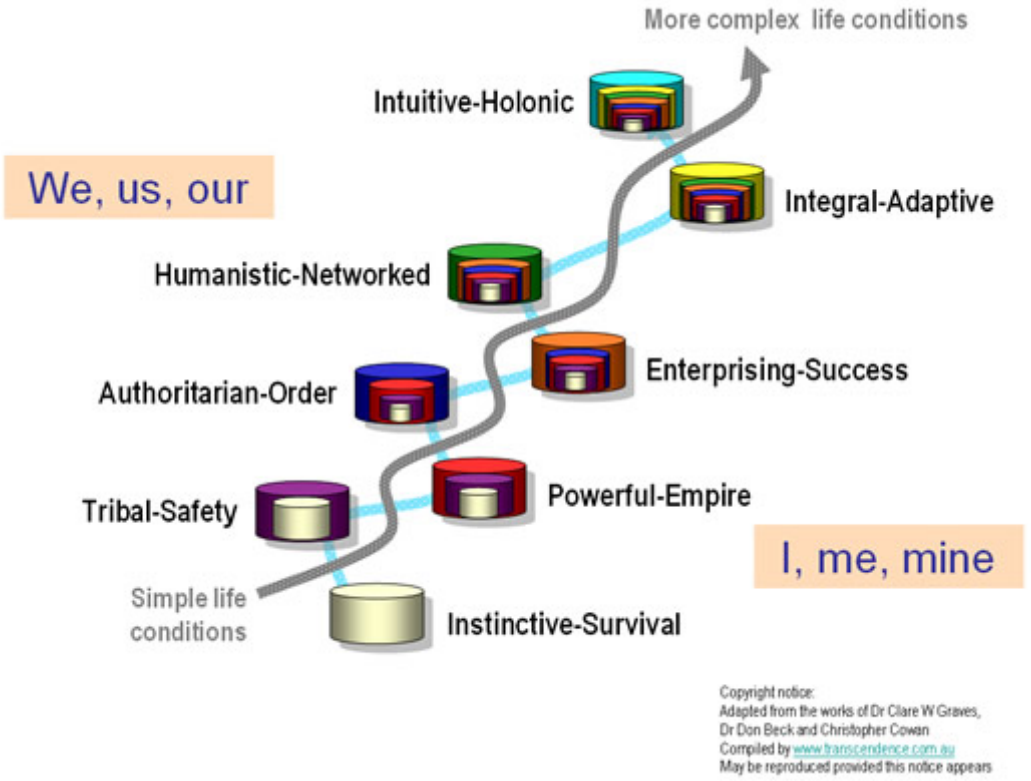
The first earth was the one created in the beginning (Genesis 1:1 (http://bible.logos.com/passage/niv/Genesis%201.1)). It was perfect in every respect (Genesis 1:31 (http://bible.logos.com/passage/niv/Genesis%201.31)). But because of Man's sin, God placed a curse upon the earth (Genesis 3: 17-19 (http://bible.logos.com/passage/niv/Genesis%203.%2017-19)).

The fourth earth — the millennial earth — will be very different from the present earth. The earthquakes that will produce it will be the most severe in history. Most important, the curse will be partially lifted, making it possible for Man to be reconciled to nature and for nature to be reconciled to itself. The wolf will dwell with the lamb because the wolf will no longer be carnivorous. The nursing child will play with the cobra because the cobra will no longer be poisonous (Isaiah 11:8 (http://bible.logos.com/passage/niv/Isaiah%2011.8)).

But Satan's last revolt at the end of the Millennium will leave the earth polluted and devastated (Revelation 20:7-9 (http://bible.logos.com/passage/niv/Revelation%2020.7-9)). Thus, at the end of the Lord's reign, God will take the Redeemed off the earth, place them in the New Jerusalem, and then cleanse the earth with fire (2 Peter 3:10-13 (http://bible.logos.com/passage/niv/2%20Peter%203.10-13)).

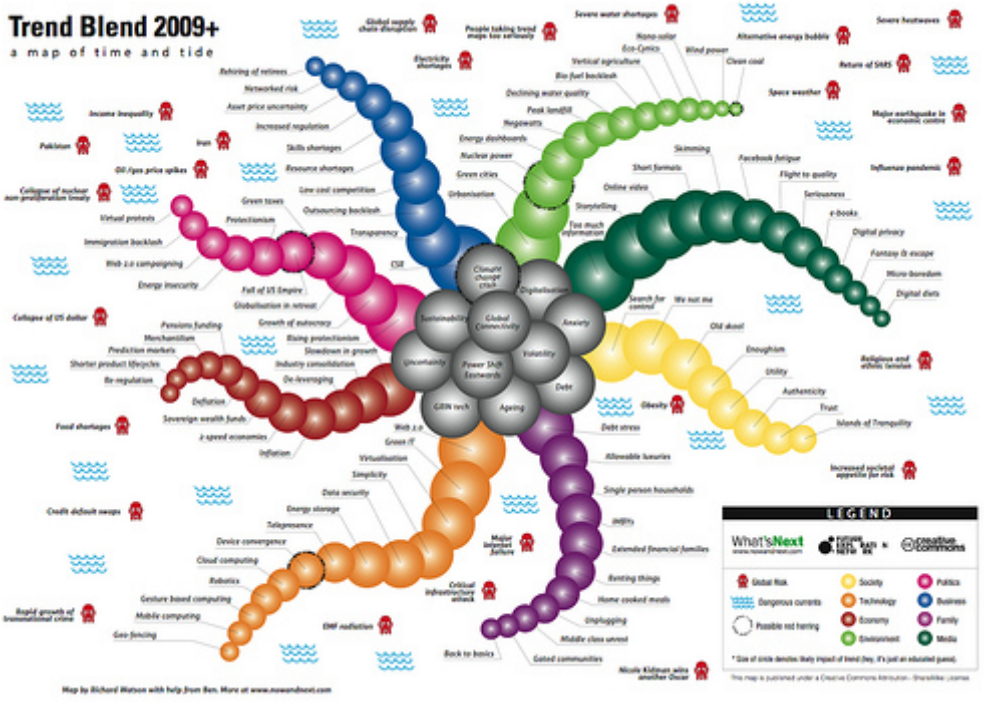


(https://computingforsustainability.files.wordpress.com/2010/03/earths-diagram.gif)**216 Change Map** (Clare Graves (http://www.clarewgraves.com/home.html), Beck and Cowan via eman8 (http://www.eman8.net/blog/?page_id=72)) See also Spiral dynamics (http://www.spiraldynamics.com/) (image (http://www.mcs-international.org/downloads/045_integral_spiral_dynamics.jpg)) (https://computingforsustainability.files.wordpress.com/2010/03/earths-diagram.gif)



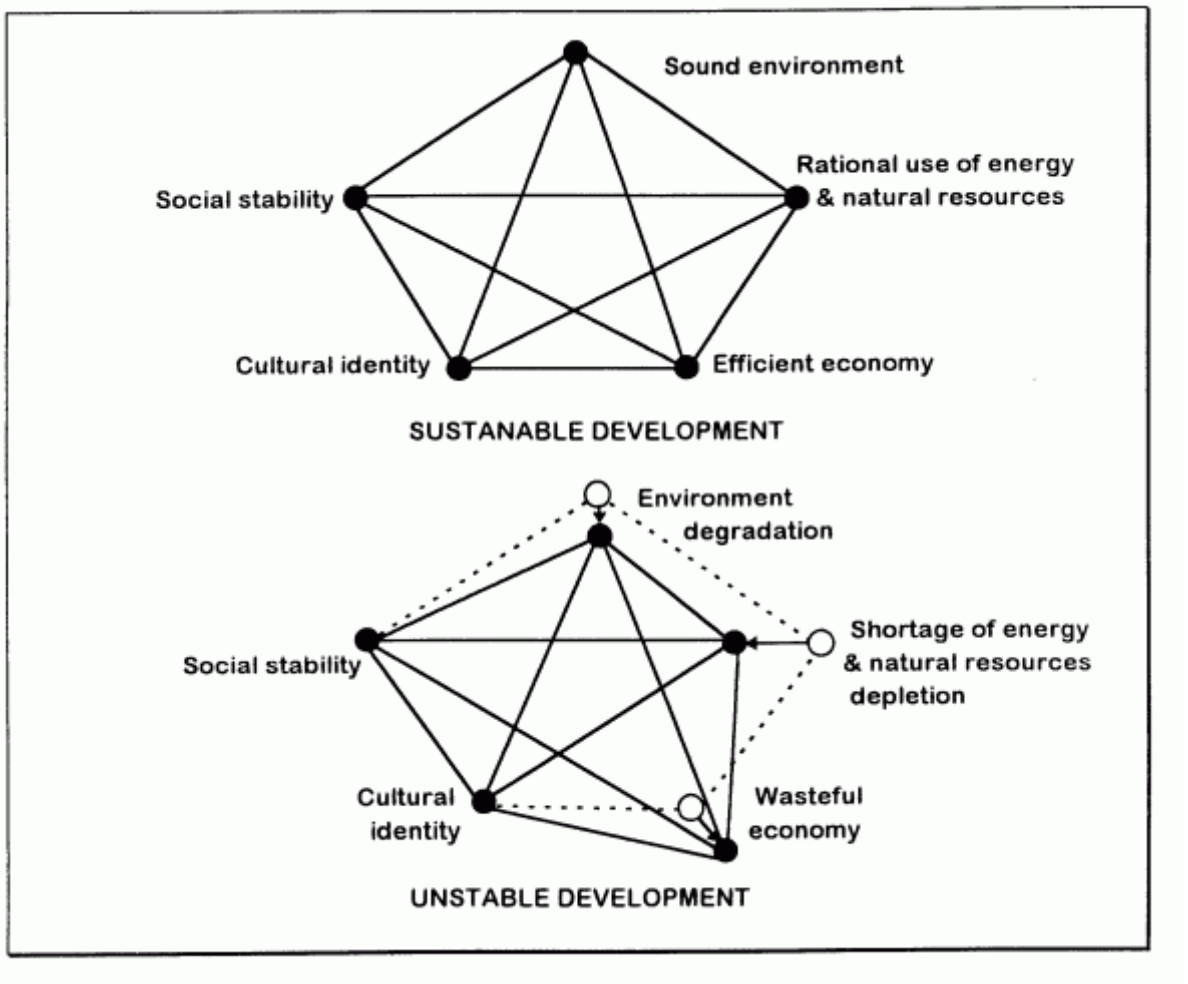
(https://computingforsustainability.files.wordpress.com/2010/03/vmeme-map41-jpg.jpg)

217 Sustainability mapped as megatrend (Richard Watson (http://toptrends.nowandnext.com/?p=427)). Higher res (http://www.flickr.com/photos/cambodia4kidsorg/3122529077/sizes/o/in/photostream/).



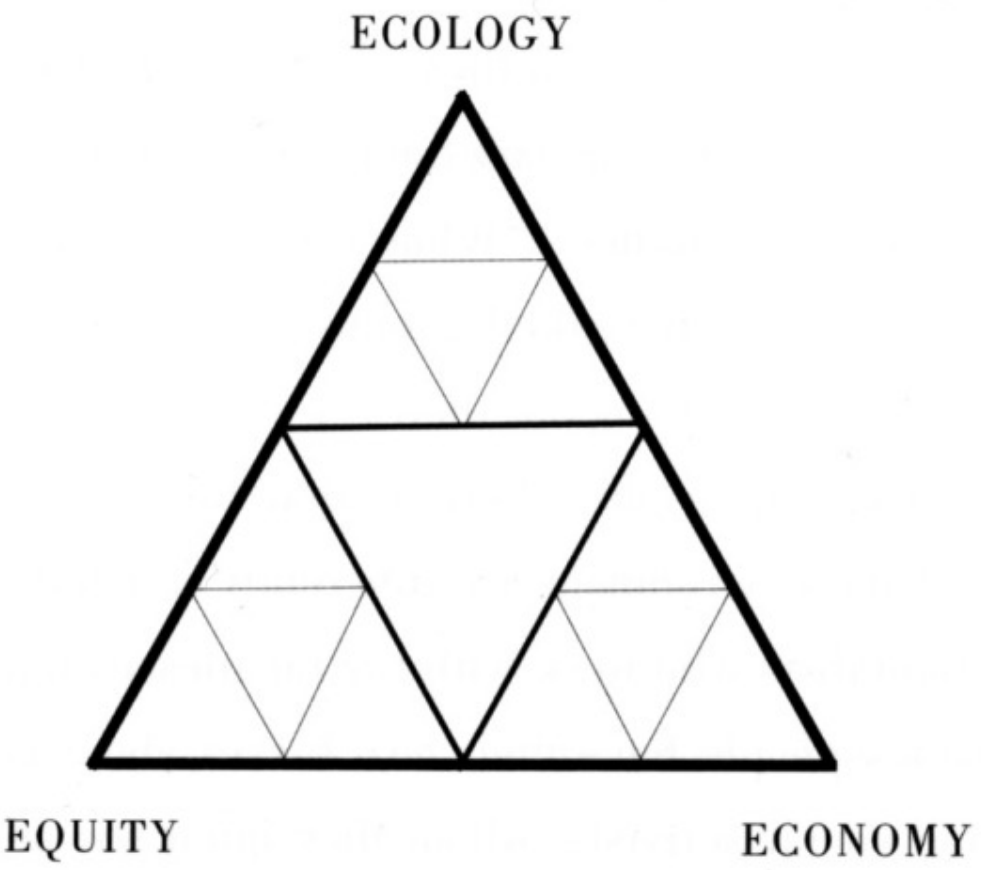
(https://computingforsustainability.files.wordpress.com/2010/03/trendmap_sm.jpg)

218 Deformation of Pentagram (Di Castri via Savchenko (http://biobel.bas-net.by/igc/ChD/Reviews5_e.htm))



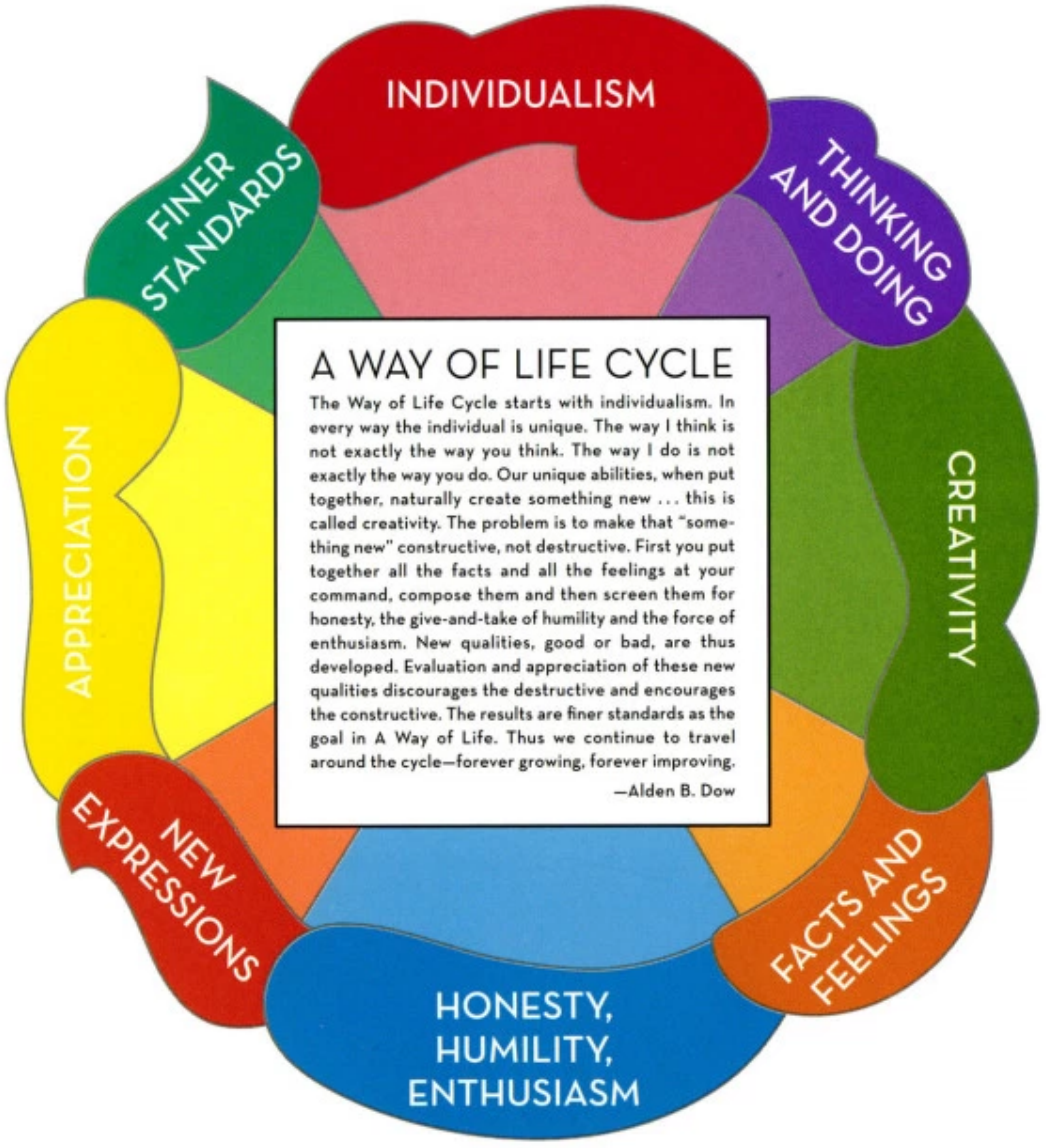
(https://computingforsustainability.files.wordpress.com/2010/03/pentagram.gif)

219 Ecology, Equity, and Economy Triangle by McDonough and Michael Baungart From the book, Cradle to Cradle: Remaking the Way We Make Things by William McDonough and Michael Baungart

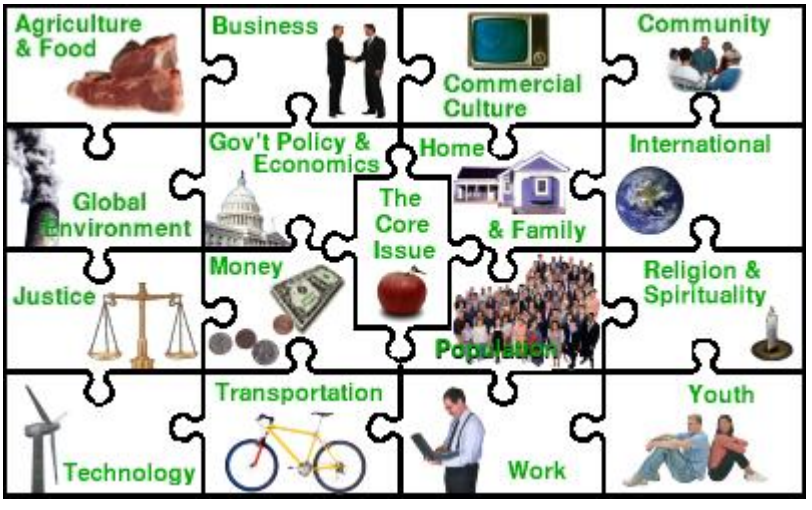


(https://computingforsustainability.files.wordpress.com/2010/03/ecologyequityeconomy.jpg)

220 Alden Dow's A way of life cycle ("Alden B. Dow Midwestern Modern (http://www.absolutemichigan.com/dig/michigan/michigan-books-alden-b-dow-midwestern-modern-by-diane-maddex/)" by Diane Maddex)

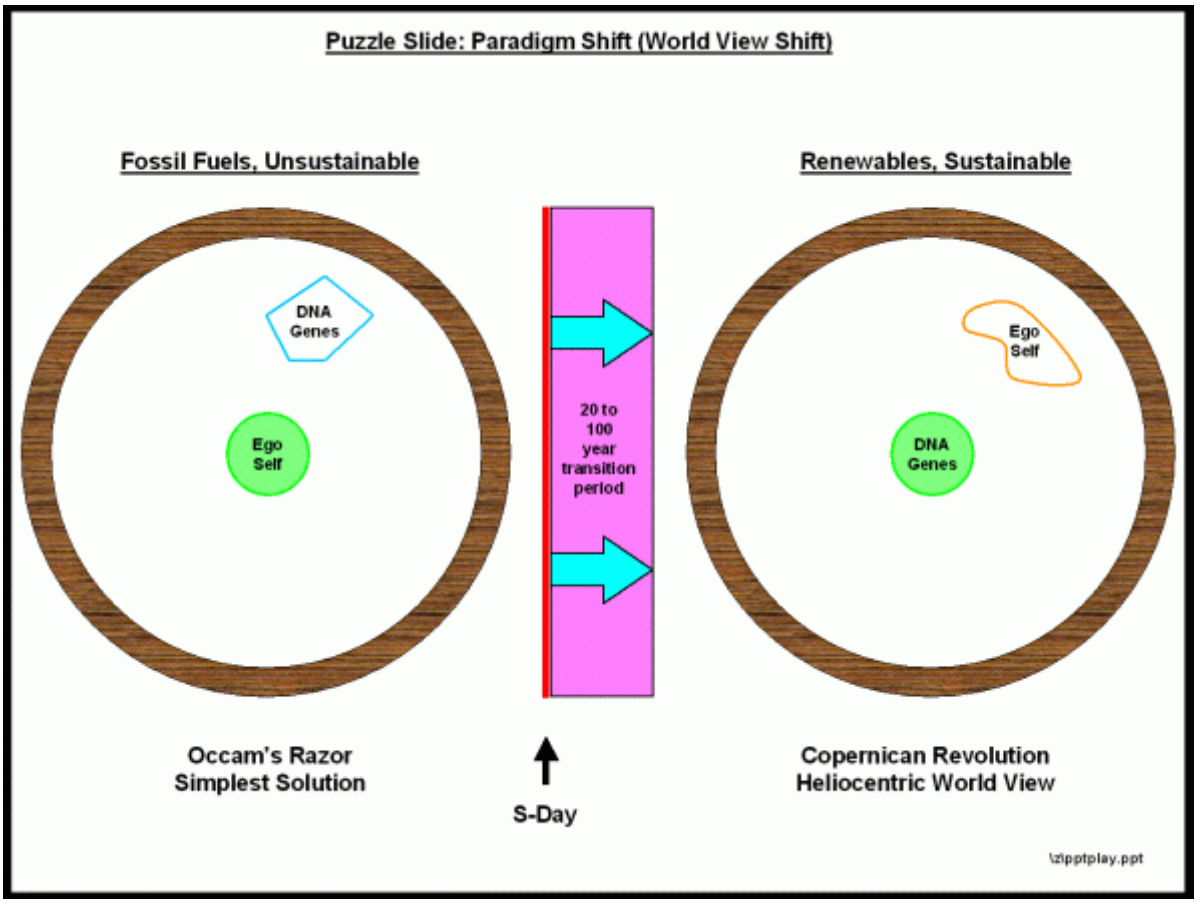


(https://computingforsustainability.files.wordpress.com/2010/03/a-way-of-life-cycle.jpg)**221 Puzzle** (from Affluenza.org (http://whitedwarf.org/affluenza/images/puzzle.jpg))



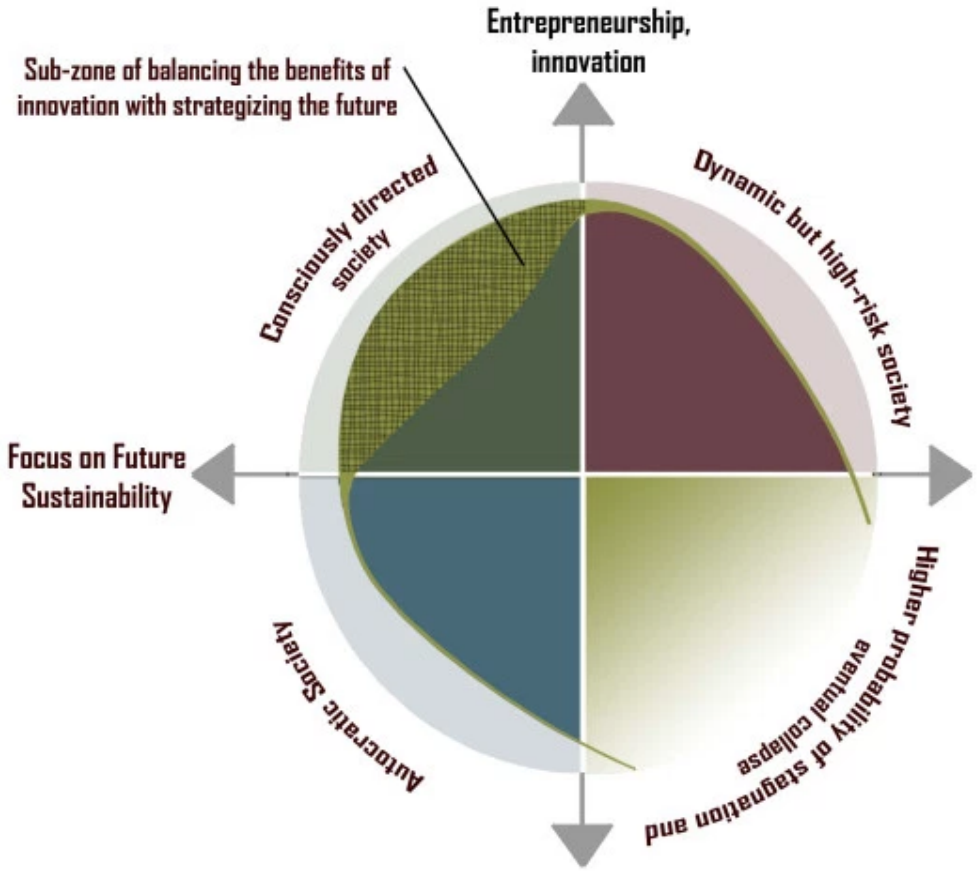
(https://computingforsustainability.files.wordpress.com/2010/03/puzzle.jpg)

222 Puzzle Slide (Henry Fiddler (http://plan-s.htfiddler.net/))



(https://computingforsustainability.files.wordpress.com/2010/03/puzzle-slide-lg.gif)

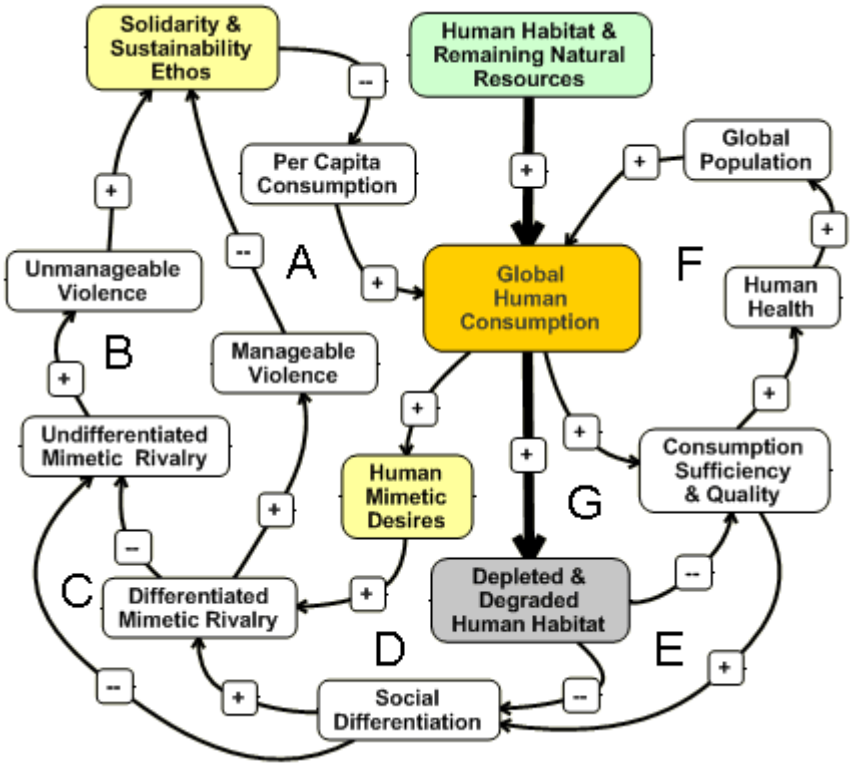
213 Social zones of sustainability (Confronting Change (http://www.confrontingchange.com/cch/2009/10/new-paradigms.html))



Zones of Social Sustainability

(https://computingforsustainability.files.wordpress.com/2010/03/social-zones-of-sustainability-diagram.jpg)

224 Mimetic feedback influence model (Gutirrez (http://www.pelicanweb.org/solisustv02n08.html) from Girad (http://en.wikipedia.org/wiki/Ren%C3%A9_Girard)) (imitation role as motivator)



(https://computingforsustainability.files.wordpress.com/2010/03/mimetic_influence1.gif)

225 Pattern of Sustainability (Joanne Tippet (http://www.sed.manchester.ac.uk/planning/staff/tippett_joanne.htm), dissertation (http://www.holocene.net/dissertation.htm))

(https://computingforsustainability.files.wordpress.com/2010/03/patternofsustainabilty.jpg)

226 River system health. Triangle has flows, processes, and is in context of larger scale. Vugteveen et al. (2006) (http://www.springerlink.com/content/e1v846376j210706/).

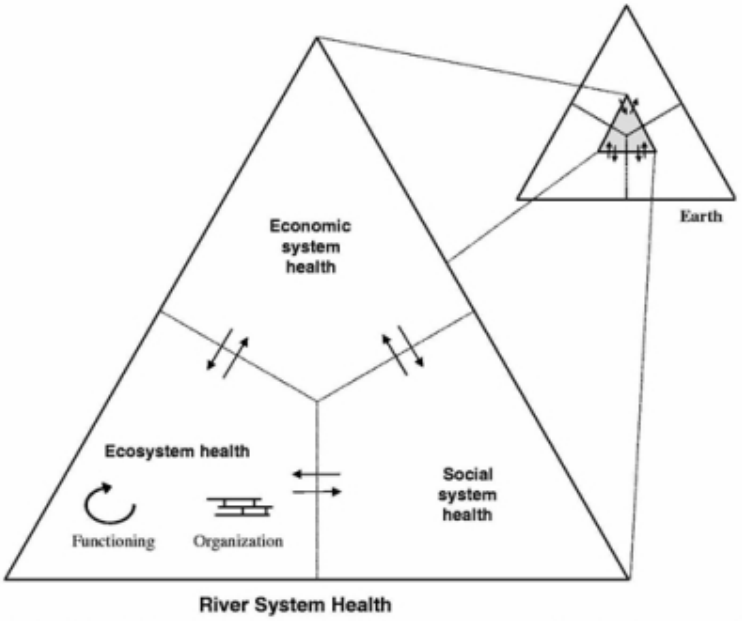
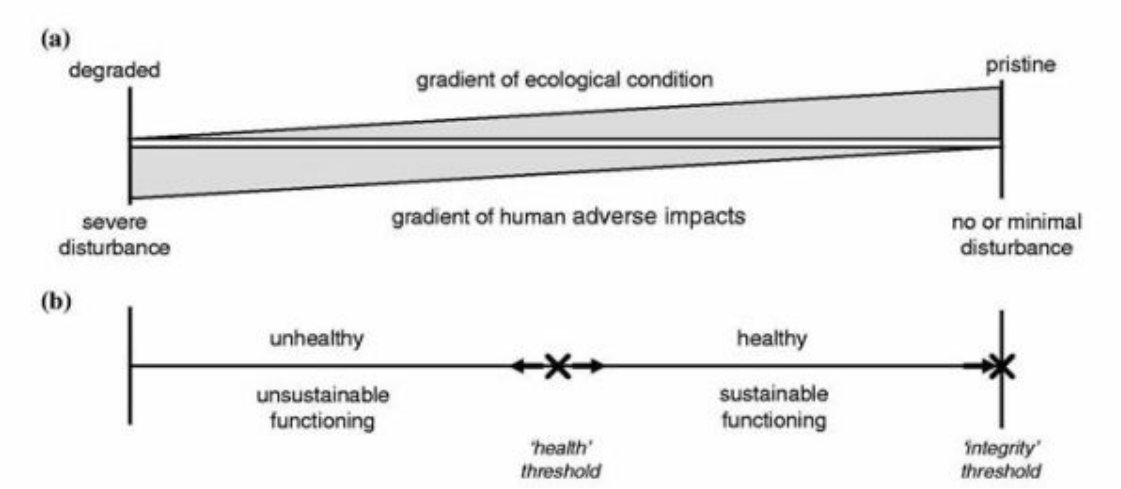


Figure 2. River System Health (RSH) is represented as the overall health status of the ecological, economic and social health components. Ecosystem health is a measure of ecological functioning within the organization of the river system. RSH itself depends on interactions between the river system and the surrounding earth.

(https://computingforsustainability.files.wordpress.com/2010/04/vugteveen_riverecosystem_triangle.jpg)

227 Continuum of human impacts and normative valuation of quality. For river condition Vugteveen et al. (2006) (http://www.springerlink.com/content/e1v846376j210706/).



(https://computingforsustainability.files.wordpress.com/2010/05/vugteveen_riverecosystem_gradient_cro

228 Entrepreneurship (Tilley and Young (http://www.greenleaf-publishing.com/productdetail.kmod?productid=2844))

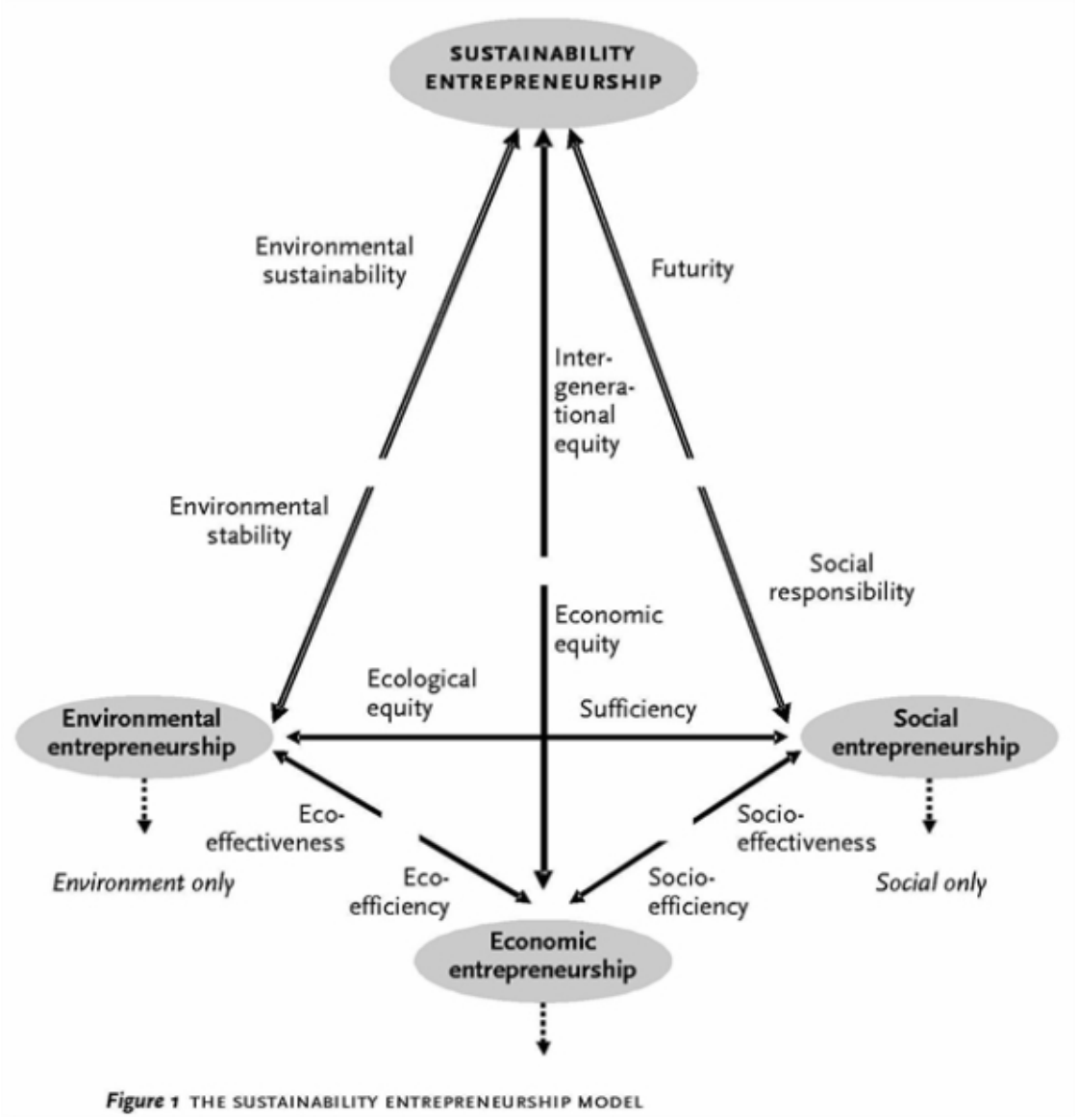
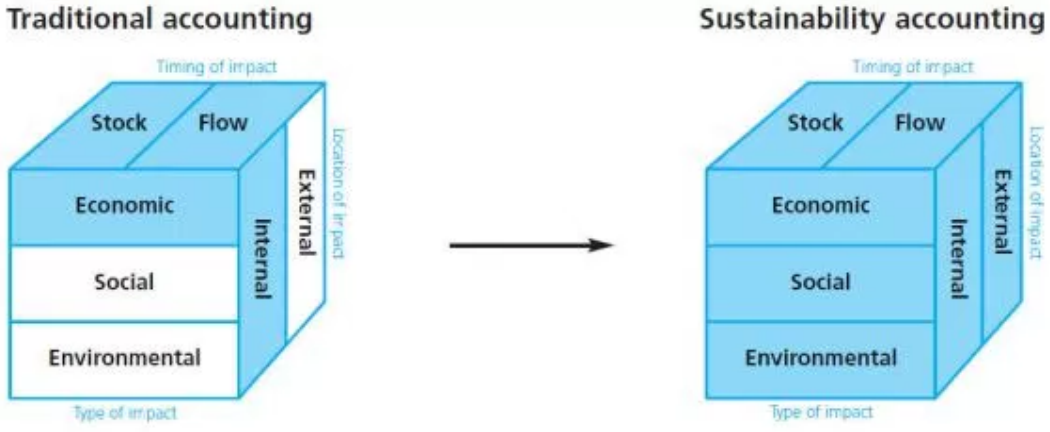


Figure 1 THE SUSTAINABILITY ENTREPRENEURSHIP MODEL

(https://computingforsustainability.files.wordpress.com/2010/05/tilley_sustainability_enterprise.jpg)

229 Accounting cube (Forum for the Future (http://www.forumforthefuture.org/files/accounting%20for%20sustainability.pdf))



(https://computingforsustainability.files.wordpress.com/2010/05/forum_for_future_accounting_cube.jpg)

230 Niche transitions (Schot and Geels (http://www.informaworld.com/smpp/583461793-93548221/content~db=all~content=a901921775))

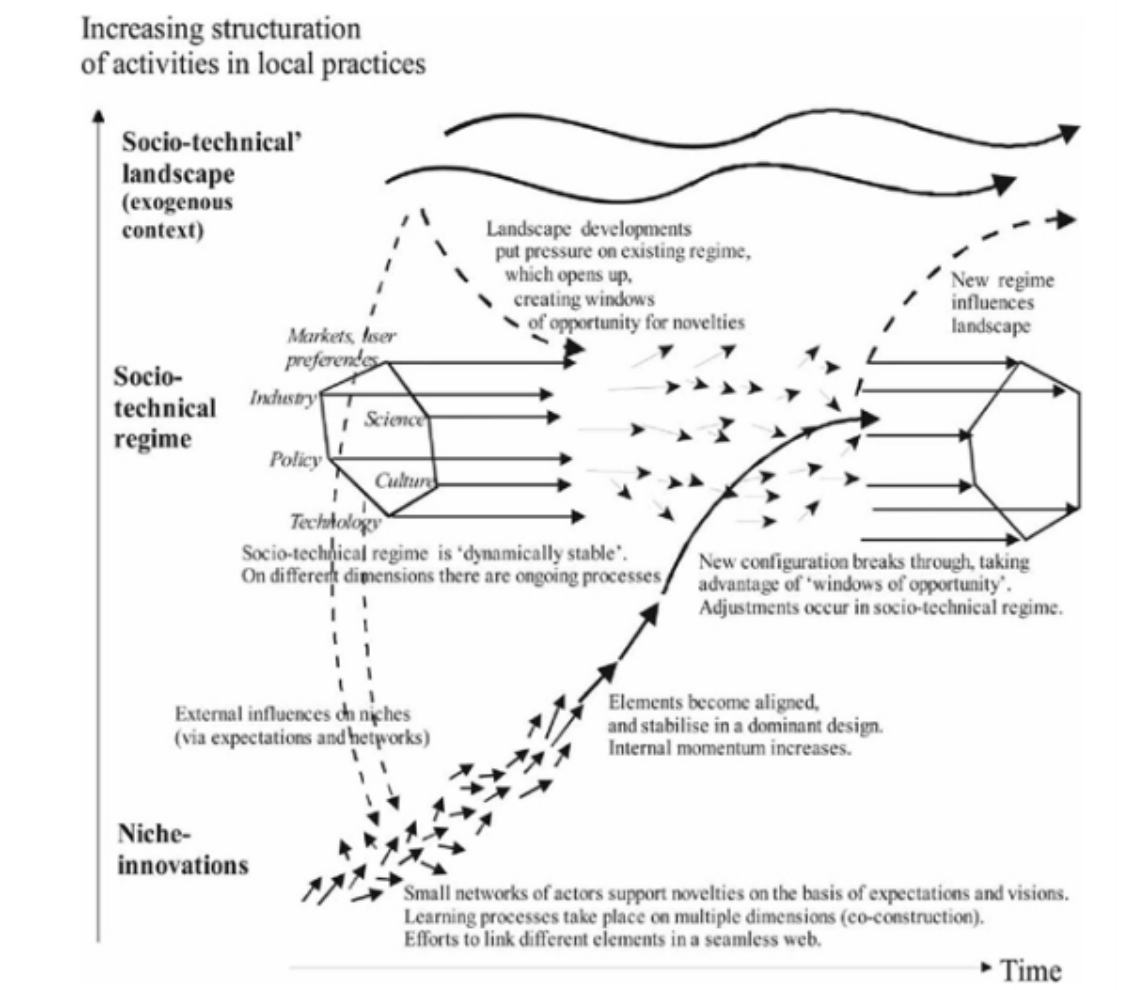


Figure 5. Multi-level perspective on transitions (adapted from Geels 2002, 1263).

(https://computingforsustainability.files.wordpress.com/2010/05/schot_nichemanagement.jpg)

231 Venn diagram with sustainability as integration (cf intersection) Schalange (http://www.greenleaf-publishing.com/productdetail.kmod?productid=2893)

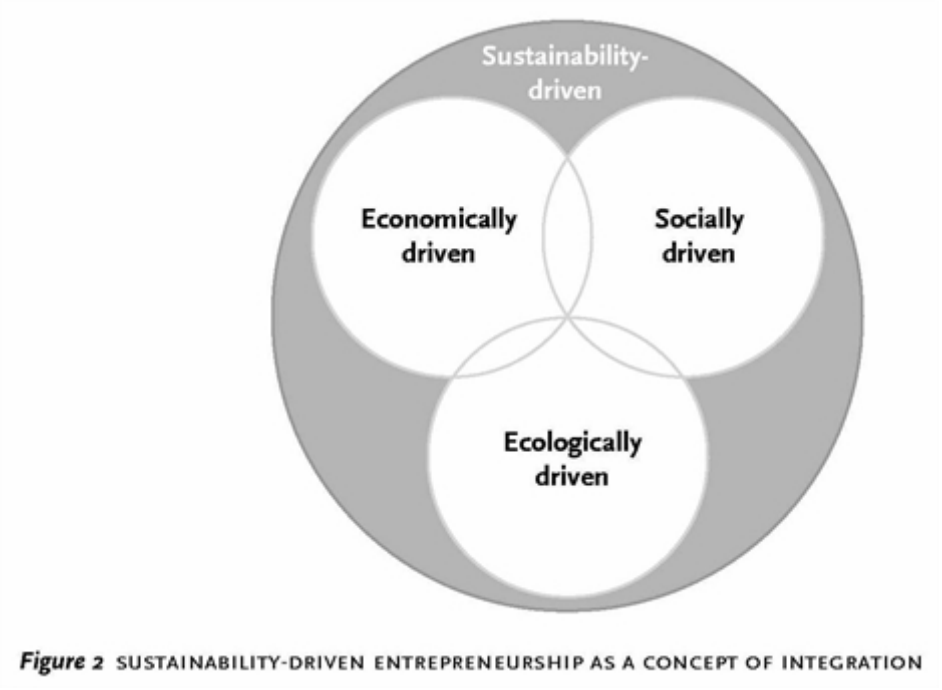
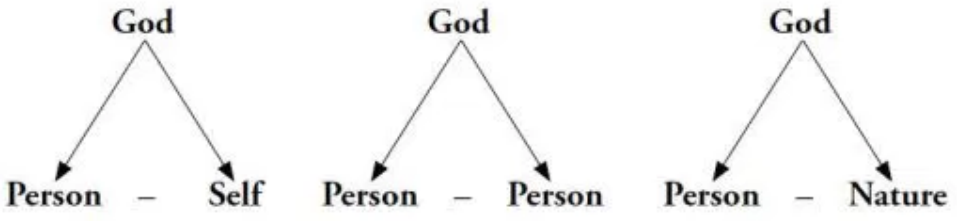


Figure 2 SUSTAINABILITY-DRIVEN ENTREPRENEURSHIP AS A CONCEPT OF INTEGRATION

(https://computingforsustainability.files.wordpress.com/2010/05/schalange_venn_integration.jpg)

232 "Sustainability is a relational principle" (Sandelands and Hoffman (http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1135623))



(https://computingforsustainability.files.wordpress.com/2010/05/sandelands_faith1.jpg)

233 Triangle (sort of) in transition (Said, Malaysian construction firms IJOrgInnovation 2:336).

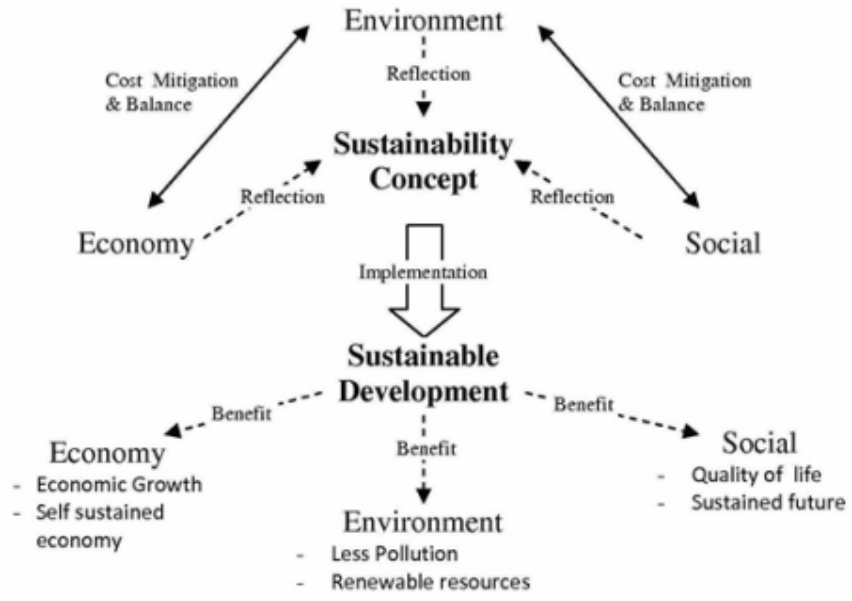
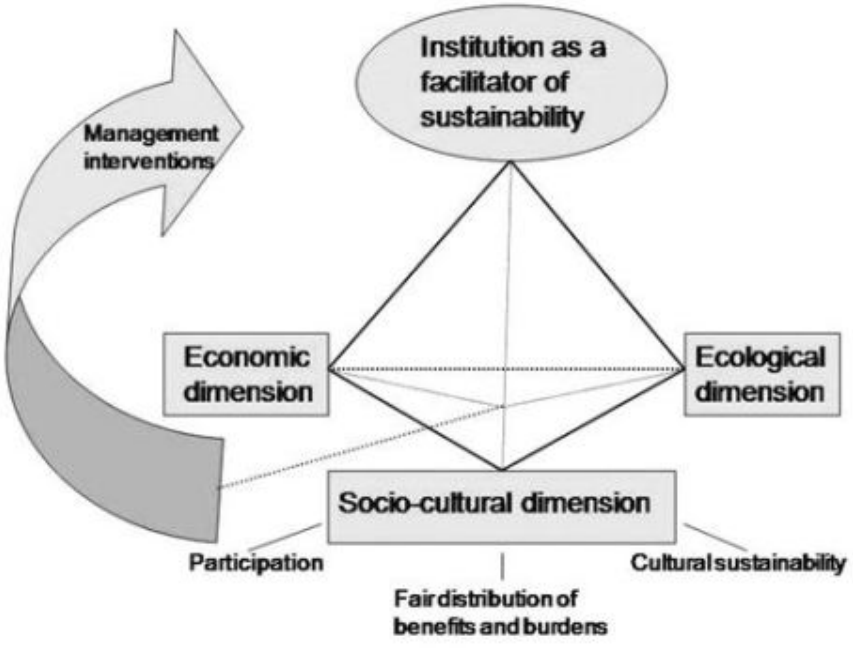


Figure 10: Sustainability implementation framework for the Malaysian construction firm

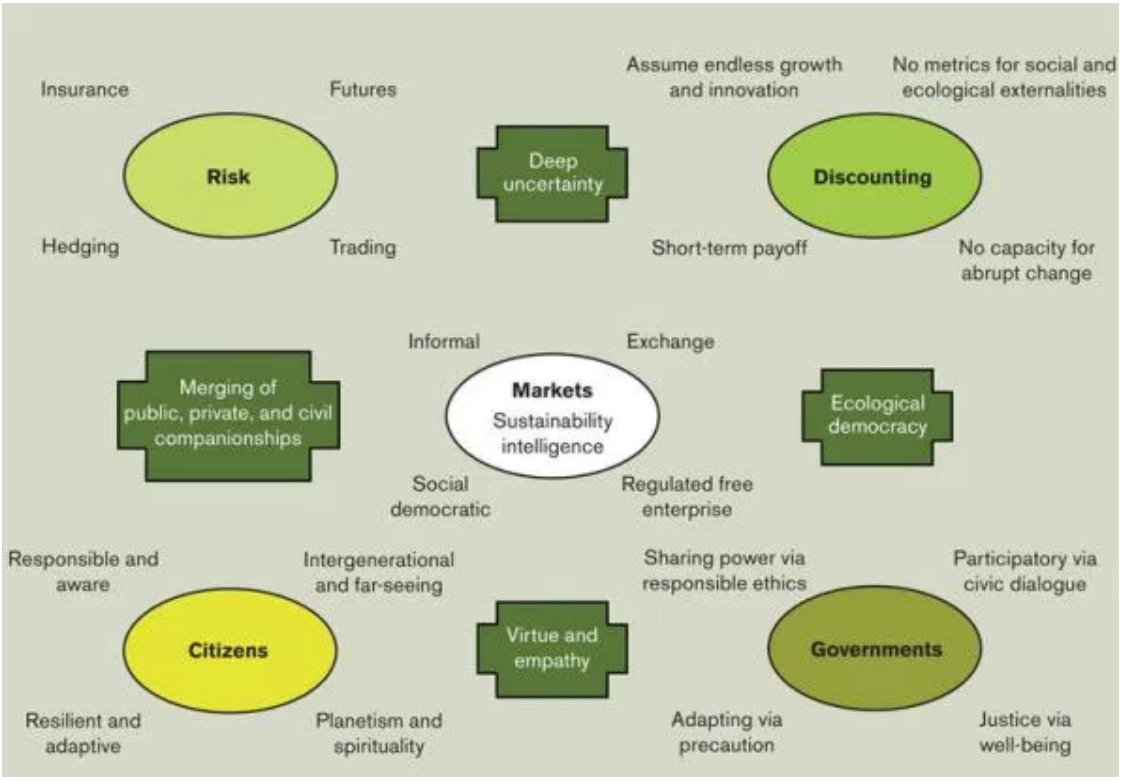
(https://computingforsustainability.files.wordpress.com/2010/05/said_malaysian_triangle_transformation

Prism (Puhakka et al (http://www.informaworld.com/smpp/content~content=a913821830~db=all~jumptype=rss), Scandinavian tourism)



(https://computingforsustainability.files.wordpress.com/2010/05/puhakka_prism_crop.jpg)

235 Markets (O'Riordan (http://www.environmentmagazine.org/Archives/Back%20Issues/March-April%202009/ORiordan-abstract.html) after Anderson)



(https://computingforsustainability.files.wordpress.com/2010/05/oriordan_markets_crop.jpg)

236 Navajo Hooghan (developed by Navajo Flexcrete, O'Neill et al. (http://www.greenleaf-publishing.com/productdetail.kmod?productid=2894))

> *The Hooghan is highly symbolic of the Navajo's spiritual understanding of the interconnectedness of all things through all time. A visitor enters the Hooghan from the East, the direction in which the door of the Hooghan always faces. East is the direction of the sunrise, which begins the day and is symbolic of the beginning of life. The visitor moves clockwise through the four quadrants. The first quadrant belongs to the Mother, who represents work and wealth, which is passed through maternal inheritance. The Father and, when he visits, the Medicine Man, occupy the south-west quadrant. The Father ties the families and clans together through marriage. The Medicine Man is a vehicle for the fundamental beliefs and values of the Diné. The north-west quadrant is for the Children, whose basic needs must be taken care of by the Father and Mother. The north-east quadrant is where the visitor ends and where Visitors gather when in the Hooghan. The Navajo consider all of life to be integrated and sacred, thus the entire structure is the 'Spiritual' whole. The Hooghan thus embodies all of the aspects of life.*

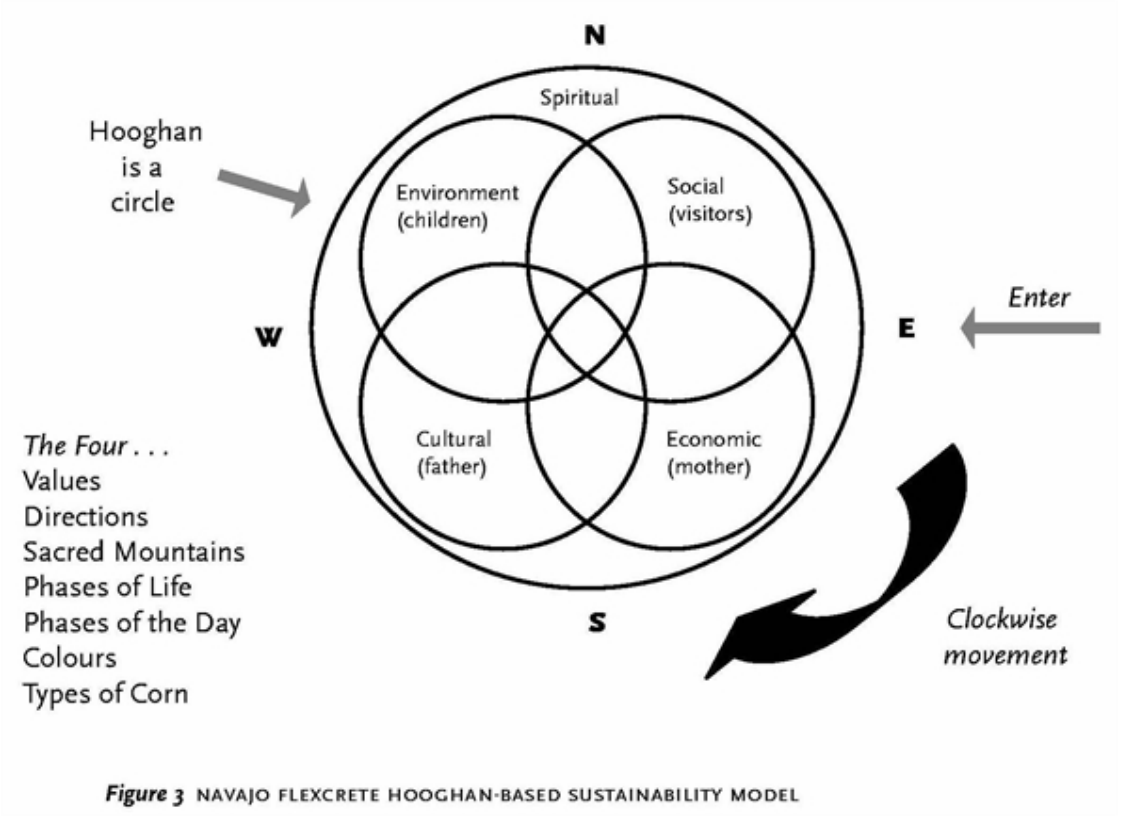
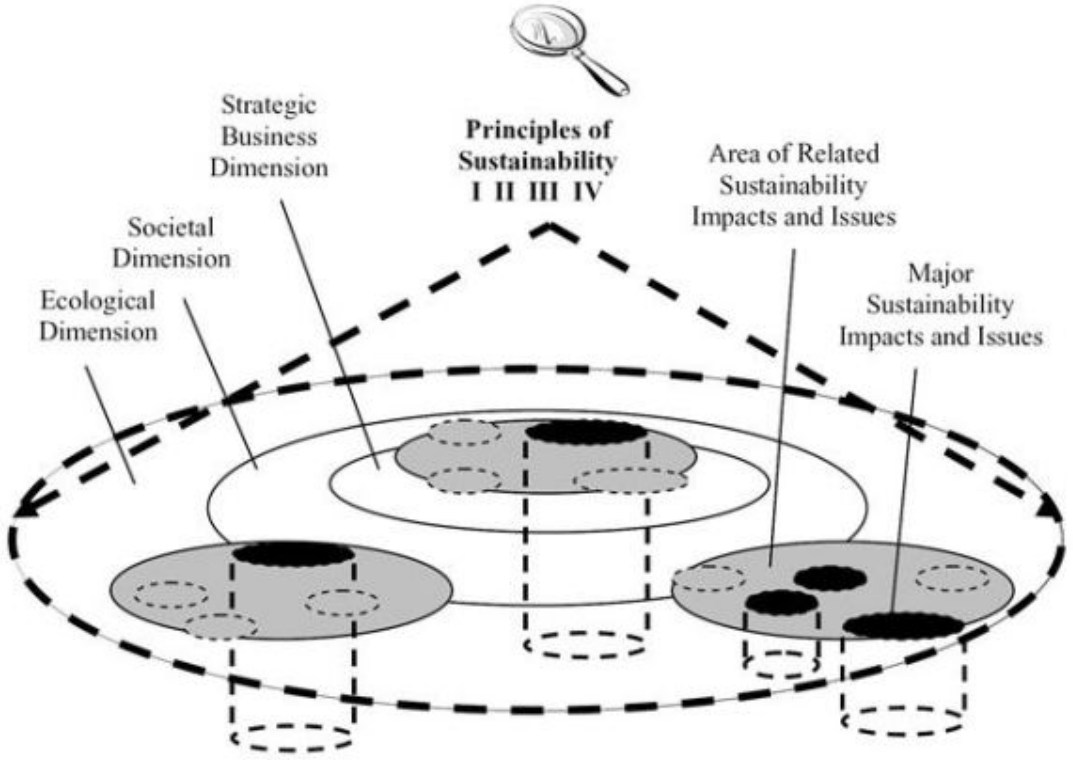


Figure 3 NAVAJO FLEXCRETE HOOGHAN-BASED SUSTAINABILITY MODEL

(https://computingforsustainability.files.wordpress.com/2010/05/oniell_flexcrete_hohan.jpg)

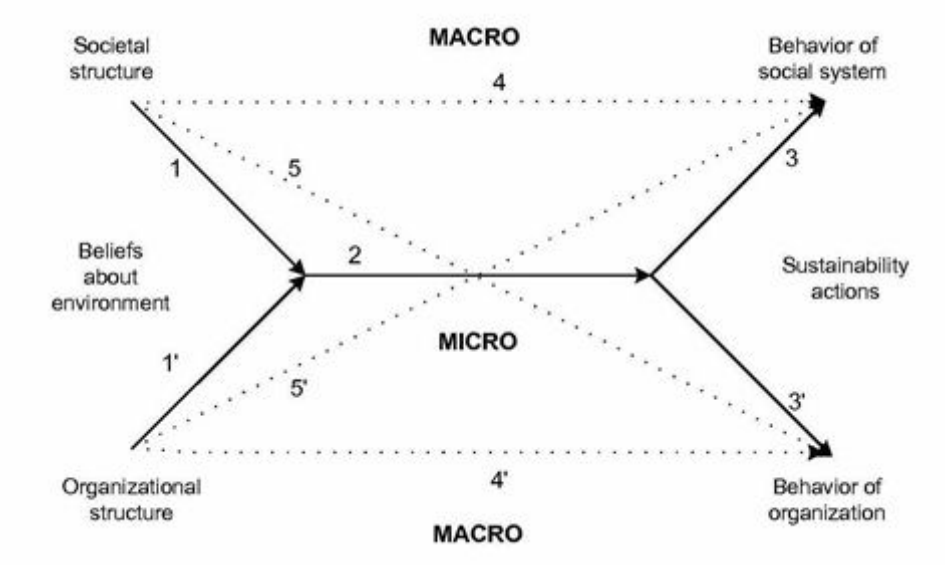
237 Strategic life-cycle management (SLCM)—sustainability principles as system boundaries. (Principles are Natural Step, Ny et al (http://www3.interscience.wiley.com/journal/120128227/abstract?CRETRY=1&SRETRY=0))



(https://computingforsustainability.files.wordpress.com/2010/05/ny_systemboundaries_crop.jpg)

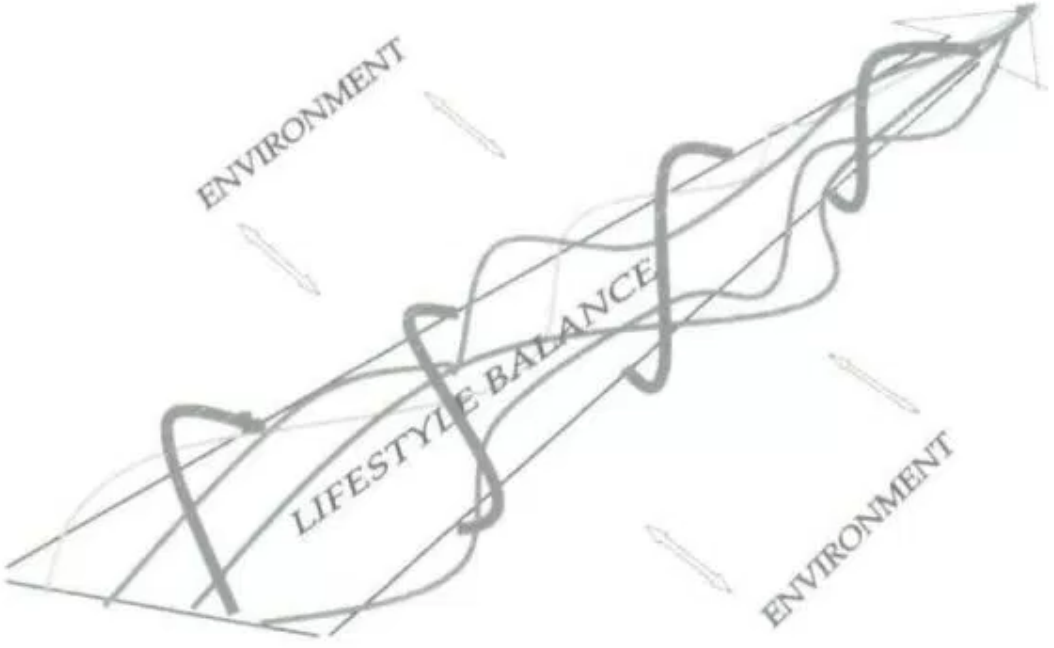
238 Belief–Action–Outcome Framework (Melville (http://aisel.aisnet.org/misq/vol34/iss1/3/) after Coleman)

> *We introduce an additional antecedent, organizational structure, as well as an additional outcome, behavior of organization (Figure 2). In this way, we account for dual socialization (individual psychic states are shaped by social structure (link 1) and organizational structure (link 1')) and dual outcomes (combined individual action may improve organizational (link 3') and environmental (link 3) performance)…*



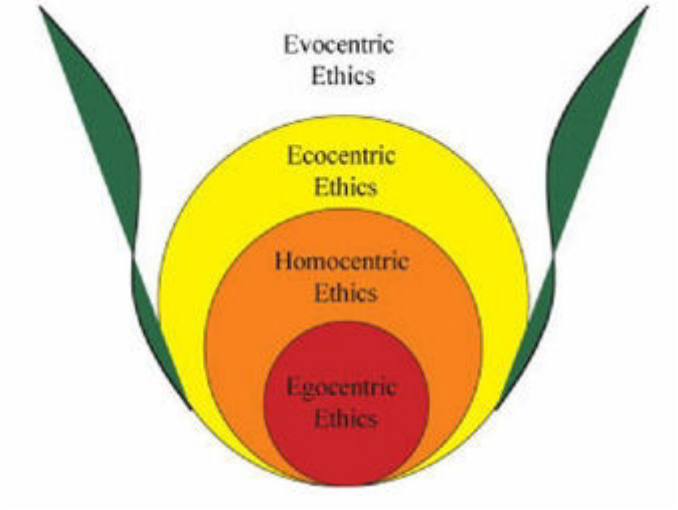
(https://computingforsustainability.files.wordpress.com/2010/05/melville_beliefactionoutcomeframework

239 Lifestyle balance (Matusaka and Christiansen (http://www.jos.edu.au/article.asp?id=303))



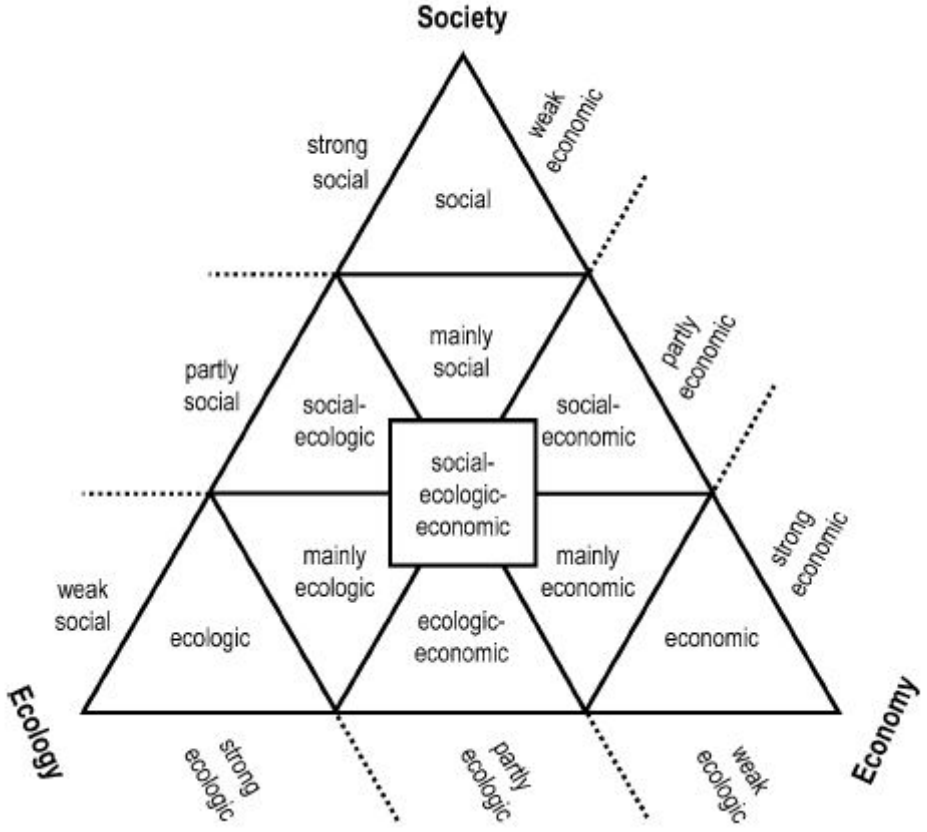
(https://computingforsustainability.files.wordpress.com/2010/05/matusaka_image_crop.jpg)

240 Ethical frameworks (and surely a golden snitch). Laszlo et al. (http://www3.interscience.wiley.com/journal/122485344/abstract)



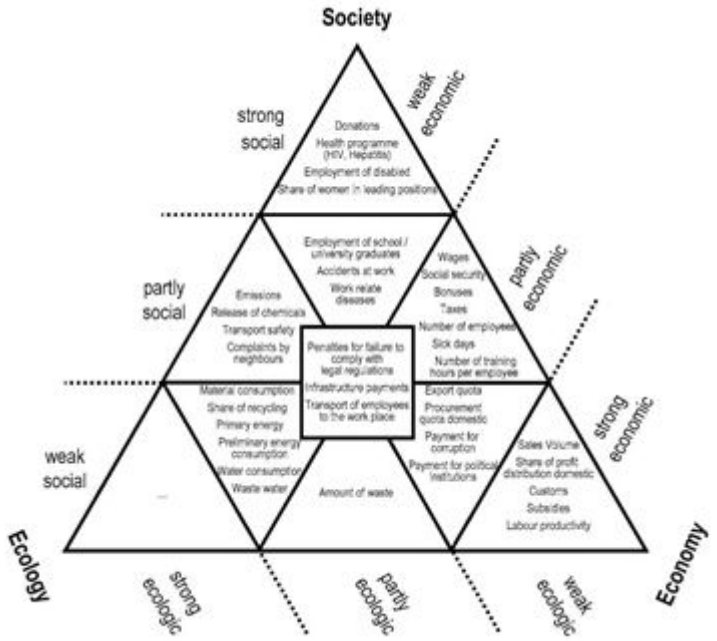
(https://computingforsustainability.files.wordpress.com/2010/05/laszlo_evocentric_ethics_crop.jpg)

241 Integrative triangle applied (Kleine and von Hauff (http://www.springerlink.com/content/77g5782643r0r127/))

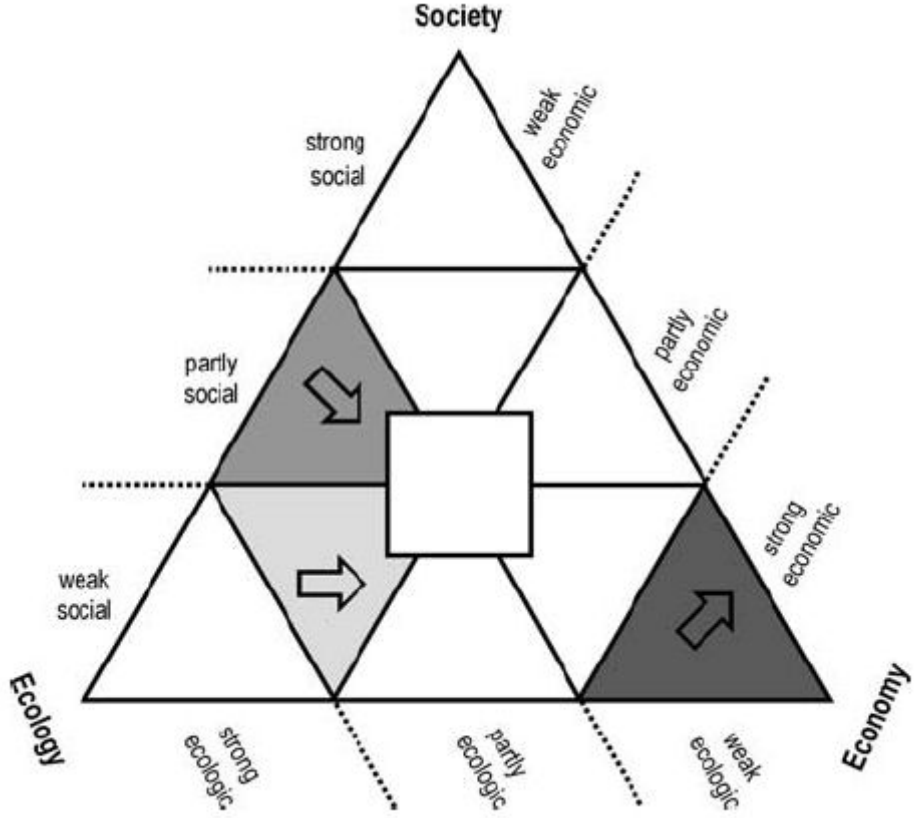


(https://computingforsustainability.files.wordpress.com/2010/05/kleine_csr_integrativetriangle_basic.jpg)

242 Integrative triangle applied to institution (Kleine and von Hauff (http://www.springerlink.com/content/77g5782643r0r127/))

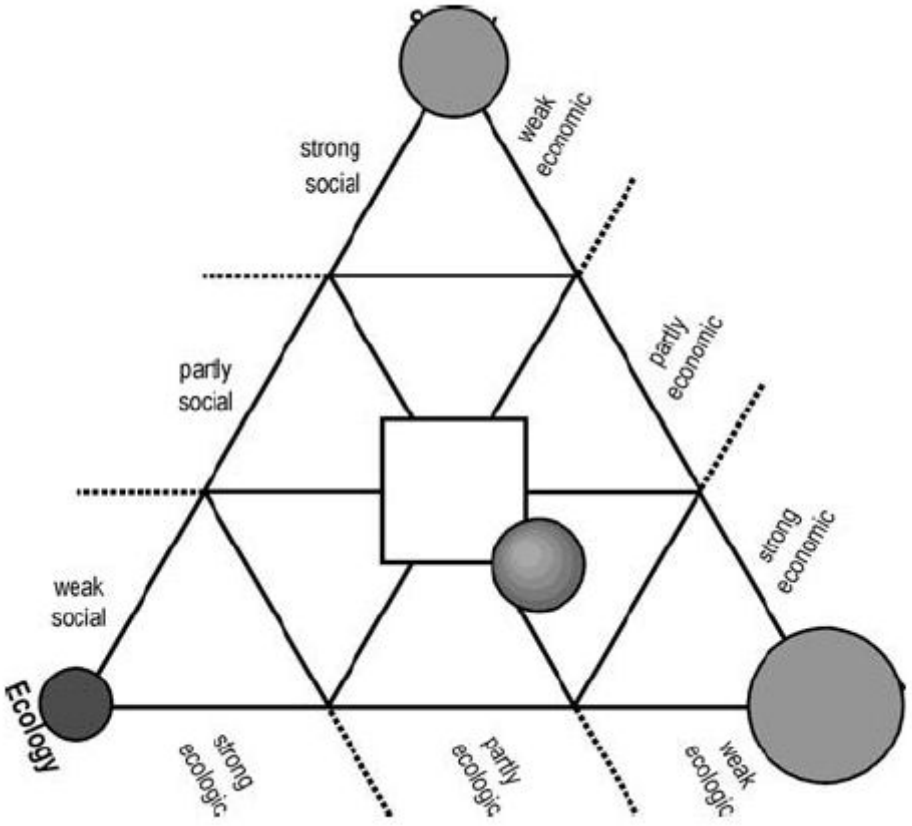


(https://computingforsustainability.files.wordpress.com/2010/05/kleine_csr_integrativetriangle_crop.jpg)2
Integrative triangle: levels and tendencies (Kleine and von Hauff (http://www.springerlink.com/content/77g5782643r0r127/))
(https://computingforsustainability.files.wordpress.com/2010/05/kleine_csr_integrativetriangle_crop.jpg)

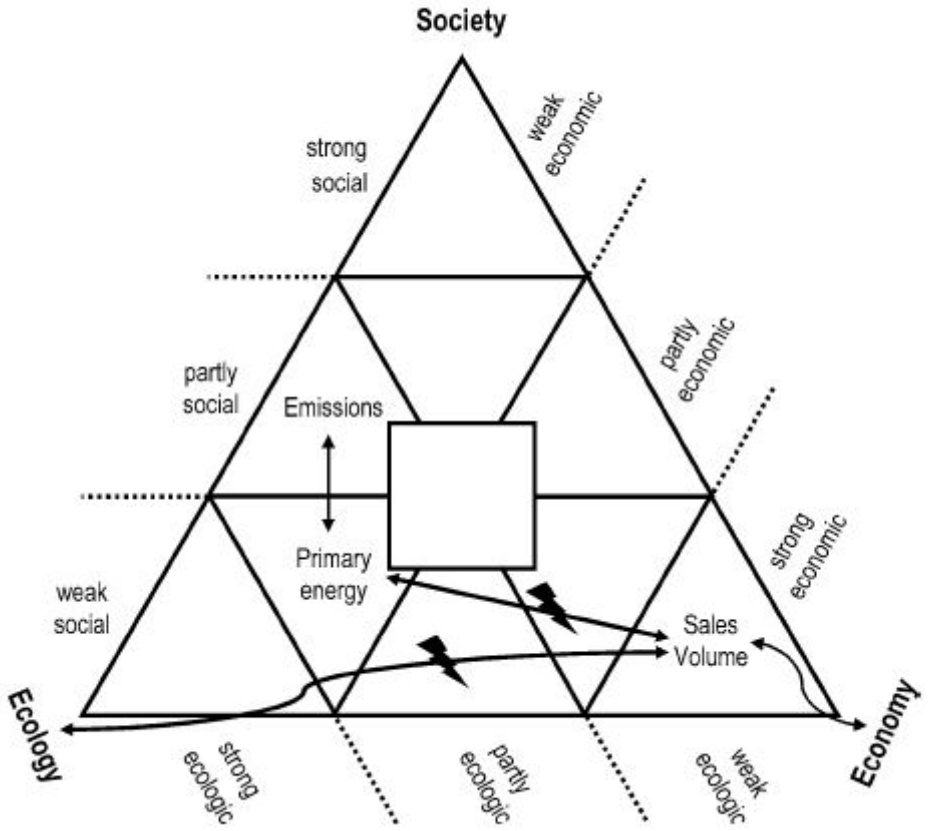


(https://computingforsustainability.files.wordpress.com/2010/05/kleine_csr_integrativetriangle_tendencie

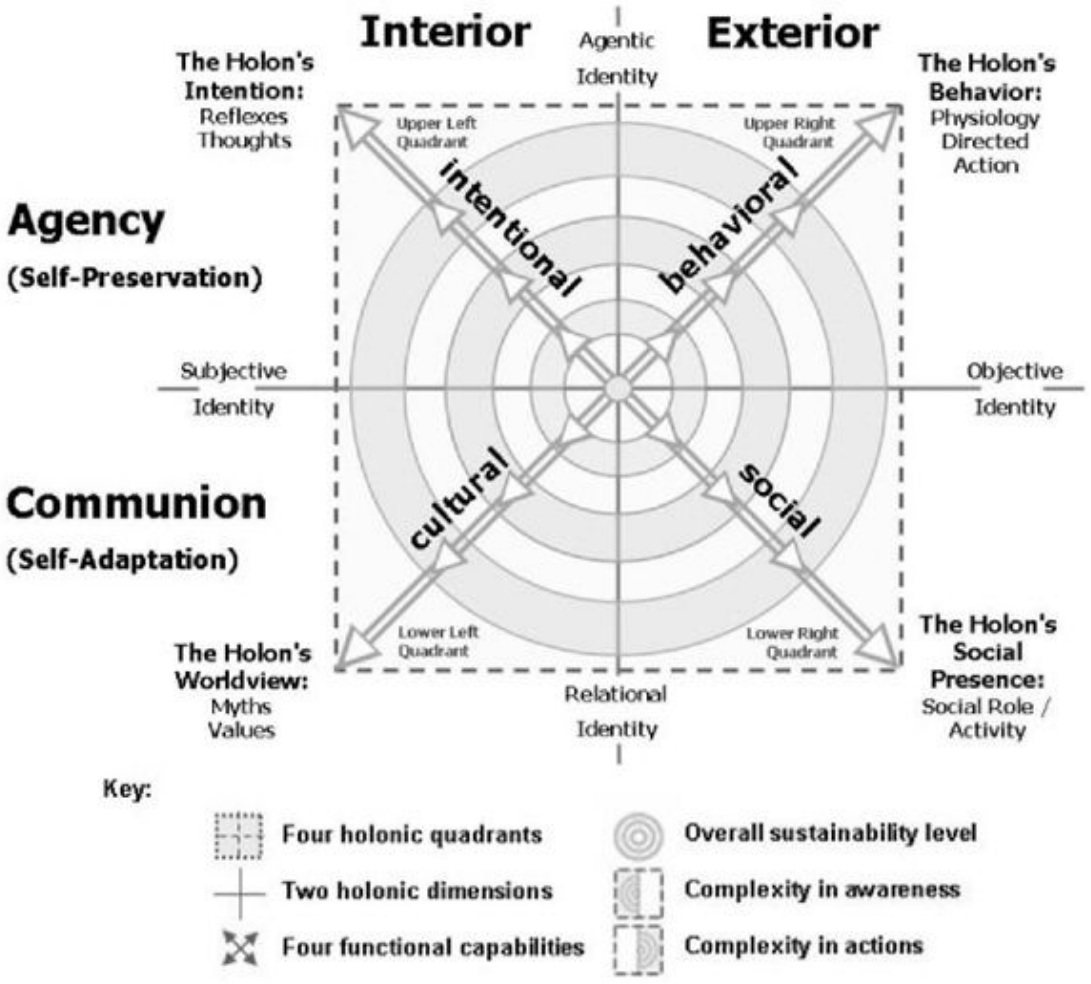
245 Integrative triangle as an assessment tool (Kleine and von Hauff (http://www.springerlink.com/content/77g5782643r0r127/)) (https://computingforsustainability.files.wordpress.com/2010/05/kleine_csr_integrativetriangle_crop.jpg)



(https://computingforsustainability.files.wordpress.com/2010/05/kleine_csr_integrativetriangle_assessme
Harmonic and conflict relationships on Integrative triangle (Kleine and von Hauff (http://www.springerlink.com/content/77g5782643r0r127/)) (https://computingforsustainability.files.wordpress.com/2010/05/kleine_csr_integrativetriangle_crop.jpg)

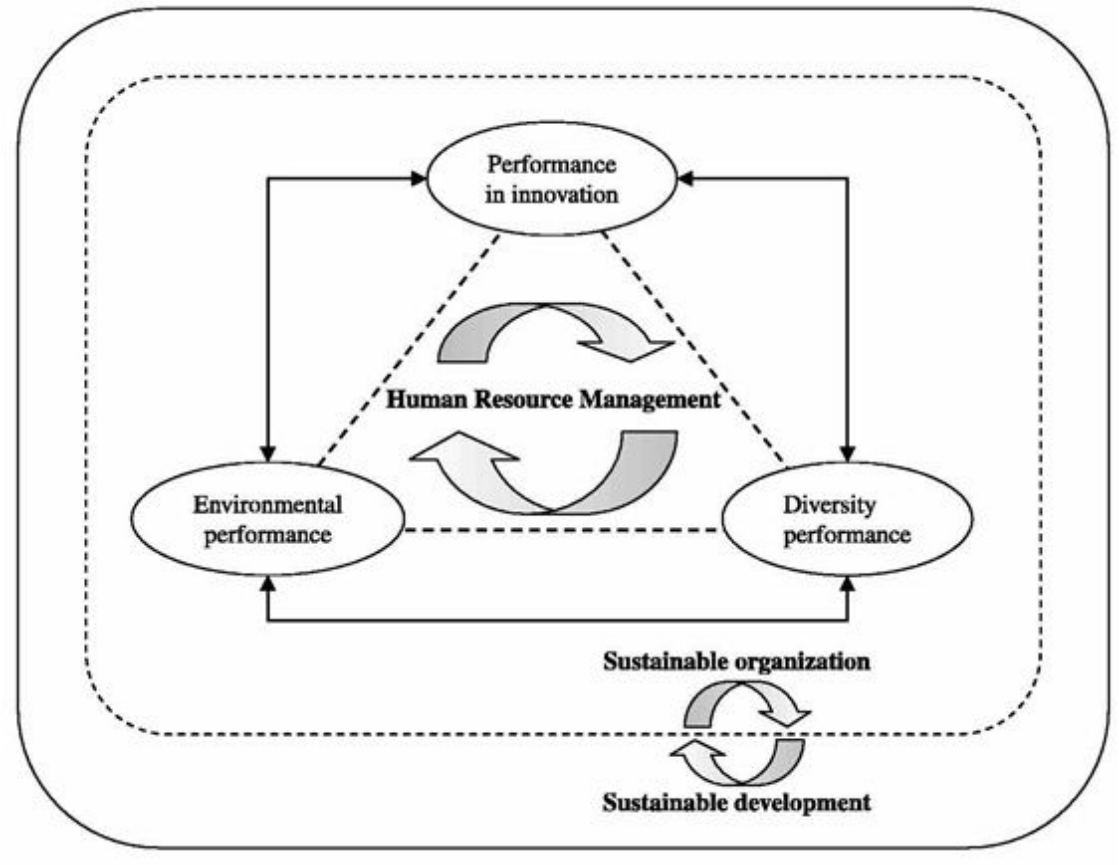


(https://computingforsustainability.files.wordpress.com/2010/05/kleine_csr_integrativetriangle_relationsh
Wilbur's holon (Kira and Eijnatten (http://repository.tue.nl/650826))



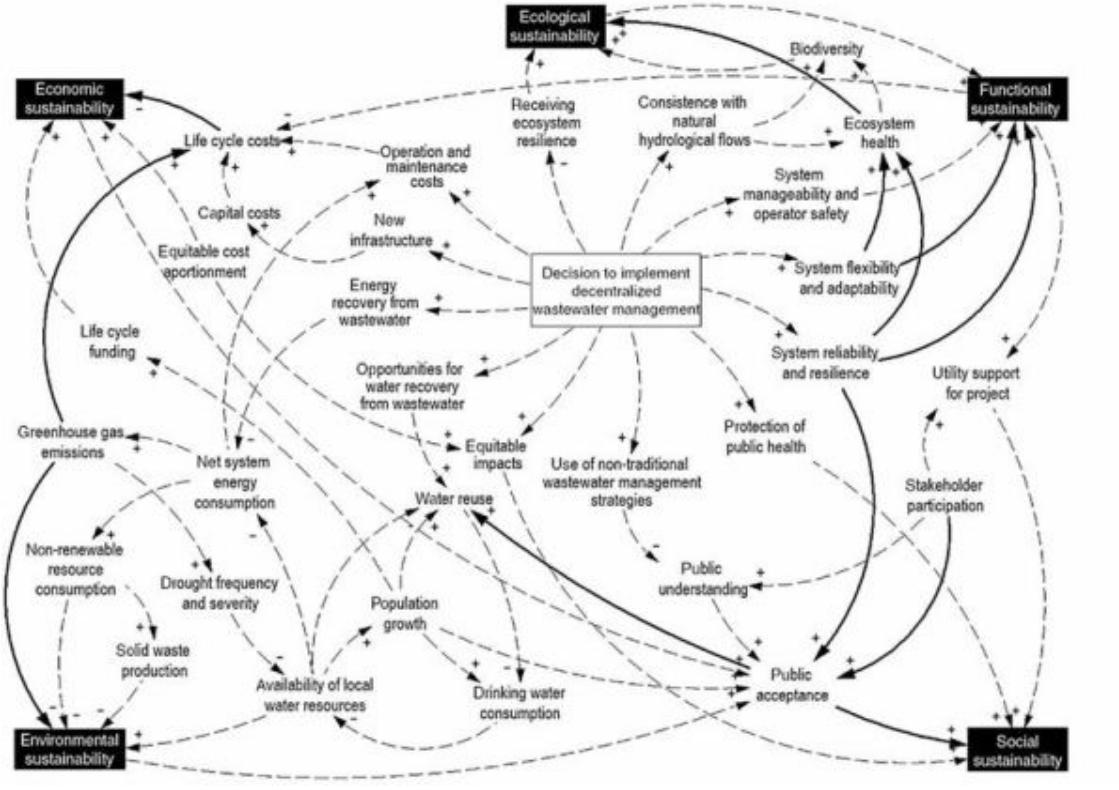
(https://computingforsustainability.files.wordpress.com/2010/05/kira_holon_crop.jpg)

248 Organisation, development and human resources (Jabbour and Santos (http://www.emeraldinsight.com/Insight/viewContentItem.do?contentId=1774373&contentType=Review))



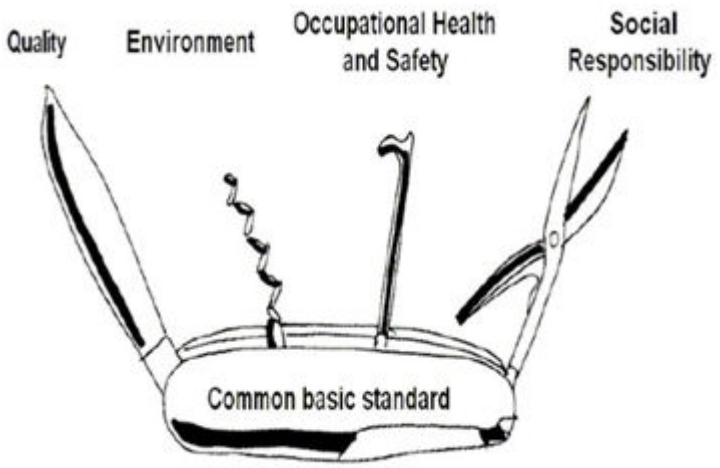
(https://computingforsustainability.files.wordpress.com/2010/05/jabbour_humanresources_crop.jpg)

249 Causal loop diagram: Qualitative system dynamic (effects of changes in municipal wastewater management, Guest et al. (http://www.ncbi.nlm.nih.gov/pubmed/20351443))



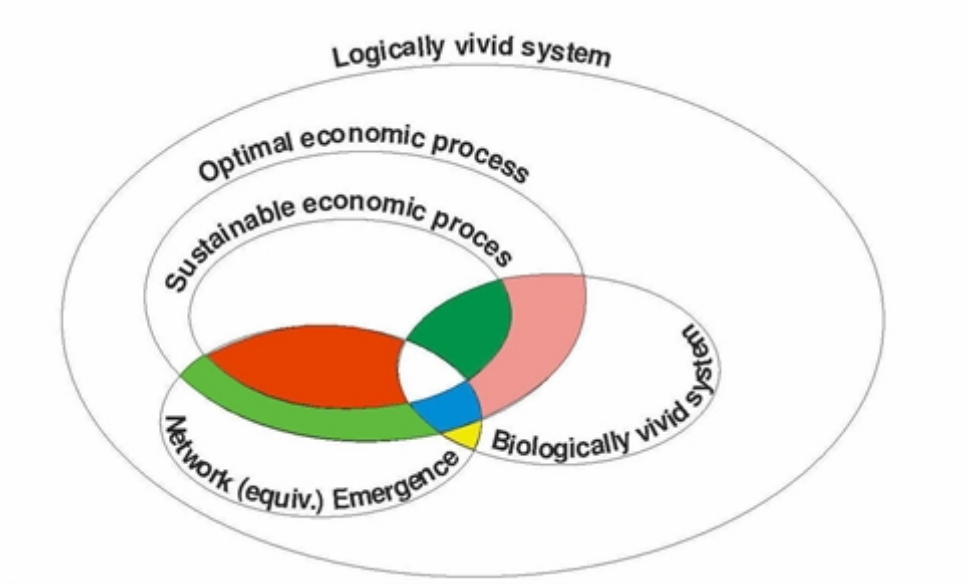
(https://computingforsustainability.files.wordpress.com/2010/05/guest_qualitative_system_dynamic_ima

250 Pocket knife (as part of quality process management, Goel (http://www.civilica.com/Printable-CQM07_092.html))



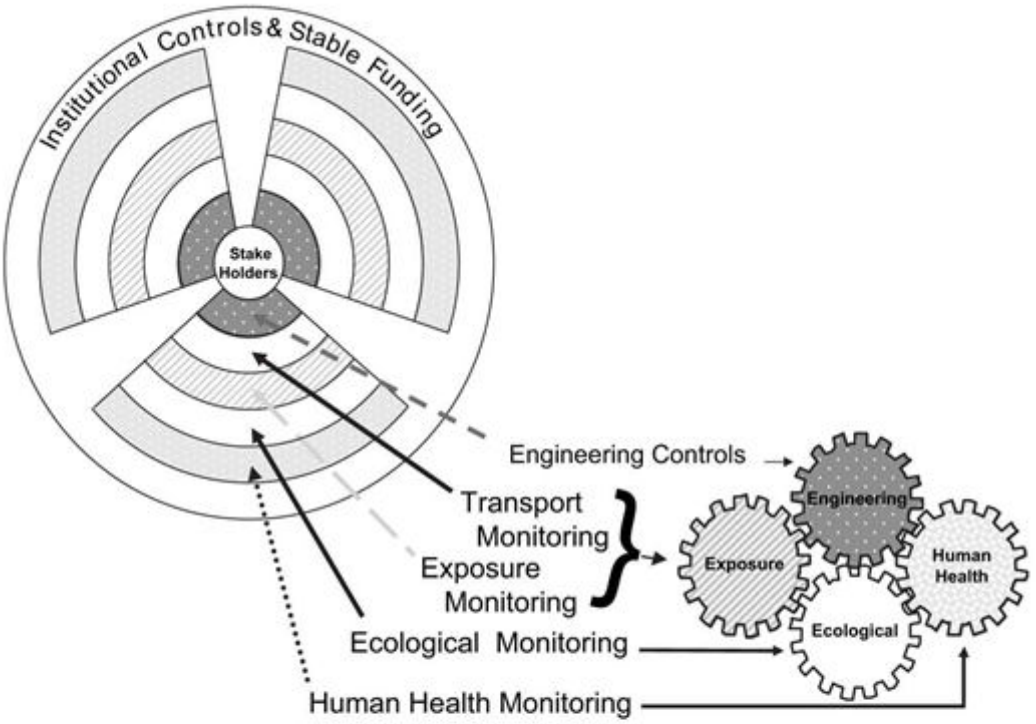
(https://computingforsustainability.files.wordpress.com/2010/05/goel_pocket_knife_crop.jpg)

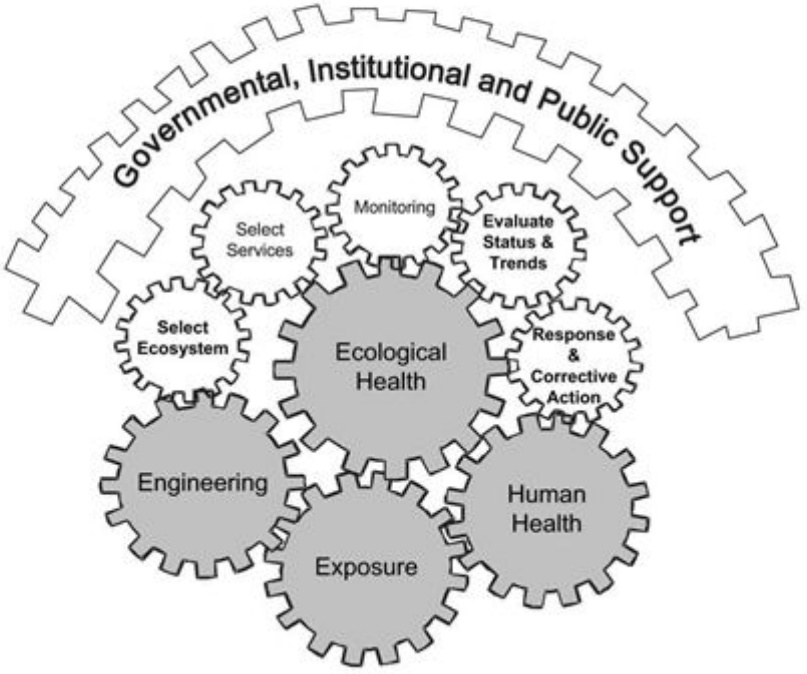
251 Logically vivid system (Dinga (http://www.ectap.ro/articole/386.pdf))



(https://computingforsustainability.files.wordpress.com/2010/05/dinga_vivid.jpg)

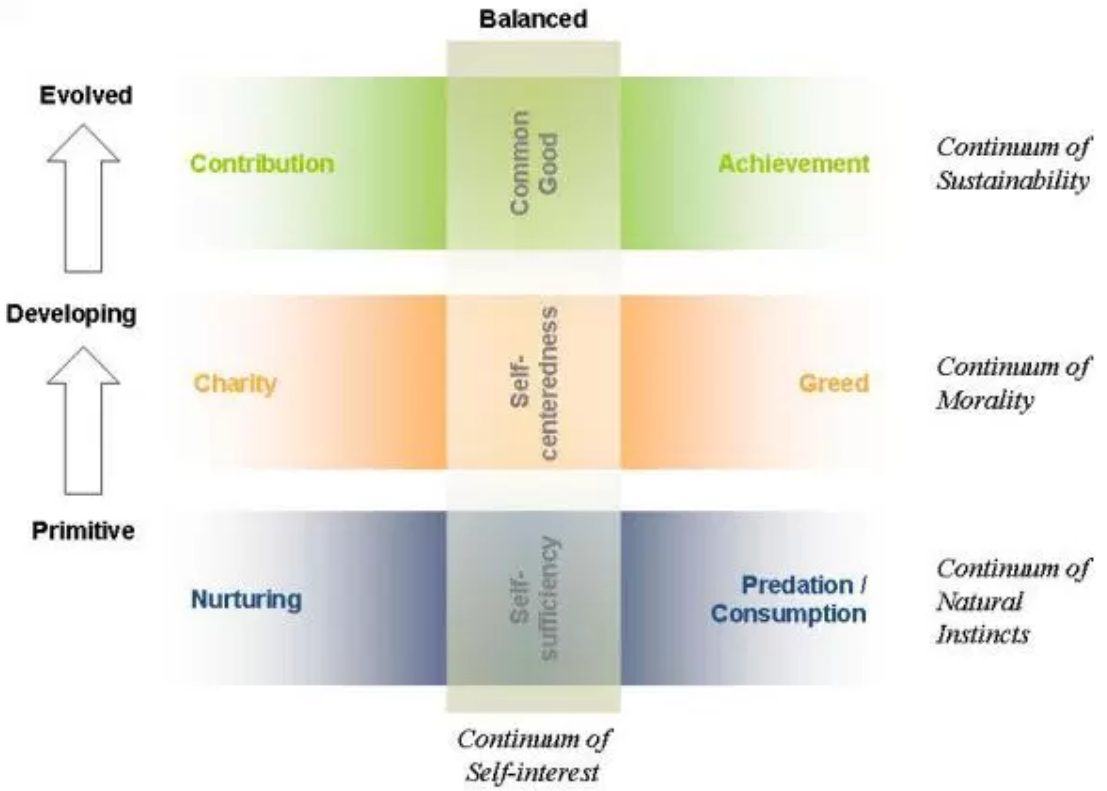
252 Interactions between disciplines required for sustainability as gears and layers. Relationship of protectiveness of ecological health layer, requires several tiers (here shown as gears) (Using buffer lands, Burger (http://www.ncbi.nlm.nih.gov/pubmed/17934954))





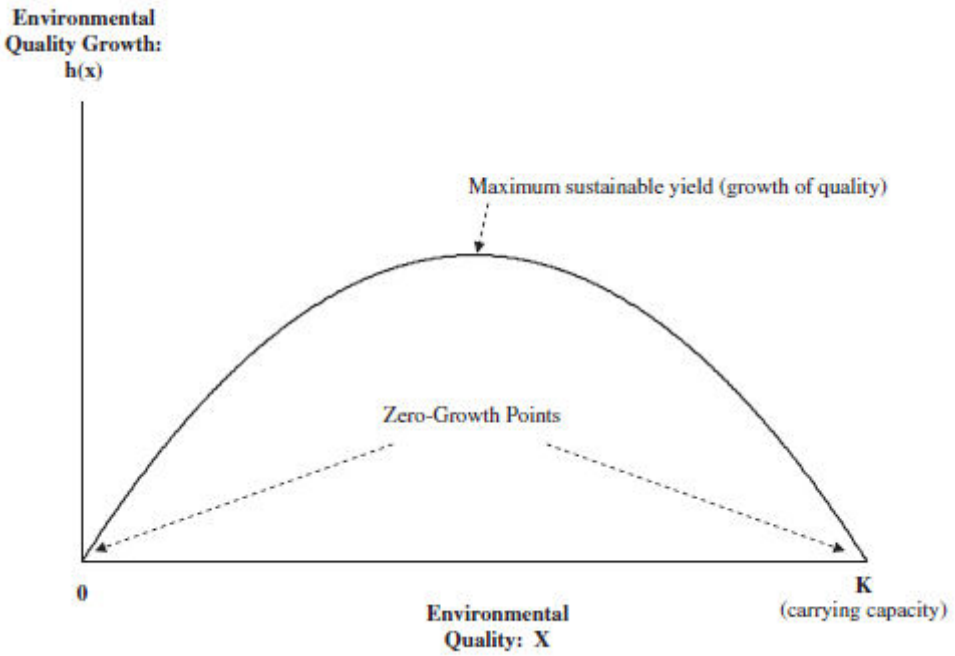
(https://computingforsustainability.files.wordpress.com/2010/05/burger_intereactionbetweendisciplines_

253 Continuum of interest (Hemant Puthli (http://hemantputhli.com/2010/02/01/hpa-perspective-on-sustainability-faqs-%E2%80%93-3/))



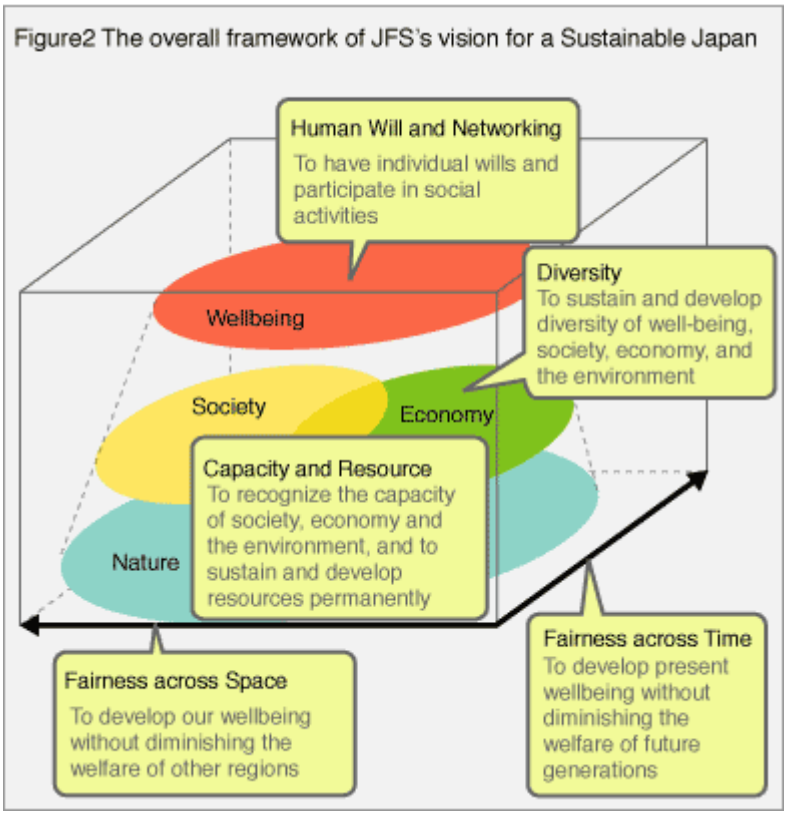
(https://computingforsustainability.files.wordpress.com/2010/05/hpa-sustainability-continuum1.jpg)

254 Stock of environmental quality (tourism sites, Johnston and Tyrrell (http://jtr.sagepub.com/cgi/content/abstract/44/2/124))



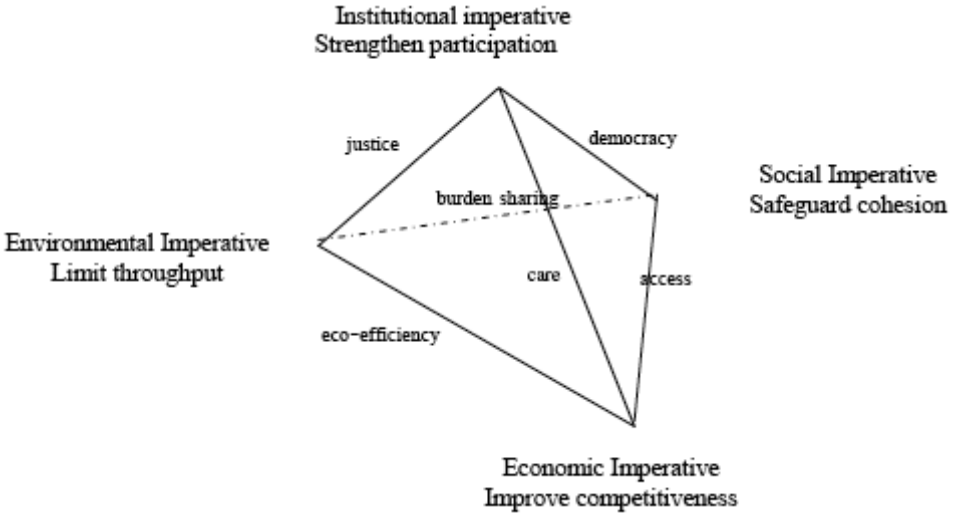
(https://computingforsustainability.files.wordpress.com/2010/05/johnston_sustgrowth.jpg)

255 Circles stacked and in a graph of time and space (Japan for Sustainability (http://www.japanfs.org/en/pages/011017.html))



(https://computingforsustainability.files.wordpress.com/2010/05/frameworkforsustaianablejapan.gif)

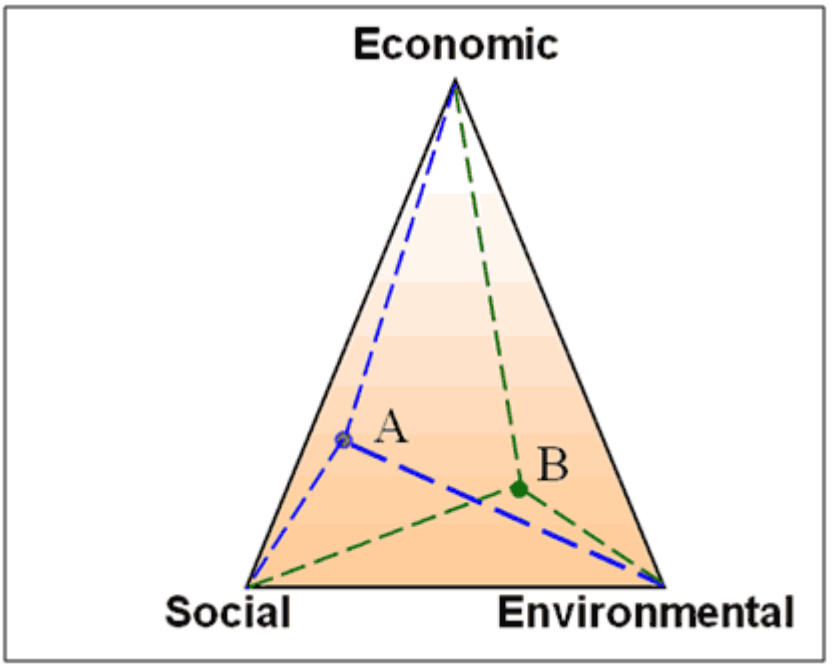
256. Imperatives (Scottish Government (http://www.scotland.gov.uk/Publications/2006/05/23091323/4) attributes Irish EPA, but I can't find)



(https://computingforsustainability.files.wordpress.com/2010/05/scottishparlimentgif.gif)

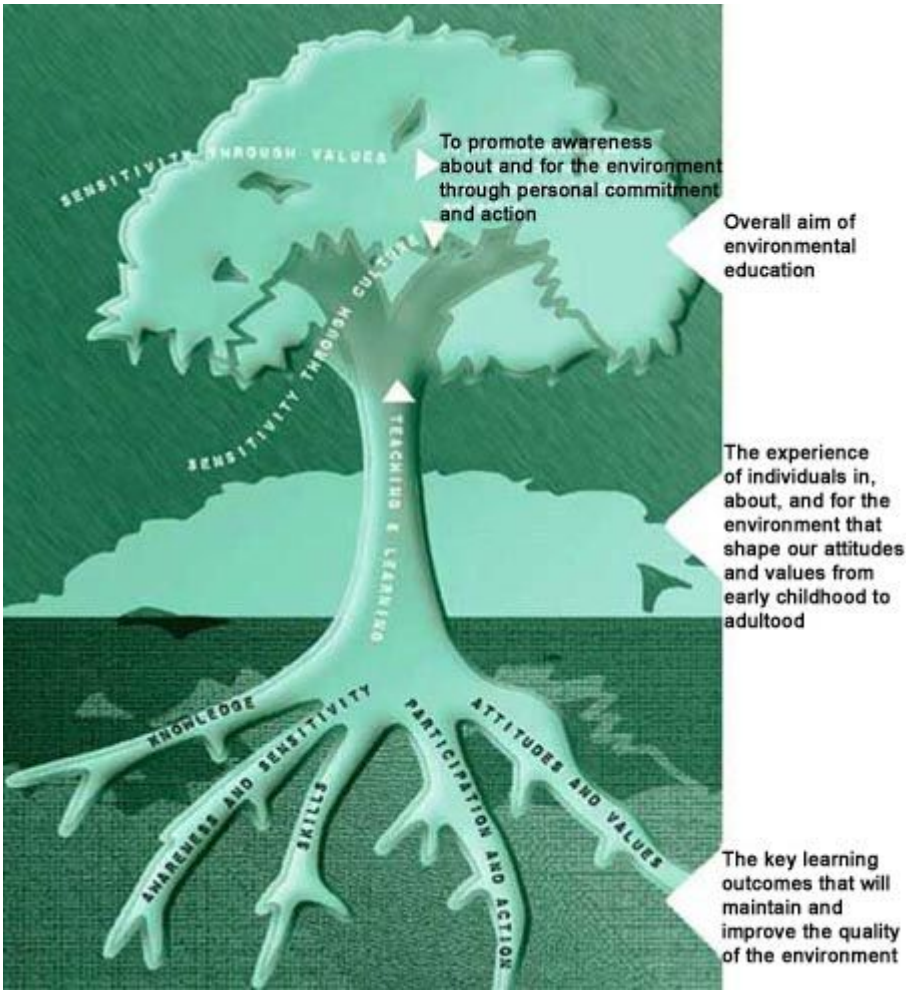
257. Triangle with explicit balance (INAP (http://www.gardguide.com/index.php/Chapter_3))

> *The balance point at A, which weighs the social and economic more heavily than the environmental, is equally acceptable as the point of balance at B, which weighs the environmental more heavily. The most suitable point of equilibrium can be identified only through an integrated consultative process involving all stakeholders.*



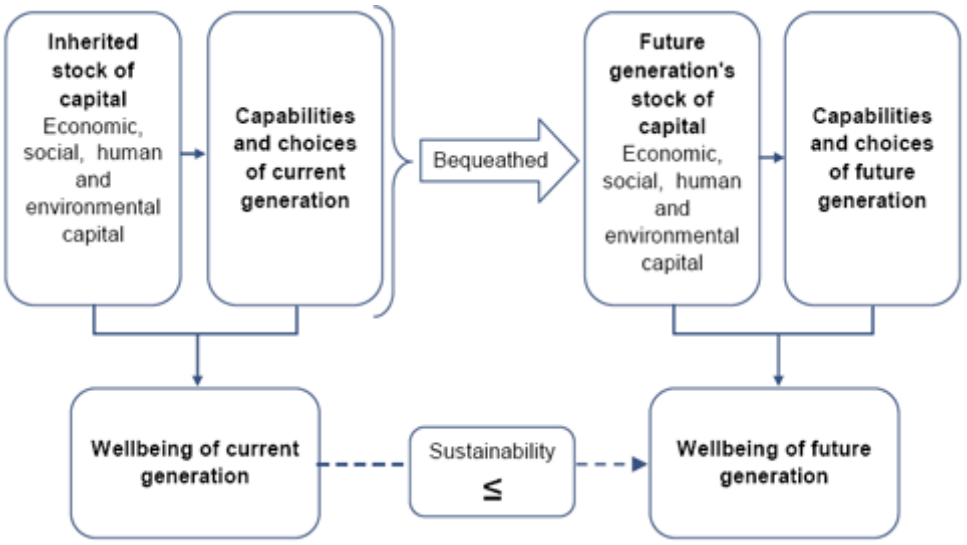
(https://computingforsustainability.files.wordpress.com/2010/05/sustainabledevelopmentbalance1.gif)

258. Aims of Environmental Education (NZ Government (http://efs.tki.org.nz/Curriculum-resources-and-tools/Environmental-Education-Guidelines/The-Aims-of-Environmental-Education))



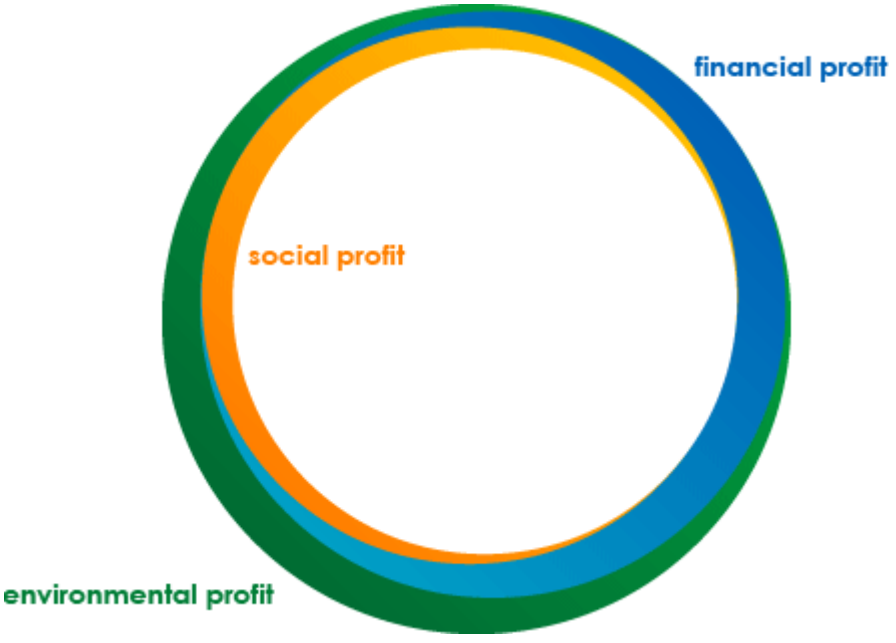
(https://computingforsustainability.files.wordpress.com/2010/05/the-aims-of-environmental-education.jpg)

259. Future generations (Australian Government Intergenerational Report (http://www.treasury.gov.au/igr/igr2010/report/html/07_Chapter_6_A_sustainable_society.asp))



(https://computingforsustainability.files.wordpress.com/2010/05/07_chapter_6_a_sustainable_society_and_1.gif)

260. Three circles in one (espdesign (http://www.espdesign.org/sustainability-definition/triple-bottom-line/))

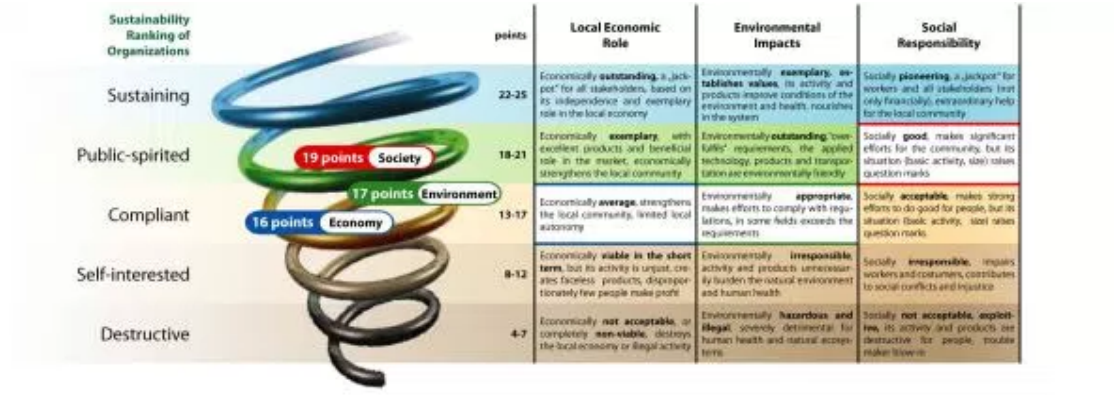


(https://computingforsustainability.files.wordpress.com/2010/05/esp_design_triple_bottom_line.gif)

261. Stool gives a short shrift (Storck (http://www.ivanenviroman.com/the-triple-bottom-line-still-includes-people/))

(https://computingforsustainability.files.wordpress.com/2010/05/walmartwhoops-tm.jpg)

262. Spring (KÖVET Association for Sustainable Economies (http://www.kovet.hu/view/main/108.html))



(https://computingforsustainability.files.wordpress.com/2010/05/denso_2006_eng.jpg)

263-266 Systemic mapping of strategic dilemmas (Anthony Judge for Intersectoral Dialogue in preparation for Earth Summit (http://www.laetusinpraesens.org/pdfs_multi/config_global_92_i.pdf)).

To explore and illustrate new possibilities, the focus of the exercise described here is on identifying "strategic dilemmas· underlying debates on Earth Summit issues. These are the dilemmas which reflect such seemingly irreconcilable concerns as safeguarding watercourses versus exploiting essential hydro-electric energy reserves. The assumption is that the set of these local (namely issuespecific) long-term dilemmas may offer clues to new patterns of global (namely inter-sectoral) strategies and bargains.

The intention was to obtain suggestions for inter-sectoral images which could best capture the Earth Summit insights and empower people to move forward in new ways.

There was a concern to move beyond the traditional text representation of the challenges of inter-sectoral dialogue and to endeavour to open up new possibilities by portraying sectoral and issue relationships in two and three-dimensions.

Pattern of strategic dilemmas in table form designed to code and organize strategic dilemmas of sustainable development. Sustainable development is a function of the pattern as a whole rather than of its components.

263. Table of strategic dilemmas

(A checklist of sectoral declarations) fails to respond to the need to raise the level of debate by offering a global (inter-sectoral) context for specific bargains, checks and balances. Such checklists, like Agenda 21, are effectively overwhelming. They encourage simplistic attempts to identify "the most important problem" whose solution it is hoped will magically transform all the others.

(The table) is one attempt to respond to this situation by showing how different social functions,understood as strategic opportunities, interfere with each other to engender a pattern of strategic dilemmas.

INTER-SECTORAL STRATEGIC DILEMMAS OF SUSTAINABLE DEVELOPMENT

Privileged function / Constrained function	Population P Security	Well-being W Health	Learning L Education	Production T Trade	Environment E Impacts	Regulation R Equity	UN Bodies	Sectors
Population/Relief P Security/Peace Vulnerable groups Women/Youth	Sacrifice of one population group for another? PP	Sacrifice pop. relief/growth for well-being of population WP	Sacrifice pop. relief/growth for education, research, etc LP	Sacrifice pop. relief/growth for economic growth? TP	Sacrifice pop. relief/growth for environment? EP	Sacrifice population relief/growth for equity? RP	UNFPA, UNV Security Cl UNICEF, UNHCR INSTRAW	Relief Military,Peace Indigenous Women,Youth
Well-being/Health W Employment (condit.) Quality of life Welfare/Fulfilment	Sacrifice well-being (+jobs) for population relief/growth PW	Sacrifice of one form of well-being for another? WW	Sacrifice well-being (+jobs) for education, research, etc LW	Sacrifice well-being (+jobs) for economic growth? TW	Sacrifice well-being (+jobs) for environment? EW	Sacrifice well-being (+jobs) for equity RW	WHO ILO HABITAT,UNRISD	Health Labour Religions
Learning/Education L Science/Research Culture/Arts/Lang. Inform./Communic.	Sacrifice educ. (+culture) for pop. relief/ growth? PL	Sacrifice educ. (+culture) for well-being? WL	Sacrifice of one form of education for another? LL	Sacrifice educ. (+culture) for economic growth? TL	Sacrifice educ. (+culture) for environment? EL	Sacrifice educ. (+culture) for equity? RL	UNESCO, WIPO UNU, UNITAR UPU,ITU,ACCIS	Students Science Media Information
Production/Trade T Industry/Technology Agriculture/Fish. Energy/Mining	Sacrifice prod. (+trade) for population relief/growth PT	Sacrifice prod. (+trade) for well-being? WT	Sacrifice prod. (+trade) for education, research? LT	Sacrifice of one form of production for another? TT	Sacrifice of prod. (+trade) for environment? ET	Sacrifice of prod. (+trade) for equity? RT	UNDP, UNCTAD UNIDO,GATT FAO,WFP,IFAD IAEA	Development Industry/ Commerce
Environment/Impact E Ecosystems/Species Urban. / Transport Design/Landscaping	Sacrifice envir. for population relief/growth? PE	Sacrifice envir. for well-being? WE	Sacrifice envir. for education, research, etc? LE	Sacrifice envir. for economic growth? TE	Sacrifice of one environmental benefit for another? EE	Sacrifice envir. for equity? RE	UNEP, UNESCO HABITAT, WMO ICAO, IMO	Environment Conservation Architects
Regulation/Equity R Govern./Mgt./Admin. Justice/Order Finance/Debt Mgt.	Sacrifice equity for population relief/growth? PR	Sacrifice equity for well-being? WR	Sacrifice equity for education, research, etc? LR	Sacrifice equity for economic growth? TR	Sacrifice equity for environment? ER	Sacrifice of one form of equity for another? RR	ECOSOC, ACC UNDP ICJ IBRD,IMF	NGO coalit. Law, Rights Finance/Banks

(https://computingforsustainability.files.wordpress.com/2010/05/judge_fig1.jpg)

Example code groupings

PW **Population needs/satisfaction / Social (un)development**
PW: Application of austerity measures to ensure long-term viability of population (cf "structural adjustment")
WP: Avoidance of measures of restraint to satisfy short-term popular demand

PL **Societal culture / Tradition**
PL: Commitment to family and group advancement at the expense of individual education (cf traditional parental commitment, socialist educational priorities)
LP: Commitment to individual education at the expense of family and group advancement (cf "selfish self-advancement", learning without social obligations)

PT **Economic (in)security of social groups**
PT: Foregoing economic opportunities to safeguard cultural integrity (cf indigenous groups, isolationism, restricted employment of women)
TP: Pursuit of economic opportunities despite the effects on cultural integrity and minority groups (cf discrimination in employment, slavery, "sweat shops", child labour)

PE **Environmental (in)security**
PE: Exploitation of non-renewable resources to ensure group survival (cf degradation of marginal lands, deforestation for fuel-wood)
EP: Control of population growth and activity to conserve natural resources

LR **Intellectual disciplines / Systems analysis**
LR: Excellence at price of general improvement in learning
RL: General improvement in learning at the price of excellence

TR **Regulation of trade / Finance**
TR: Rewarding the entrepreneur at the price of the worker (capitalism)
RT: Equal sharing of benefits to the detriment of the most productive (socialism)

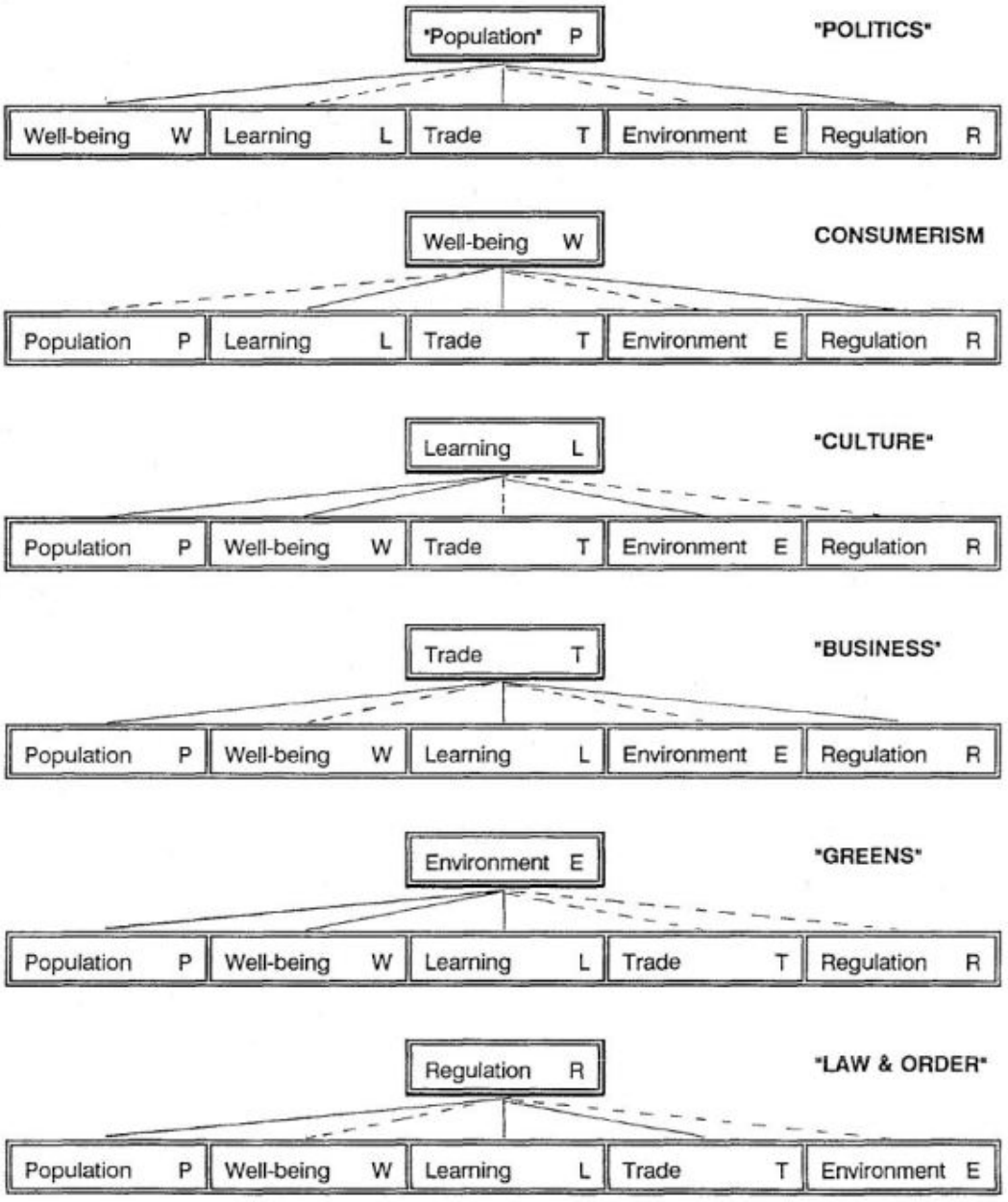
ER **Environmental regulation**
ER: Limiting environmental benefits to the privileged
RE: Allowing degradation of the environment through unconstrained access to resources

(https://computingforsustainability.files.wordpress.com/2010/05/judge_fig1b.jpg)

264. Network of bargain areas

The traditional tabular presentation (of the table) is itself a conceptual trap. It encourages a very mechanistic approach to the pattern of dilemmas, reinforcing tendencies to much-contested forms of "linear thinking". The linearity may be deliberately challenged by allowing the information to be encoded or projected onto a network. In this exercise the network has been deliberately chosen to facilitate comprehension of global properties of the pattern of strategic dilemma.

The 6 hierarchical structures below may be viewed as caricatures of a set of currently competing world views. In each, the dominant function (from the table) tends to distort or suppress the operations governed by the recessive functions (in much the same way as the gene for brown eyes masks the expression of the "blue eyes' gene). The challenge of sustainable development is to interweave the functional contributions so that all are both expressed and constrained under appropriate circumstances.



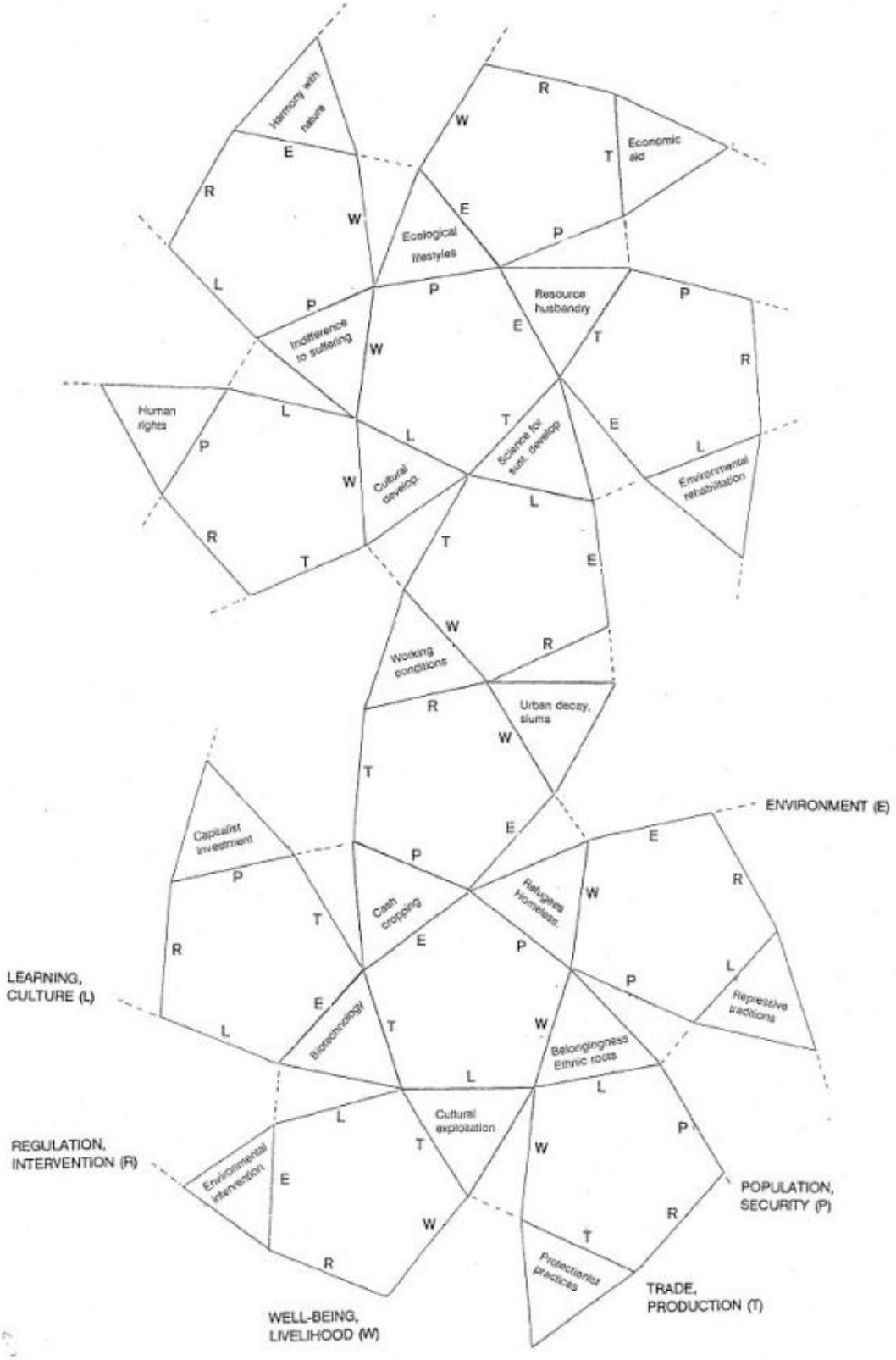
(https://computingforsustainability.files.wordpress.com/2010/05/judge_fig2.jpg)

265. Representation of issue arenas on icosadodecahedral net

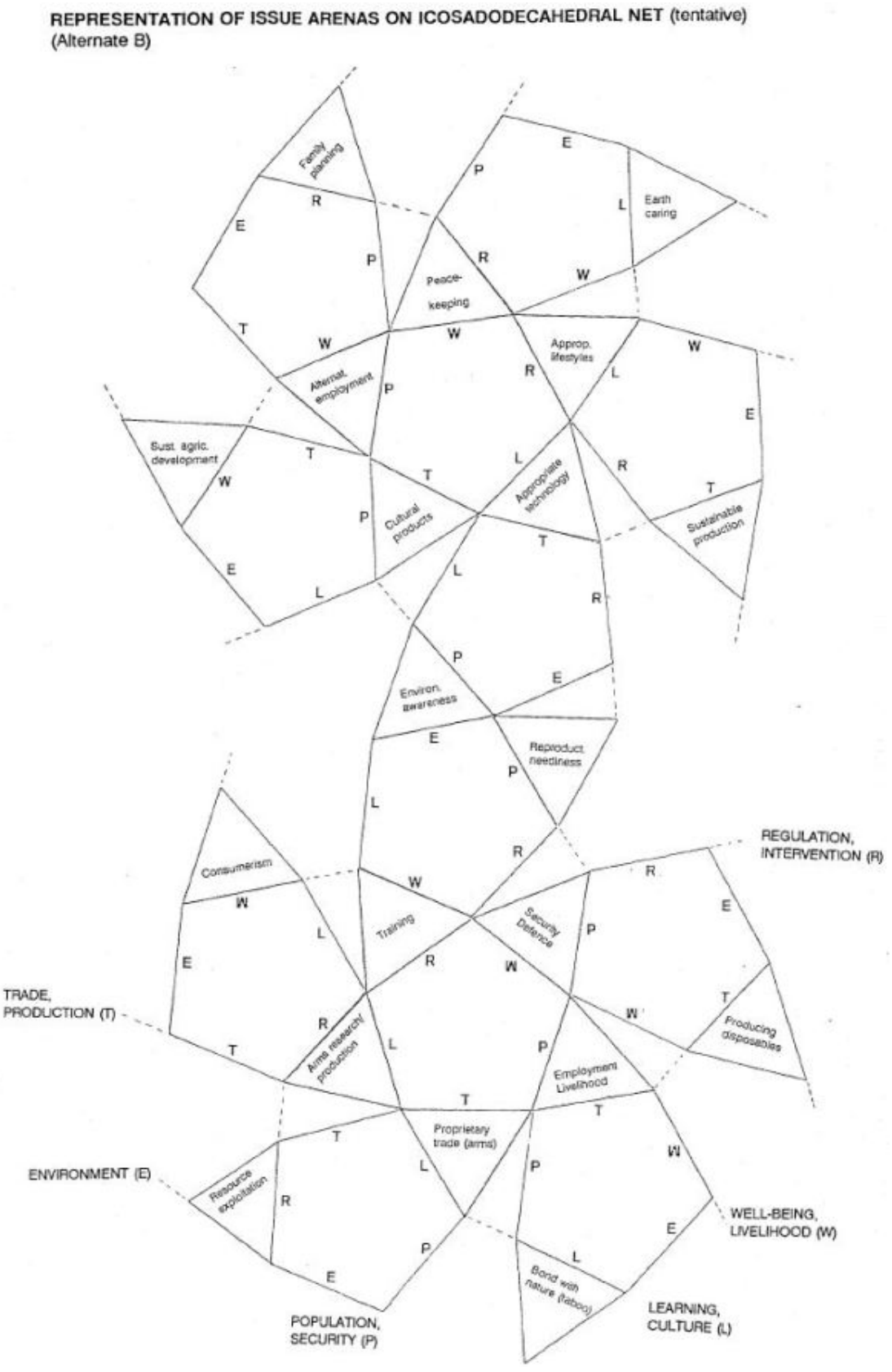
Globally patterned network (see Figures 3A and 3B) chosen to be compatible with the set of strategic functions (in a previous table). The areas can then be used to signify issue- specific bargain arenas. The network is thus a globally organized network of local bargain arenas (where global and local are understood in a functional rather than a geographical sense).

The systemic coherence of the network pattern of Figure becomes clear when it is seen how the 2-dimensional network may be folded around the surface of a sphere in 3 dimensions. This establishes the functional globality of the pattern of bargain arenas and the associated strategic dilemmas.

Further insights into how local bargains may interlock may be obtained by considering the tensegrity structures which illustrate the principles by which spherical structures can be rendered self-sustaining in practice. Tensegrity structures are effectively patterns of sustainability.



(https://computingforsustainability.files.wordpress.com/2010/05/judge_fig3a.jpg)



(https://computingforsustainability.files.wordpress.com/2010/05/judge_fig3b.jpg)

This approach points to new policy possibilities in which the degree of global consensus required is reduced to a minimum (in a design sense) by localizing the patterns of disagreement. In this way disagreement no longer acts globally — tearing apart the global community. Rather it is locally confined and understood as a long-term strategic dilemma on which ·consensus· can only be achieved in the short-term. Sustainability thus lies at the global level not at the local level.

266. Two columns of bargaining areas

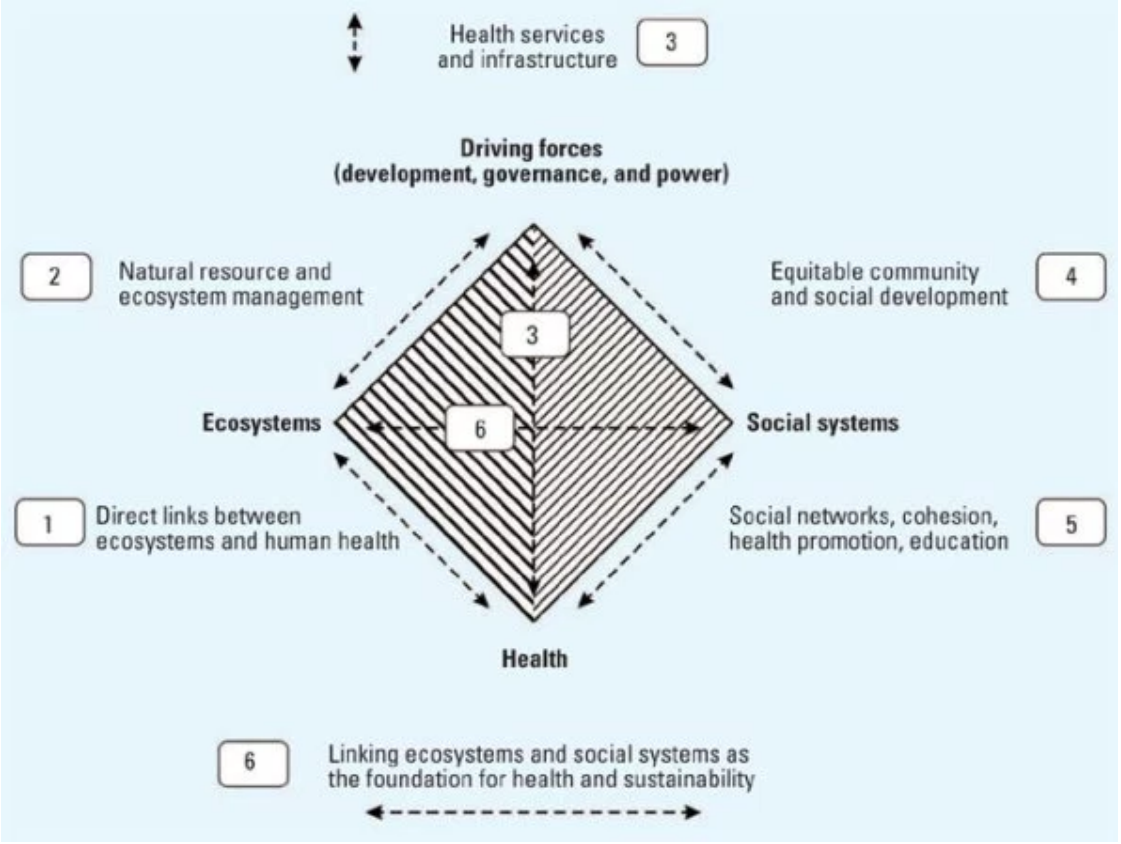
These may be understood as simpler (3-valent) and more complex (5-valent) bargaining arenas around specific concerns.

…a tentative indication of the significance of each code is given here (not all shown here) . The codes appear in two columns. The left hand column indicates a development-focused application of the strategies. The right hand column indicates an environment-sensitive application of the strategies.

		DEVELOPMENT-FOCUSED			ENVIRONMENT-SENSITIVE
LER	+	Application of knowledge to redesign the environment (eg draining swamps, clearing forests, introduction of species)	LER*	+	Application of knowledge to reconstitute devastated ecosystems
	-	Irresponsible intervention in ecosystems (eg elimination of wetlands)		-	Ineffectual application of knowledge to remedy negative environmental conditions
LTE	+	Application of learning to productive exploitation of the environment ("green revolution") / Biotechnology management	LTE*	+	Science for sustainable development
	-	Environmentally irresponsible research / Irresponsible biotechnology / Unconstrained advocacy of agrochemicals		-	Ineffectual use of learning to ensure environmentally sound development
LTR	+	Application of knowledge/know-how according to production/commercial priorities (arms production)	LTR*	+	Appropriate research for economic development / Research into non-exploitive patterns of production
	-	Misapplication of knowledge (weapons research)		-	Ineffectual/Unproductive application of knowledge for development
PER	+	Fulfillment of reproductive needs / Unconstrained population dybamics	PER*	+	Population control / Family planning
	-	Excessive population levels (for the environment) / Unwanted children		-	Eugenics / In-breeding / Ageing population / Imbalanced sex ratio
PLE	+	Traditional (spiritual) bond with the environment	PLE*	+	Environmental awareness
	-	Taboo / Superstition		-	Environmental fascism
PLR	+	Maintenance of traditional patterns of authority (or cultural values) / Imposition of particular ideology	PLR*	+	Human rights / "Affirmative action"
	-	Social rigidity / Discrimination against minorities / Repression / Socially inappropriate conceptual inadequacies		-	?

(https://computingforsustainability.files.wordpress.com/2010/05/judge_fig5.jpg)

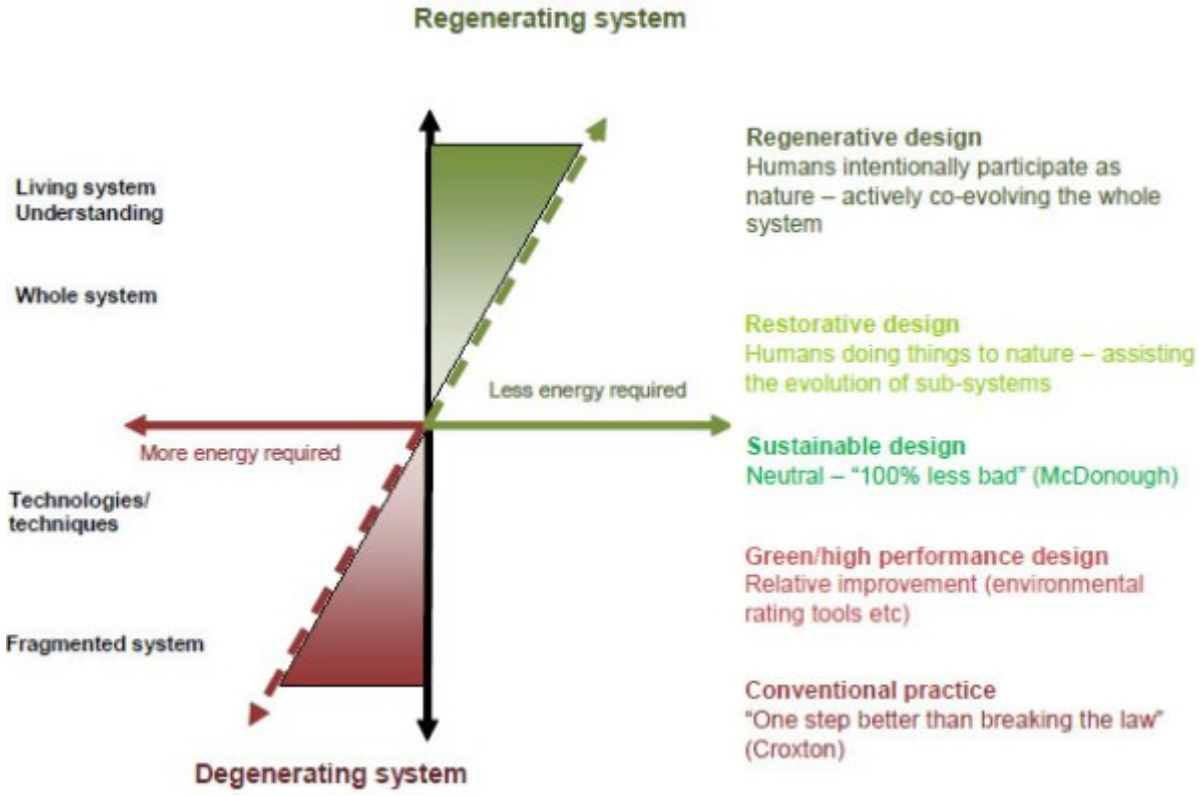
267. Prism of health and sustainability (Parkes et al. (http://www.questia.com/googleScholar.qst?docId=5001947792))



(https://computingforsustainability.files.wordpress.com/2010/05/parkes_diamond.jpg)

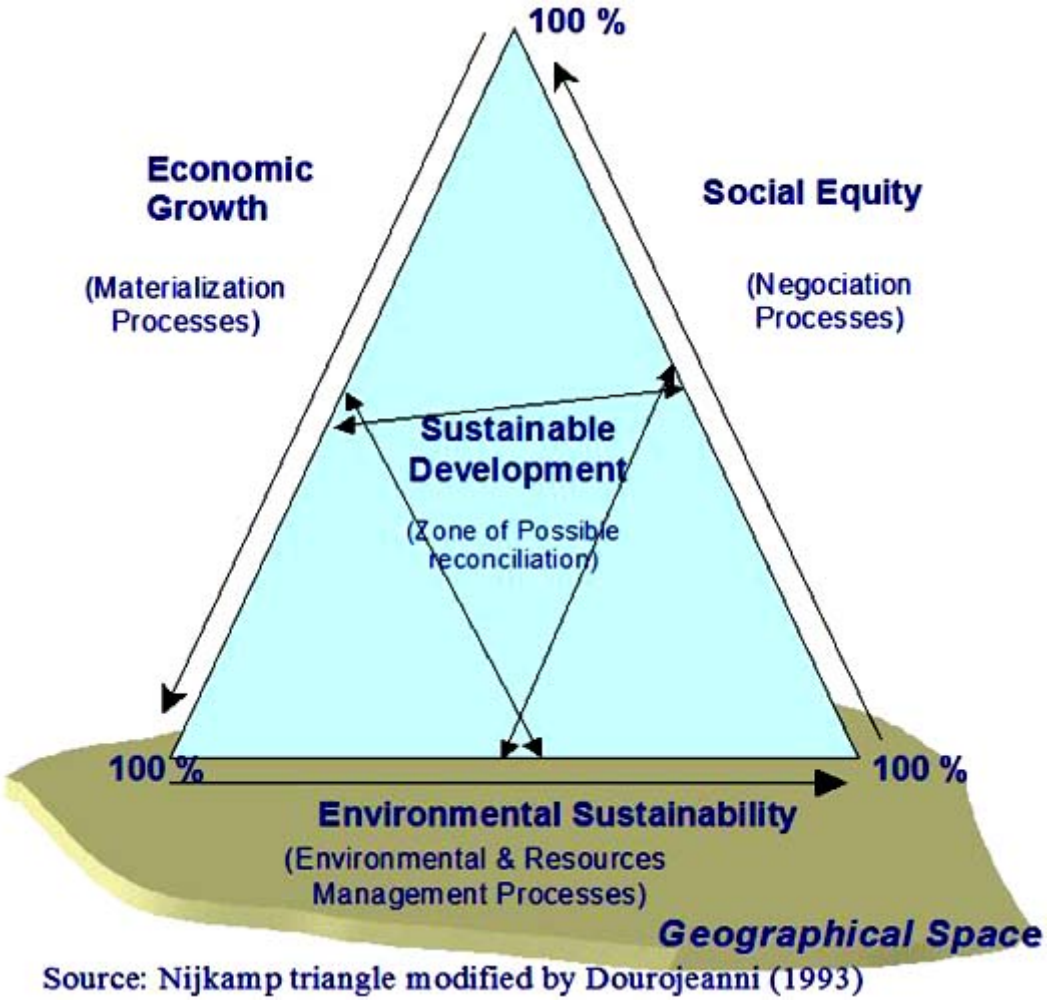
270. Trajectory of environmentally responsible design (NZ Ministry for the Environment (http://www.mfe.govt.nz/publications/sus-dev/rethinking-our-built-environment/page3.html#_Toc221619447))

This figure illustrates that 'Conventional practice' and 'Green/high performance design' both fall beneath the bar of sustainability. This is because they are still degenerating ecosystems and human health. 'Sustainable design' can be thought of as neutral. This is because it neither causes ecosystem degeneration, but nor does it contribute to positive outcomes. 'Restorative design' and 'regenerative design' are regenerative systems and are above the bar of sustainability. This is because they have positive ecological and community outcomes. As design moves from conventional, to green, through sustainable and onto restorative and regenerative, less energy is needed. A conventional design can be thought of as relating to a fragmented system. Green or high performance as well sustainable design solutions tend to focus on new techniques and technologies. Restorative design takes into account the whole system, and regenerative design encompasses a full understanding of living systems (including humans).



(https://computingforsustainability.files.wordpress.com/2010/05/minenv_builtenvfigure3-1.gif)

271. Triangle showing factors, on 'geographic space" (Nijkamp modified by Dourojeanni (http://athaia.com/development_economic.html))



(https://computingforsustainability.files.wordpress.com/2010/09/nijkamp_modified_triangle.jpg)

272. Diverse hierarchical levels and limits of universal lawlessness (Gasto et al 2009 (http://www.scielo.cl/scielo.php?pid=S0718-16202009000100001&script=sci_arttext))

> *The core problem of sustainability is given by not respecting the highest hierarchical levels, exceeding their limits of universal lawfulness. A good decision must be sound in each and all of the hierarchical levels.*

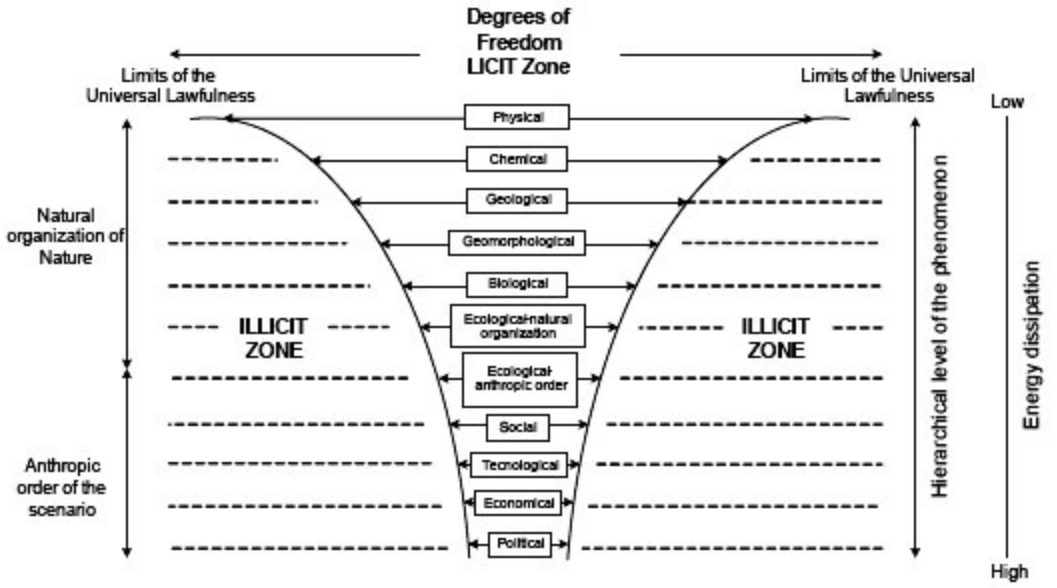


Figure 1. General scheme of the diverse hierarchical levels and their degrees of freedom given by the universal lawfulness of the phenomenon. Physics is the highest hierarchical level followed by chemistry, geology, etc. As the hierarchical level decreases, the degrees of freedom that determines the illicit zone in decision making also decreases. Unsustainability appears if the limits of universal legality are overcome.

(https://computingforsustainability.files.wordpress.com/2010/09/gasto_hierarchy.jpg)

273. Focus point of four hierarchical dimensions (Gasto et al 2009 (http://www.scielo.cl/scielo.php?pid=S0718-16202009000100001&script=sci_arttext))

> *…relate the contiguous pairs of the four fundamental hierarchical dimensions with four acting axes. Between the local and the anthropocentric are the stake-holders, or civil society, directly managing the phenomenon. Territory governance arises between the anthropocentric and the global context. This scheme sets the properties and demands of the ruled system (natural and anthropogenic) and the provisions that the ruling system must have (anthropogenic) to give control to the territory (Jentoft, 2007). It also states that the general functions of the ecosystem has to be considered for such effects as the maintenance of zones destined to control greenhouse gases, the regulation and purification of waters, and the conservation of culture. The maintenance and application of global international agreements is centered on the relationship between the ecocentric axis and the globalization of human actions. Whatever the nature of the human actions, they must be conditioned by restrictions of ethical and aesthetical nature, which are located between the local and ecocentric axes. If these factors are not satisfied, system sustainability deteriorates.*
>
> *In this context, human presence constitutes an integral part of all ecosystems; its actions are relevant in global impact and deterioration (McDonnell and Pickett, 1993; Vitousek et al, 1997; Lubchenco, 1998). The focal point is the center of divergence from where the position of confluence of the different hierarchical axes intervenes in the human actions and the social agent's decision-making are established. Therefore, the natural and cultural generic restrictions are integrated into the territorial restrictions. As a result,* ***new illicit spaces appear****, because the solution can be contained in the inner legal space of one of the systems, but outside of other systems.*

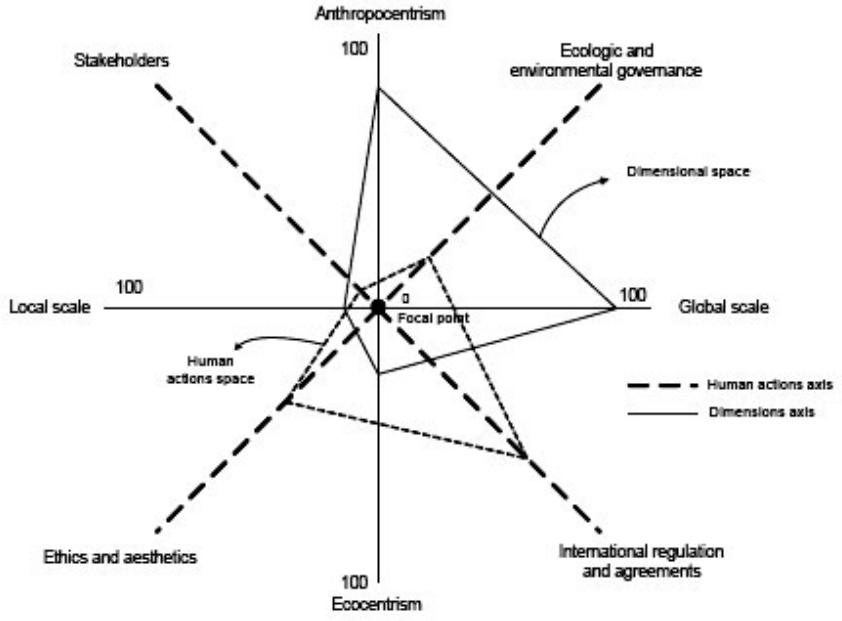
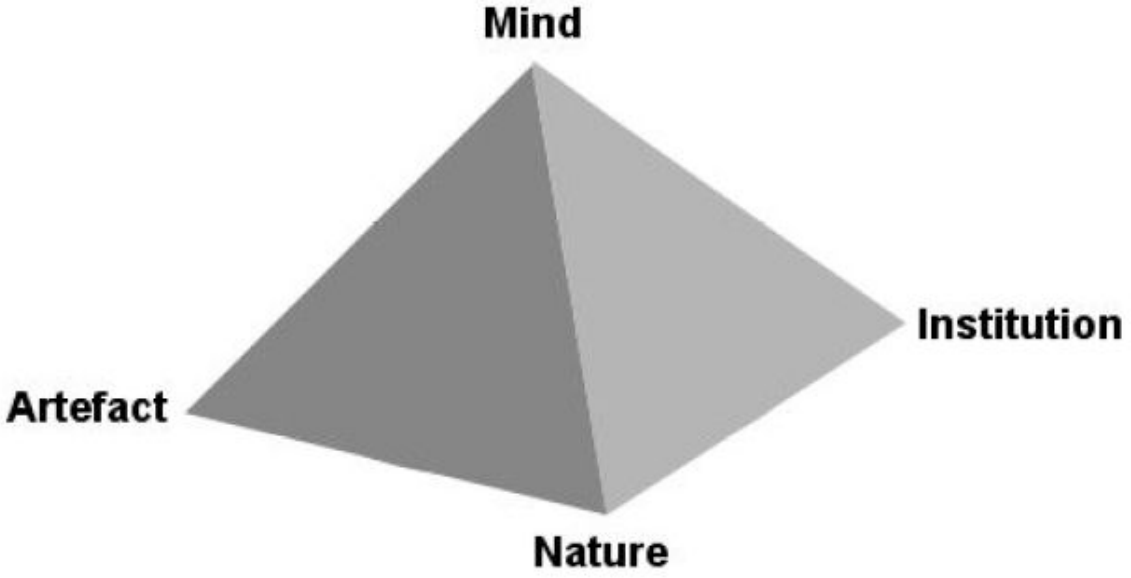


Figure 2. Focus point of the four main hierarchical dimensions that describe phenological sustainability. There are actions and interventions among them, as an example two spaces are presented: one expresses the dimensions focalized on the problem and the other focalizes on the actions taken over the system. There should be a relationship between the dimensions of the problem and the human actions taken.

(https://computingforsustainability.files.wordpress.com/2010/09/gasto_hierarchy_graph.jpg)

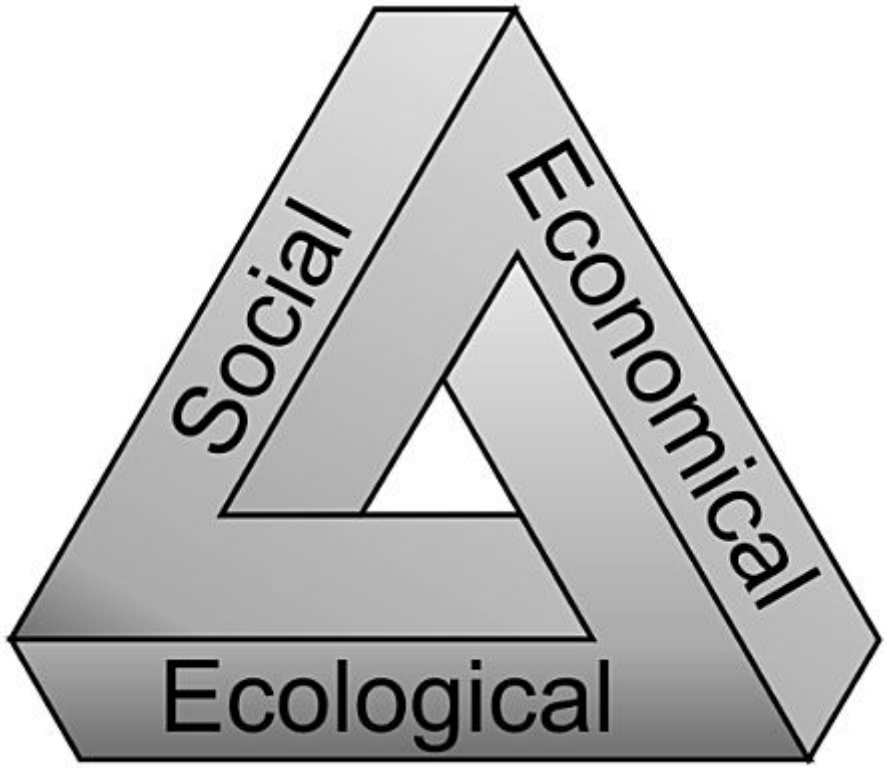
274. MAIN prism (Kain 2000, in Keiner (http://e-collection.ethbib.ethz.ch/eserv.php?pid=eth:27943&dsID=eth-27943-01.pdf)) (an abstraction of World Bank's four capitals model and CSD's social, economic, environmental, institutional).

> *Mind, Artefact, Institution and Nature in order to relieve the prism from the burden of expressions as social and economic, which are judged to be more confusing than explanatory. The environmental dimension (nature) comprises all natural capital, which may be subdivided into stocks of non-renewable and stocks of renewable resources. The economic dimension (artefact) stands for all man-made material assets such as buildings and roads. The social dimension (mind) should be perceived as the awareness of the individual subject (worldview, knowledge, and experience). The institutional dimension concerns the organization of our society and the relation between people.*



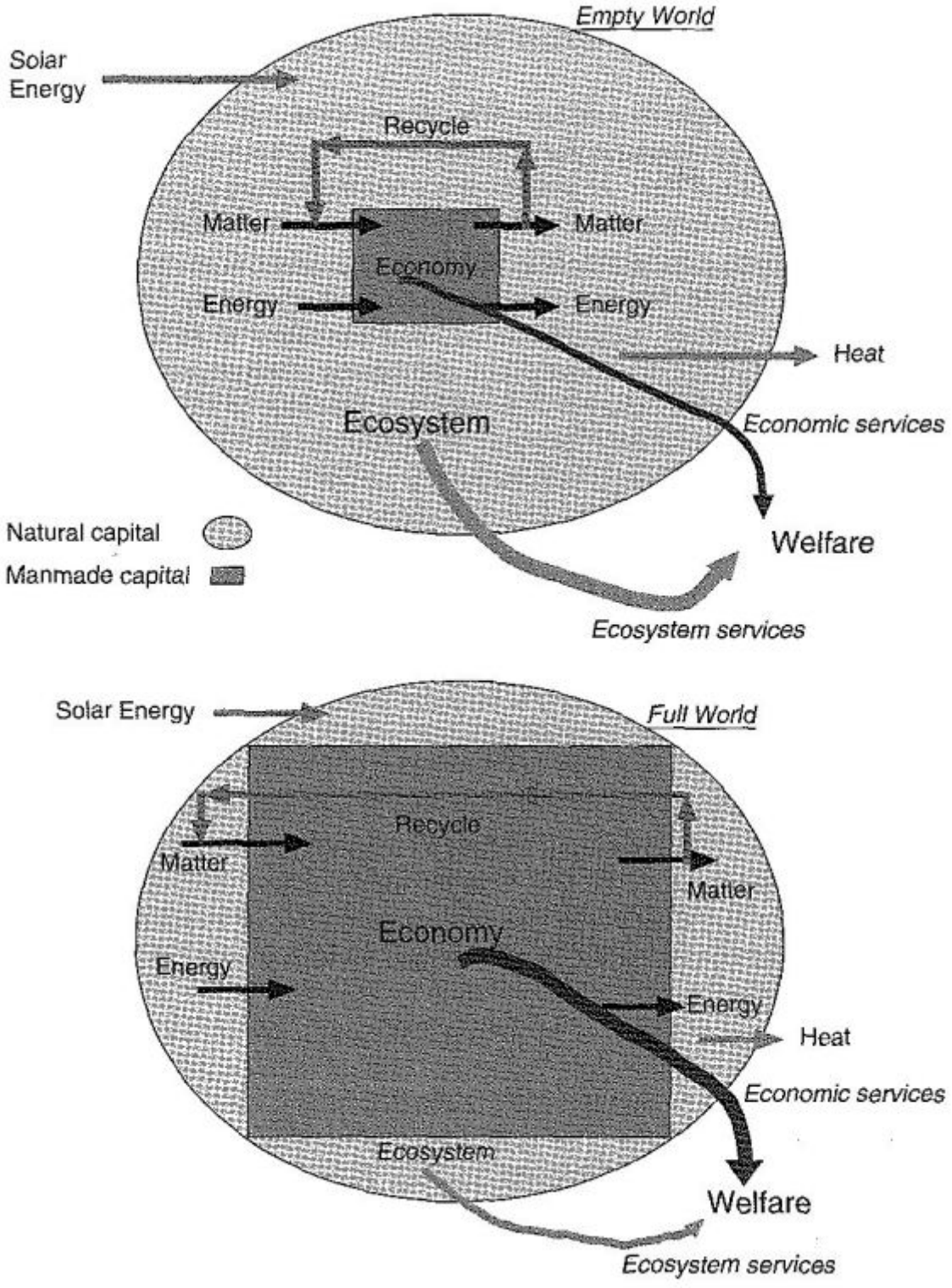
(https://computingforsustainability.files.wordpress.com/2010/10/kain_main_prism2000.jpg)

275. Never-ending triangle of sustainable development (Välimäki 2002, in Stanners *et al.* 2007 (http://books.google.co.nz/books?id=W4o-qunretMC&pg=PA154&lpg=PA154&dq=V%C3%A4lim%C3%A4ki+never+ending+triangle+sustainable&sU2qTPOYLoausAOL9ryBBA&sa=X&oi=book_result&ct=result&resnum=1&ved=0CBQQ6AEwAA#v=one



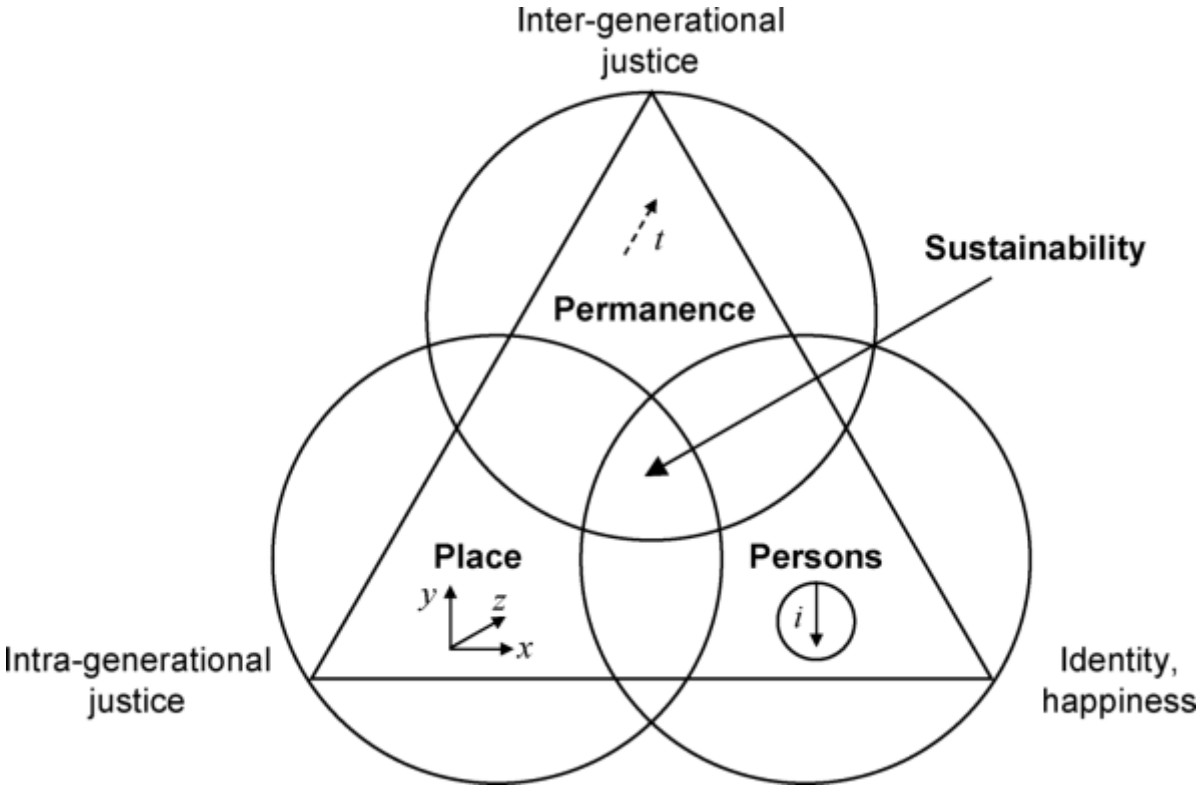
(https://computingforsustainability.files.wordpress.com/2010/10/valimaki_never_ending_triangle.jpg)

276. Daly empty versus full world (Daly 2001, selected essays 2007).



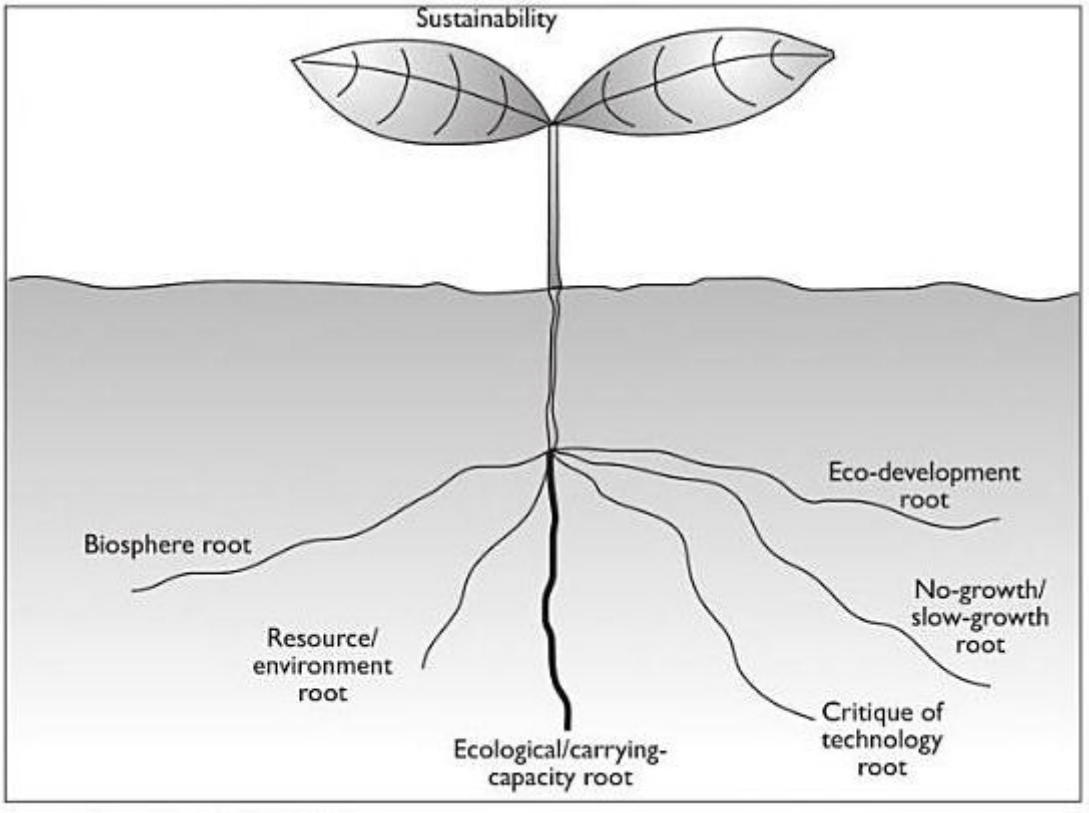
(https://computingforsustainability.files.wordpress.com/2010/10/daly_empty_full.jpg)

277. Conceptual framework within which the territorial, temporal, and personal aspects of development can be openly discussed (Seghezzo 2009 (http://www.informaworld.com/smpp/section~db=all~fulltext=713240928~dontcount=true~content=a9133



(https://computingforsustainability.files.wordpress.com/2010/10/seghezzo.png)

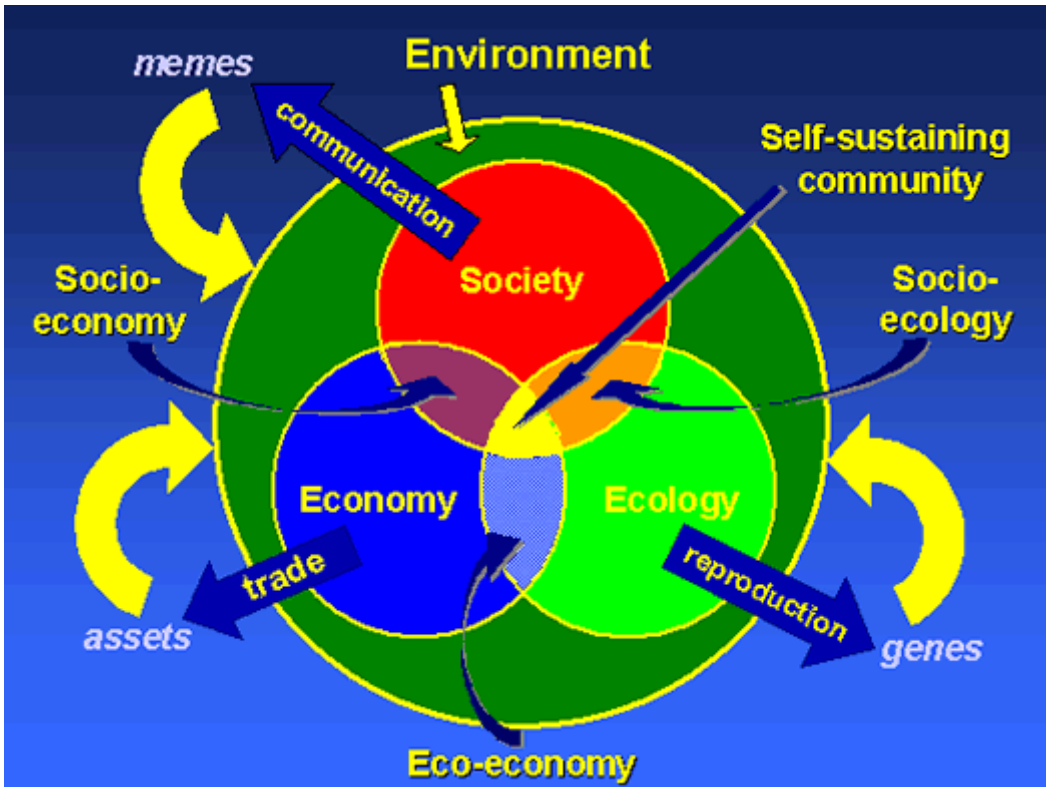
278. Roots of the modern view of sustainability (Kidd 1992, in Bell and Morse 2008 (http://books.google.com/books?id=6DOC13cd9c0C&dq=bell+morse+sustainability&source=gbs_navlinks_s))



Source: adapted from Kidd (1992)

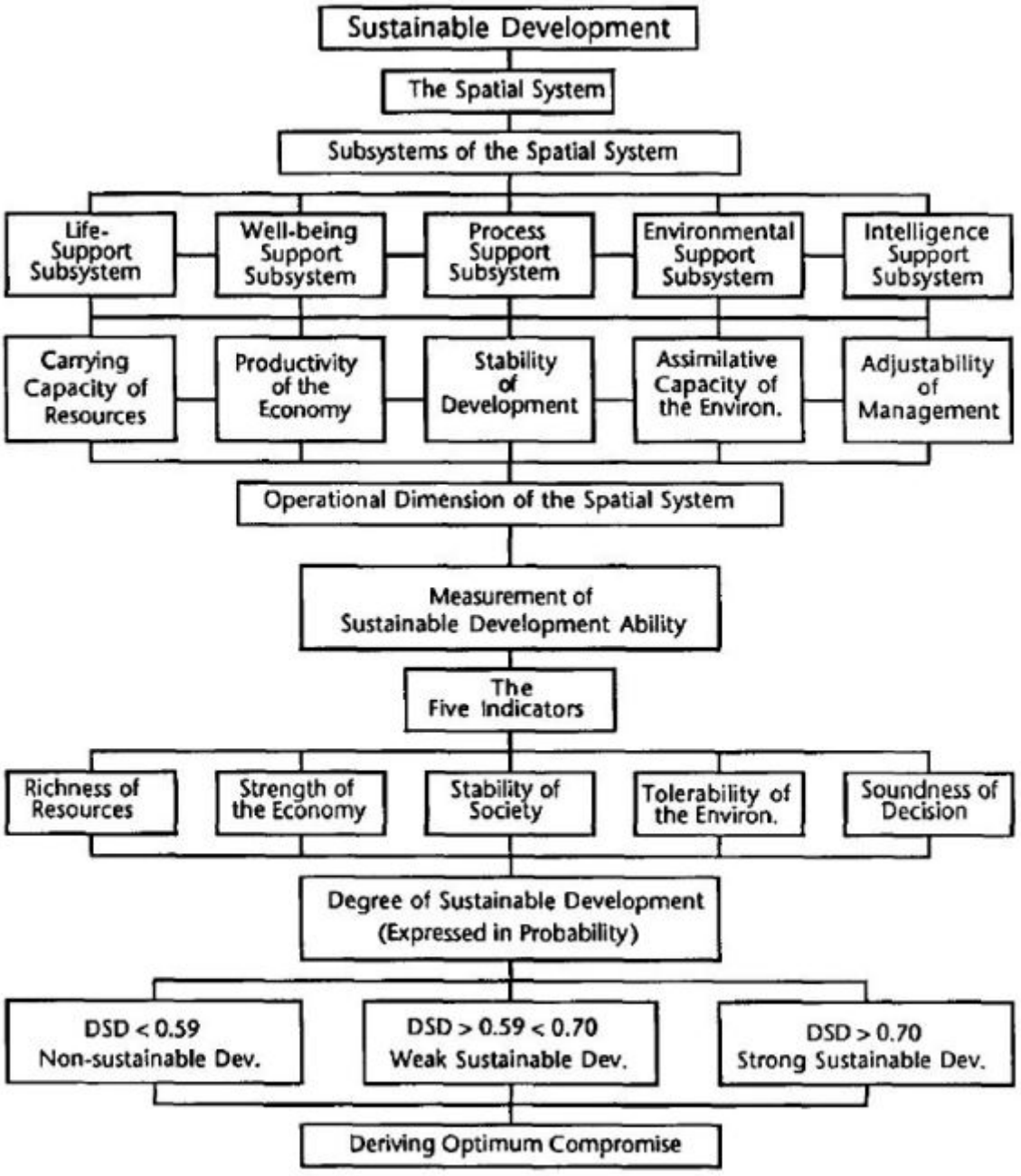
(https://computingforsustainability.files.wordpress.com/2010/10/bellmorse_kidd_tree.jpg)

279. Venn diagram with feedback loops (DEFRA Estuary Guide 2009 (http://www.estuary-guide.net/guide/chapter2_estuary_management.asp))



(https://computingforsustainability.files.wordpress.com/2010/10/defra_estuary_guide.gif)

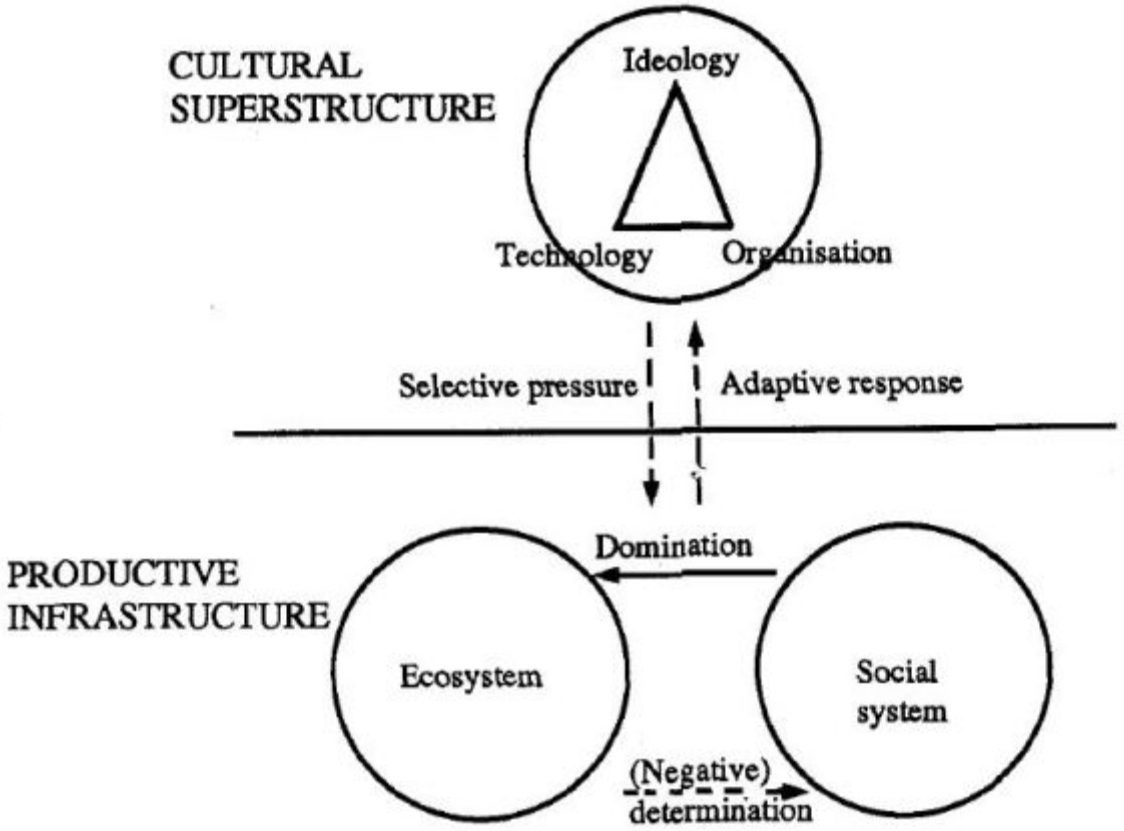
280. Spatial systems framework (Niu et al 1993).



(https://computingforsustainability.files.wordpress.com/2010/10/niu_spatialsystem.jpg)

281. Linkages between ecological, social and cultural systems (Ingold 1980).

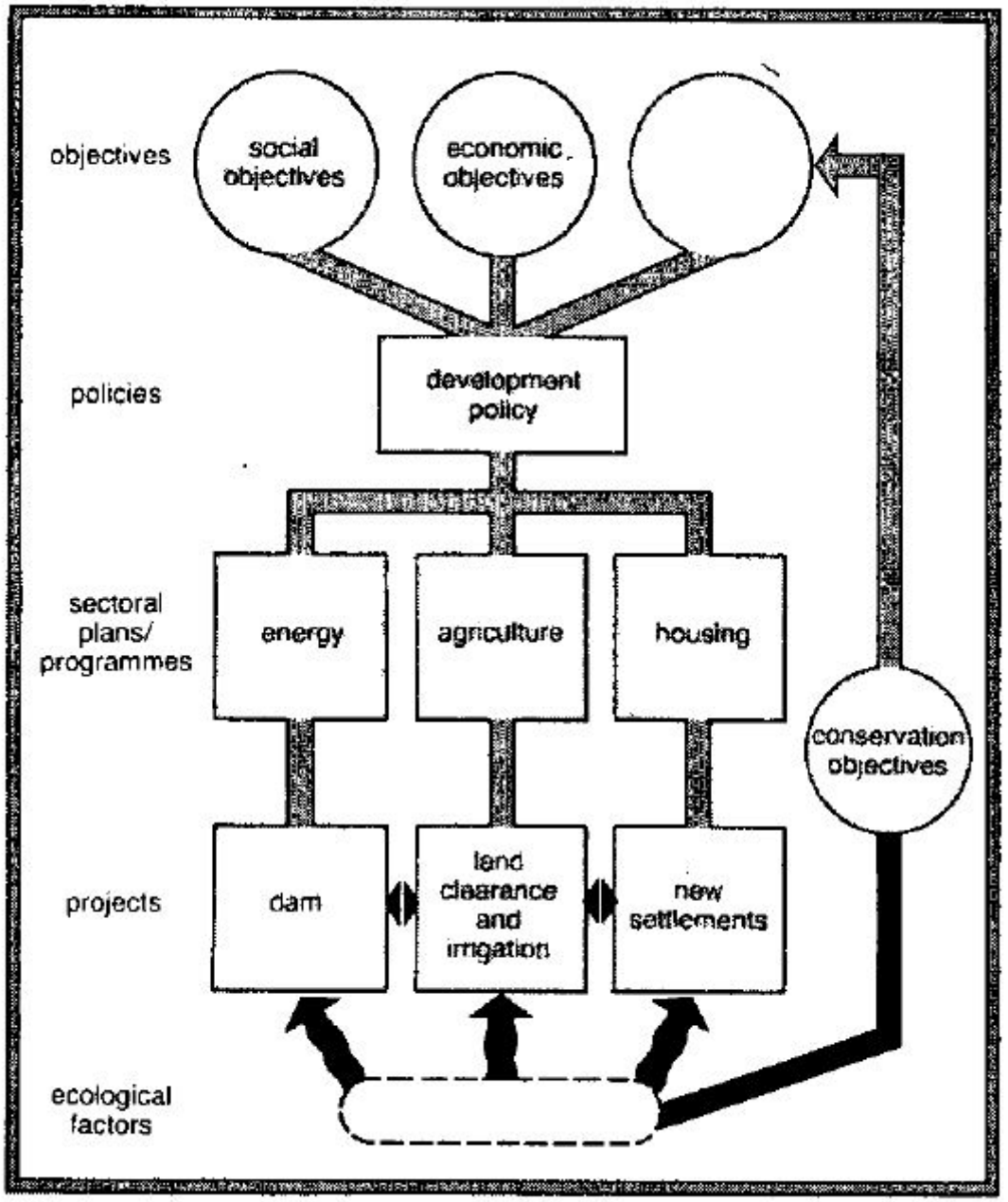
Not strictly sustainability, but interesting as 1980 exploration of dynamics of relationships between social and ecological systems. Used to explore different models of utlisation of reindeer (hunting, pastoralism, ranching), despite similar environment and ecology in Artic tundra.



(https://computingforsustainability.files.wordpress.com/2010/10/ingold_in_fitzhardinge.jpg)

282. Living Resource Conservation for Sustainable Development (World Conservation Strategy 1980)

The strategy saw conservation as a means to achieve social and economic objectives, and social and economic constraints as barriers to achieving conservation objectives (elements are on the same page, nearly integrated as what we now know as sustainability).



(https://computingforsustainability.files.wordpress.com/2010/10/worldconservationstrategy1980.jpg)

Posted in: *Computing for Sustainability (https://computingforsustainability.com/category/computing-for-sustainability/)*, *visualisingsustainability (https://computingforsustainability.com/category/visualisingsustainability/)*

135 Responses "Visualising sustainability" →

Julian Crawford

March 18, 2009

Hi – what a great inititative – love it! Sustainability in all it's beauty, complexity and diversity. People working to understand, appreciate and adapt..

Reply

Anna Hughes

March 18, 2009

Hi Sam

Great resource you have collated here. Somewhat overwhelming viewed all at once. I struggle to see the value in 'models' sometimes. I think they are good 'guides'. The same information (which much of this is) shared in different ways is valuable for the fact that people's brains process things differently. I'm still looking for the next step. The one that comes after we have established what sustainability encapsulates and means. What is it? How do we communicate it and encourage others to take it on? anna ;)

Reply

joanium

April 8, 2009

The reason why 'decent homes' is in the public sector in diagram 37 is because it reflects the UK government's 'Decent Homes Programme' for improving social (public) housing.

Reply

Samuel Mann

May 12, 2009

Thank you.

Reply

brian kesner

May 12, 2009

Contact Ken Haggard, architect/professor, for a great diagram which also shows the evolution thru history of the aspects of sustainability. 805.438-4452.

Thanks for your wonderful collection. I will expect to see it in book form some day.

Reply

Samuel Mann

May 12, 2009

Thanks Brian, I will contact Ken.

Have a book on teaching sustainable practice due at the end of the month and then a software engineering one chasing it, but yes, a book tracing these images would be an interesting project.

Cheers
SaM

Reply

Chris Yalonis

June 24, 2009

Hi Sam,

I have a new sustainability consultancy called Sustainametrics that comprises a team of sector and functional experts as well as a development team that is building an open source platform to help organizations do assessments, develop goals and strategies, track progress, view performance dashboards, and output reports for stakeholders. What licensed software have you seen that does a good job at encompassing a solid Sustainability framework? Also, what platform (ie. Saas, social network, Database, content management, etc.)do you recommend that we build upon for sustainability solutions. We want to allow templates by sector and for practitioners to add to the database (with vetting/approval)

Aaron

May 27, 2009

I am surprised that my work appeared here. Beautiful and informational post, it would have made my master's project impossible to complete.

Reply

Daniel Montano

June 20, 2009

Funny. A While back in a blog posting I wrote that all diagrams and conceptual models are reductive.

Now I can see that you are featuring what I think is one of the most reductive diagram I have ever made.

I drew it because it looked like a 'generic' diagram…I was hoping it would be easily digestable by the intended audience (business folks).

I hope that I can revisit the idea under a different vein of inspiration.

Reply

João Miguel

June 26, 2009

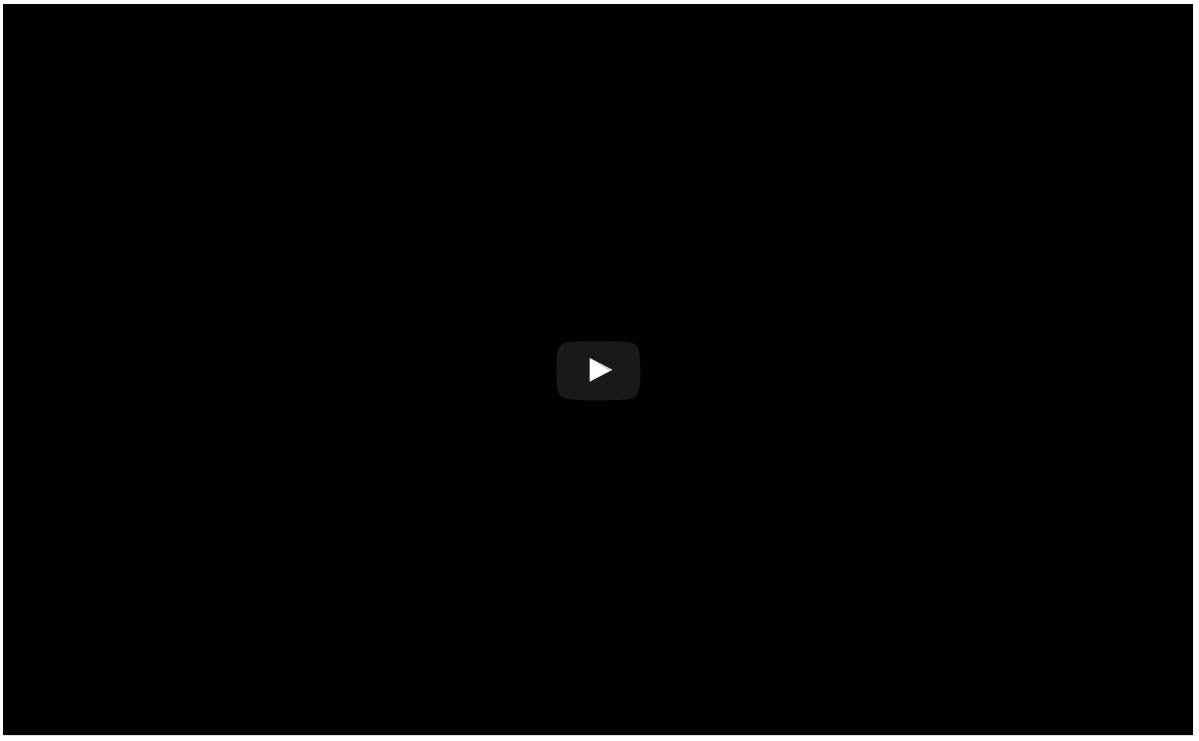
It's fantastic the work you've done here. So many charts.. And they gave me lots of ideas and some guidance also to a work I'm preparing for presentation at university. I'll have your website as reference in this paper. ;)

Reply

Julie

July 4, 2009

Amazing treasure trove of visuals for sustainability. I have been looking for this. I recently made a video called "Visualizing Sustainability" that is yet another "look" of a very different kind.
Description:
Professional Visual Facilitators Mariah Howard and Julie Gieseke bring whiteboards, pens,cameras and one question to the Maker Faire: What does sustainability look like? Here is the harvest of images they discovered from the Makers.
You can view it on YouTube



Reply

Samuel Mann

July 22, 2009

Thanks Julie, amazing initiative. I really like the Dissanayake quote on your website: "Innate does not mean inevitable. Most innate aptitudes in humans require fostering". I also like the line on Mariah's page: "we'll find out what wants to happen next". As you found, these images are bursting to do more.

Reply

sheri

July 14, 2009

Hi,
I'd love to invite you to check out this visualization as well which uses the integral map. we used it for our imagine cascadia project and it was invaluable!

http://www.bchealthycommunities.ca/Content/Capacity%20Building/Index.asp

Thanks.
Sheri

Reply

Sara Mears

July 15, 2009

Fantastic work. I will be referring to your list a lot! Do you mean Strong Sustainability as opposed to Stong? First image with the concentric circles.

Sara

Reply

Samuel Mann

July 16, 2009

Yes, thank you Lisa, Strong. Incidentally, SANZ has just released this think tank report:
http://www.phase2.org/documents/Strong_Sustainability_for_New_Zealand_v1_May_2009.pdf

Reply

justposted

July 31, 2009

Great bit of research – thank you for both doing and publishing it. A great find for me! A few more that you may wish to include (each one should be the first hit if you Google them):

Arup SPeAR
Bioregional calculator
Pharos materials

Reply

Colby Senior

August 27, 2009

I think the best diagram is number 23. The other diagrams illustrated the causes of the problems facing our planet or the time we have left before we destroy it, but number 23 illustrates colorfully and clearly how to solve the problem. By taking public transportation, reusing water bottles and grocery bags, installing solar panels, and recycling, we can be part of the solution to this very urgent problem.

Reply

Sara

August 27, 2009

This is a great resource! Thanks so much!

Reply

John Thornton

September 19, 2009

Great collection of sustainability frameworks. Almost a bit overwhelming to examine with some many here, you've done good work in putting these all in one spot.

Reply

Marcos Buson

September 25, 2009

Great compilation !

Marcos Buson
PhD Researcher, UFSC, Brazil
Research field: Planning for Sustainability

Reply

Tamara

October 3, 2009

What a great resource! Thanks so much!

Reply

maMun

October 9, 2009

Sam

Your total effort is the sustainability. GREAT.

Reply

James Abrahamsz

November 5, 2009

Great idea, your initiative is very helpfull for my teach process. Can I get some refferences about how to computing the sustainability. Thanks before…

Reply

Rick

November 11, 2009

A local professor, now retired from UNL but active in leading local discussions, has been using a five-pronged image to describe his view of the applicable domains that comprise sustainability. P 4 of this document has the image, the document provides context
http://www.ecospheres.com/strategy_for_sustainability.pdf

Reply

marika

November 21, 2009

Great range in your collection of models: few have collected as many, for any field.

Here is a little contribution to understand this plethora of models: Very similar visual models exist in many other fields: the iconic images are not specific to sustainability, but a range of images that the intellect uses to model and represent, in any field (eg medical models, mind models…). The images are significant of a state of intellectual thought rather than what the intellect represents, and there is a developmental process from one image to another, in both complex and simple directions. That's why there is no general agreement on how to define and model sustainable development or on the values attached and evaluation methods. Topology can be used to study the shifts and deformations of these image-models and the valuing can also be modeled.
Too bad we act out policies and 'solutions' based on these models… for just 'more of the same'.

Reply

Durable

February 6, 2010

Wow, that has to be the most thorough analysis of visual representations of sustainability. My personal favorite is the 3 section Venn Diagram, by far the most easy to understand. Very nice collection of images, excellent. It's cool to see the evolution of the concept of sustainability too.

Reply

Larry

February 11, 2010

Hey very nice blog!! Man .. Beautiful .. Amazing .. I will bookmark your blog and take the feeds

Reply

sgrplanet

February 19, 2010

hello!!!, your blog was very useful for me!!! thank´s for your contribution, I have saved a lot of time with the same idea.

Reply

David Rojas Elbirt

March 29, 2010

What a way to help us all think abaut planetary futures.
Muchas gracias!

Any compilation on models or examples of applied models on desining locations to apply sustainable living?

Reply

Samuel Mann

March 30, 2010

Thanks David, Not that I know of. In looking for images for this compilation I've certainly seen a lot of models from architects showing their design for a sustainable development.
SaM

Reply

sibeso mukelabai

April 20, 2010

am deeply moved by the extent at which we are 'committing suicide' by exerting so much pressure on the world that we entirely depend on. am completing my 1st degree program in under three weeks….. now am certain that am pursuing environmental engineering for my masters degree. thank you all for your initiatives and contributions to making our world a better place. am inspired!

Reply

Karen Janowski

April 28, 2010

Funny and a little sad, too. So many different ways of conveying essentially the same things – I just hope that this variety of visual 'languages' will reach scads of different people and get the message across so we can act with all due speed!

Reply

Karen Janowski

April 28, 2010

Btw, you should add the Real Eyes animation:

Reply

Samuel Mann

April 30, 2010

Thanks Karen,
Is certainly a nice animation (http://www.realeyes.ie/sustainability-explained-animation/).
SaM

Reply

Team 4

June 1, 2010

We'll be salal!

Reply

claudia phillips

August 26, 2010

How do I add our Sustainable Design model to your list?
Very interesting site!!
Claudia

Reply

Alex Gore

September 15, 2010

seems like sometimes people take to much time thinking about sustainability rather then solving how to seamlessly integrate it.

Reply

Adriano Ellero

October 23, 2010

I hope to add small contribution to the entire work done in this web site.

Reply

Greg Haunschild

October 28, 2010

Love the site! Glad to see someone is recognizing us computer geeks out there who really enjoy environmental sustainability platform development. Keep up the good work!

Reply

Vicente Gonneville

November 1, 2010

big league almanac you've get hands on

Reply

Produce Sperm Volume

December 20, 2010

A low semen analysis evaluates some characteristics of a male's low semen volume and the sperm that is found in the semen fluid volume. It may be done while investigating a couple's infertility problems or after a vasectomy to check that the procedure was successful. It is also used for testing the donors for semen fluid donation. Nowadays it's possible to boost ejaculation fluid with really safe ways including taking herbal pills from the various Internet stores.

Reply

David Millar

December 21, 2010

Hi Samuel. Quite a collection. You'll find more in Wikipedia Sustainability http://en.wikipedia.org/wiki/Sustainability, the Rockstrom planetary boundaries review article in Nature (Sep 2009 tho' I prefer the New Scientist version of the graph) http://climatesafety.org/great-johan-rockstrom-presentation-on-planetary-boundaries-concept/,
NET's climate change thermometer and some biodiversity-loss graphs in my http://qewnet.ning.com/forum/topics/un-info-csd-commission-on, Northern Sun's "build global community"poster http://www.northernsun.com/n/s/4436.html. A whole bunch at http://marukuwato.multiply.com/journal?&page_start=200 including Hermann Daly's full earth / empty earth: astounding that he was fired by World Bank for implying that the economic growth was limited by earth's carrying capacity.

Reply

Insurance Claims Jobs

January 12, 2011

If two lawyers were drowning, and you could only save one ofthem, would you read the paper or go to lunch?

Reply

Tom Bliss

January 12, 2011

Email contact has not delivered a result so trying this –

How can I obtain permission to use the top three images on this page to help illustrate an article in a uk-based academic journal?

Reply needed urgently please, deadline this week.

Reply

Samuel Mann

January 13, 2011

Sorry for slightly slow reply, still on holiday here. Sorry, can't help. None of those images are mine.

However, I have been chasing the originators of all the images on this post for my forthcoming book.

I'm quite sure neither the Mickey Mouse and Stool images have "owners" (of course people might claim the individual renderings).

The bullseye is after Daly. It is very widely used without specific permissions though.

Daly, H. E. (1996). Beyond Growth: The Economics of Sustainable Development. Boston: Beacon Press.

Cheers SaM

Reply

One Last Voice

January 21, 2011

Great resources. Great website have linked you to mine http://www.onelastvoice.com

Reply

Kervin Cablaida

April 26, 2011

Very informative, a one-stop-site with the collection of “sustainable development” perspective, great effort for Samuel Mann. It worth a good feedback… God bless (“,)

Reply

Patricia Santos

July 2, 2011

Excellent collection. If only visualisation was used more…

Reply

Victoria

July 26, 2011

This is wonderful! Thank you so much. This gives a clear picture of sustainable development. Do you have specific information about Education for Sustainable Development(ESD)?

Reply

Andri Novi Hendrarto

July 27, 2011

Thank you for your great compilation.

Reply

Garry C. Canto

July 28, 2011

you have presented a lot of diagrams showing the sustainability. Can you make next time on the topic of biodiversiry? i am particular on how to make a fishbone diagram.

Reply

Ehsan Ranjbar

September 15, 2011

Dear Samuel
It's great. I am working on my PhD thesis about sustainability of urban spaces. I have founded some of models but yours is more complete and useful for me. I think 4 month later I can send my model thats new for small scales of urban design.
Ehsan Ranjbar

Reply

Scott Edmondson, AICP

September 16, 2011

Amazing set of research results illustrating at once the diversity of perspectives around a relatively common core. Thank you for this work and the results.

Reply

Steve McCoy

November 8, 2011

Hi, I found your site a couple of years ago and it was so very useful in helping me visualize sustainability… my apologies for not saying so at the time. The fruit of that thinking time is here: http://sn.im/wcvll If you think there may be some visuals that might be useful to add to your collection (I am SO not objective!), then please let me know and I can break them down and send them in whatever is the best format… or, feel free to take screen shots. Many thanks again, cheers, Steve

Reply

Ashok Bhatia

December 7, 2011

This is a great compilation!
Regards

Reply

Rob Fleming

December 29, 2011

Thanks for the work here. I am drawing a diagram for a sustainability curriculum. shall i send it to you when complete? This was very helpful, thanks again.

Reply

atlasphere

January 14, 2012

This is great! thanks for compiling this labor of love.

Here is an article I reference again and again, it is not visual but it is informative.
http://www.orionmagazine.org/index.php/articles/article/5502/

Enjoy!

Reply

leadershipliteracies

February 4, 2012

Hi Samuel, Great list. I think the citation you are looking for in #101 is this book:

The Winners and Losers in Global Competition
Why Eco-Efficiency Reinforces Competitiveness: A Study of 44 Nations
http://www.rueggerverlag.ch/page/verzeichnis/detail.cfm?id=166

Reply

leadershipliteracies

February 4, 2012

Another one is the Corporate Sustainability Development Model from Dunphy, D. C., Griffiths, A., & Benn, S. 2007. Organizational Change for Corporate Sustainability: A Guide for Leaders and Change Agents of the Future. (2nd ed.). Series: Understanding Organizational Change Milton Park, Abingdon, Oxon ; New York, Routledge, 346 p.
They use a "Waves of Sustainability" model in this book.

Reply

Jared de Belo

February 28, 2012

What a sustainable resource! Thank you so much for your efforts.

Reply

Jared de Belo

February 28, 2012

What a sustainable resource!!! Thanks Sam.

Reply

fullcircuitsustainability

March 2, 2012

Thanks for the collection – gives the mind some new ways to travel. Didn't catch a diagram with the idea of continually advancing balanced cycles, though. Once we reach sustainability, the world doesn't freeze in place – it keeps growing as we learn, and systems and societies continue to grow within the sustainable region… Perhaps since this post? Again thank you.
http://fullcircuitsustainability.blogspot.com

Reply

tutormentor1

March 18, 2012

Thanks for compiling this set of visualizations. I've been using maps and visualizations for many years to illustrate strategies adults and business need to take in many places, for many years, to help kids in poverty move through school and into jobs and careers. I incorporate these into blog articles such as these http://tutormentor.blogspot.com/search/label/visualization. If you search Google for "tutor mentor" and click on images you'll find many more.

What I apply that I don't see much of in the visualizations on your list is a set of geographic maps showing all of the poverty areas in the Chicago region. Thus, the concepts are intended to create a spatial distribution of resources into multiple places, while also showing the role of many owners in building the public awareness, training and resource flow needed to build and sustain tutor/mentor programs in these areas.

Reply

http://fastingforweightloss.net

March 19, 2012

I was just looking for this info for a while. After six hours of continuous Googleing, finally I got it in your site. I wonder what's the lack of Google strategy that don't rank this type of informative web sites in top of the list. Normally the top websites are full of garbage.

Reply

Dean Walker

March 27, 2012

Hi Samuel, I work with iwi in Te Tau Ihu on sustainability issues. Groups in the Nelson and Motueka area in particular use a Nga Atua Kaitiaki framework under which they carry out a variety of work including cultural impact assessments and culturally-based environmental monitoring. The framework is a sustainability model from a te ao Maori perspective which I think is worth adding to the multitude. It can be accessed on page 8 of the following document http://www.envirolink.govt.nz/PageFiles/425/628-nlcc31.pdf The latest version includes the atua Ruaumoko but is not available online as yet.

Cheers Dean

Reply

Bernie Slepkov

April 1, 2012

Hi Samuel

I invite you to explore my websites to see if the animated model I've created doesn't have a place here. http://sustainableniagara.ca and http://for-legacies-sake.ca

Awesome stuff by the way. Quite overwhelming while still thought provoking.

Reply

Julie Winnard

April 20, 2012

Brilliant site. I'm working on similar diagrams to explain to people in industry what to do about it, given it's a desirable state, in their day jobs- i.e. how to compare different strategies or designs and decide which gives you less unsustainability and less irresilience. You've saved me the job of having to invent a whole load of diagrams to explain the basic principles of what is sustainability!

I see you are part of Sustainability in education in NZ- do you work with Susan Krumdieck at all?

Particularly also enjoyed the pithy overview you report from a colleague on ipods as deliberately unsustainable items…Thanks.

Reply

Bernie Slepkov

April 22, 2012

Hi Sam
This is a great resource. Mind boggling, actually.
I'd tried leaving a post a few weeks back but don't see it here. I tried to inform you about a model for sustainability I designed and animated, which can be seen at my website. I have another animated version which I'd be happy to email you.

Reply

sitasupomo

July 11, 2012

great resource! two thumbs up!

Reply

Live Video

July 25, 2012

Live comments are enabled by default. They can be disabled at any time. You should always have a dedicated comment moderator for high-traffic events.

Reply

Ric Stephens

August 18, 2012

An Escher version:
http://www.flickr.com/photos/ricstephens/7155490731/in/photostream/lightbox/

Key Planning Concepts:

Reply

Ivan

November 4, 2012

Great job Samuel, your blog and info came accross to a research I´m doing to clarify what is/are the differences between sustainable (sostenible in spanish) and sustaintability (sustentabilidad), if ever there is in spanish such a difference, as it seems that in english both are just the same.

I was surprised by some models I haven´t even seen in my life. I do work for the development world, and it is refreshing and motivating to see that are also free of charge people helping and supporting the sustainability against pure irresponsible consumption.

Congratulations!

Reply

zoebanfield

March 13, 2013

Reblogged this on Bennington Sustainable Food Project and commented:
Unpacking buzzwords, what are some different things that people can mean when they use the word sustainability? Here some interpretations are represented graphically.

Reply

Josip

March 20, 2013

This is Bible for sustainable development

Reply

Jeetesh Rathi

May 17, 2013

Great Work, So many charts, diagrams, figures, images …. simply amazing work
Love that

Reply

リモワ アウトレット

October 18, 2013

http://cheaprimowal.tumblr.com/

Reply

Sudar

April 3, 2014

Good work done. Got a full over about sustainability.

Reply

mike

May 6, 2015

I just wanted to say I love the graphs. I think that seeing things visually really can help us understand things better. I think that people always look at healthy transportation like biking or walking for sustainability for our eco system. The food we eat though support healthy soils though too.

Reply

Michelangelo Du

June 20, 2015

https://drive.google.com/drive/folders/0B7-r5QSjcuoTTHpyM1hPZ0JzUk0

Please help me add practical, exponential, and leapfrogging technologies, appropriate for a Philippine and South East Asian World of 2106, using real schematics, or ones thought thru by leading edge engineers and industrial designers.

You are free to screenshot any data here.

If there is an interesting venture, or community concept (i am also a Rotarian and a former Jaycee (Junior Chamber International)) , please let me know.

Reply

Schael engel

July 24, 2015

Really interesting!

Reply

car loans interest

July 26, 2015

Hi my loved one! I want to say that this article is amazing, great written and come with approximately all significant infos.

I'd like to see more posts like this .

Reply

Frances

August 4, 2015

computingforsustainability.com has potential, you can make
your page go viral easily using one tricky method.
Just type in google:
Kelashy's Method To Go Viral

Reply

Wendell

November 4, 2015

About the Author: Steve P. younger is the Director of Product advertising
for SmartShoot in which marketers visit get stunning photos and video
clip from the best regional photographers and filmmakers.

Reply

Shelby

November 6, 2015

A maioria das pessoas que procuram remédio para emagrecer já fez algum tipo de dieta.

Reply

Juliane

November 7, 2015

Excellent article. I certainly love this website. Keep writing!

Reply

Aidan

November 8, 2015

Des outils adaptés sont mis à votre disposition afin de vous aider à
contacter / échanger avec les autres membres !

Reply

download facetime for android

December 1, 2015

The revamped aesthetic design is the result of the production process where thhe
device is being made from metal and strengthened glass, resulting in a smooth but durable
appearance.
If you are running the full screen video camera as well aas a wireless
internet connection, then the battery is going to be taxed pretty heavil
on the i – Pad 2. Even more fun is the fact that you don't
have to download your video to your Mac anymore for
edijting purposes.

Reply

Armando

December 2, 2015

Vous devez également vous entourer de gens qui sont également intéressés à perdre du poids.

Reply

Salina

December 6, 2015

s with Two Factor Authentication where the One Time Password is
generated and sent to the user via SMS or generated using a Hard Token (A small key which
generates a new password after specific
intervals of time. Hope these can help you for playing Mr jump, by the way, on our website we
also provide other free mobile game download, you can find the
veryb hot games in mobile game marketing by searching on our website.
For this tutorial, we will be using a virtualization method to install OS X on a PC.

Reply

comment pirater un compte facebook

January 7, 2016

I simply couldn't depart your web site prior to suggesting
that I really enjoyed the usual information an individual provide to your
visitors? Is gonna be back often to check up on new
posts

Reply

Monserrate Trevino

February 15, 2016

I know this web site gives quality dependent articles and extra data, is there any other web page which presents these stuff in quality?

Reply

christine

February 24, 2016

Hello! I've been following your blog for a long time now
and finally got the courage to go ahead and give you a shout out from Dallas Tx!
Just wanted to say keep up the great job!

Reply

dien dan rao vat nha dat

March 2, 2016

whoah this blog is wonderful i love reading your posts. Keep up the
good work! You realize, many individuals are looking around for this info,
you can help them greatly.

Reply

সুমন রহমান

April 5, 2016

How I can make a Sustainability tools/App for windows where I can put number and indicator shows the percentage with color. have any Software or idea to Develop?

Reply

41 Trackbacks For This Post

1. *Visualizing Sustainability | The Grove* →
   March 18th, 2009 → 5:35 am

[…] focusing on green business, sent me this amazing link to Computing for Sustainability's Visualizing Sustainability post. Here is just one of some three dozen illustrations of sustainability concepts, from simple to […]

2. *MappingIdeas.com » Explaining Sustainability with Graphics* →
March 18th, 2009 → 11:53 am
[…] Computing for Sustainability has done a wonderful job of collecting over 150 visual representations describing various topics on sustainability in their recent post – Visualising Sustainability. […]

3. *SusHI | Sustainability in Hawai`i » what does sustainability look like? on visualization* →
March 18th, 2009 → 12:45 pm
[…] One of the leading Kiwi sustainability advisers has compiled a kewl collection of images called "visualizing sustainability" that explores how to convey the essence of sustainability in a few sketched lines (via compsus). […]

4. *Elemental » Links for March 31st through April 6th* →
April 7th, 2009 → 12:01 pm
[…] Visualising sustainability « Computing for Sustainability – An incredible resource – 158 different visualisations of definitions of sustainability. I can't remember who send me this – thanks whoever it was. […]

5. *Otago Polytechnic's Simple Pledge: towards sustainable practice « Computing for Sustainability* →
April 27th, 2009 → 2:34 pm
[…] No Comments My compilation of images representing sustainability a few weeks back (goal, 158 approaches) was prompted by our desire to tell our story. The result is Otago Polytechnic's simple […]

6. *Extraordinary computing « Computing for Sustainability* →
May 12th, 2009 → 10:37 pm
[…] being even remotely religious (imagine my relief whenVisualising sustainability shot past my previous "most viewed post" Working with the integrity of creation to […]

7. *Handprints to panarchy: 20 more sustainability diagrams « Computing for Sustainability* →
May 26th, 2009 → 10:02 pm
[…] for Sustainability, visualisingsustainability No Comments Diverse lot to add to the collection this time – from the very simple (how did I miss the balance images so far?) to those […]

8. *Creatively, Sustainable… » 179 Visual Models of Sustainable Development* →
May 27th, 2009 → 5:04 am
[…] was caught by surprise when my Socio-ecological Model of Innovation appeared on Computing for Sustainability blog. It's #57 of 179 models, and it was specifically identified for its identification of […]

9. *Twitted by socialtechno* →
July 20th, 2009 → 12:11 am
[…] This post was Twitted by socialtechno […]

10. *Twitted by RealizeTheNext* →
July 20th, 2009 → 2:05 am

[…] This post was Twitted by RealizeTheNext […]

11. *JOELGEHMAN.COM » Blog Archive » Sustainability Visualizations* →
September 17th, 2009 → 3:44 am
[…] Here's an interesting post which has amassed a collection of 179 different attempts to visually communicate "sustainability." […]

12. *Visualizing Sustainability « The Butterfly Generation* →
September 20th, 2009 → 7:56 am
[…] picture of what the sustainability problem and concept are is probably one of them. The blog Computing for Sustainability has pulled together a very cool bundle of images and graphics that do exactly that. There are 179 […]

13. *150 Diagrames , Schémas du développement durable at As-map Blog* →
September 22nd, 2009 → 11:29 pm
[…] L'article initial : /visualising-sustainability/ […]

14. *CleanFuture » Many ways of Visualizing Sustainability* →
September 26th, 2009 → 4:25 am
[…] a look at Computing for Sustainability's collection "Visualizing Sustainability" for images and graphics to convey […]

15. *jenstory | Sustainability Sketched* →
October 10th, 2009 → 6:23 am
[…] the underlying science by compiling a "zillion diagrams". See the complete list at: Computing for Sustainability. Here are a few […]

16. *Visualizing Sustainability « Keeping Ahead of the Oil Curve* →
January 9th, 2010 → 5:04 pm
[…] a look at Computing for Sustainability's collection "Visualizing Sustainability" for images and graphics to convey sustainability […]

17. *SKMurphy » Verdafero Profiled by SJ BizJournal "Sustainability Planning Over the Web"* →
February 10th, 2010 → 8:05 pm
[…] Visualizing Sustainability a list of 138 different visualizations of sustainability. Hat tip to David Sibbet who notes "a full panorama from simple to complex, mapping onto every conceivable base map. I've contended for a long time that a sustainability mindset requires systems thinking, and that systems thinking requires visual thinking—even if the display is just between your ears. […]

18. *Thirty more sustainability diagrams « Computing for Sustainability* →
March 24th, 2010 → 1:40 pm
[…] visualisingsustainability Leave a Comment I'm working towards structuring the collection into a book (watch this space). I've almost got a framework sorted out, so this lot is […]

19. *Lots of diagram styles | virtualmv* →
March 31st, 2010 → 1:13 pm
[…] https://computingforsustainability.wordpress.com/2009/03/15/visualising-sustainability/ Create a free edublog to get your own comment avatar (and more!) […]

20. *Some puzzles, triangles and circles, a golden snitch and a pocket knife « Computing for Sustainability* →
May 13th, 2010 → 6:58 pm

[…] May 13, 2010 Some puzzles, triangles and circles, a golden snitch and a pocket knife Posted by Samuel Mann under Computing for Sustainability, visualise, visualisingsustainability Leave a Comment I'm filling holes on the framework so a slightly strange collection for the corpus. […]

21. *Lots of diagram styles « virtualmv.com* →
May 29th, 2010 → 10:36 am
[…] https://computingforsustainability.wordpress.com/2009/03/15/visualising-sustainability/ ..and more […]

22. *Green IT: Challenge for designers « Computing for Sustainability* →
June 20th, 2010 → 9:49 pm
[…] What images could we use to tell this story? As a start, I think that almost any of the diagrams in the collection could, with a bit of designerly sprucing and placed in a computing context, do a better job here at […]

23. *High level architecture of earth system models | Serendipity* →
August 12th, 2010 → 12:24 pm
[…] While looking for good diagrams, I came across this incredible collection of visualizations of various aspects of sustainability, some of which are brilliant, while others are just […]

24. *Visualising sustainability | Resilience Science* →
September 13th, 2010 → 3:59 pm
[…] Computing for Sustainability has a fascinating collection of conceptual diagrams of sustainability. The collection includes over 250 images. results from a google image search for sustainable development conceptual diagram […]

25. *Variants and a couple of precursors « Computing for Sustainability* →
October 11th, 2010 → 1:55 pm
[…] few more for the collection. Some variants and a couple of […]

26. *255 Visualisaties duurzame ontwikkeling « Stijn van Liefland* →
January 17th, 2011 → 9:58 pm
[…] ontwikkeling vast kan leggen in een simpele figuur. Het resultaat van zijn zoektocht mag er zijn, meer dan 255 visualisaties van het begrip duurzame ontwikkeling. Sommige geven een beeld van het abstracte begrip duurzame […]

27. *wiki's definition | Teacher Adriana Reyes* →
March 11th, 2011 → 5:07 pm
[…] also reveal a strong tension between ecocentrism and anthropocentrism. Many definitions and images (Visualizing Sustainability) of sustainable development coexist. Broadly defined, the sustainable development mantra enjoins […]

28. *Week 2 – Sending a Message about Sustainability « Aaron at Saint-Gobain* →
June 9th, 2011 → 6:44 pm
[…] an impressive collection of diagrams and graphics on Samual Mann's blog, but they don't seem appropriate for the readership of the USA […]

29. *The Taxonomy of Sustainability | cruxcatalyst* →
July 3rd, 2011 → 7:05 am

[…] humanity struggles to get to grips with the issues before it in the 21st century, a range of 'sustainabilities' are being defined and articulated – however all fall into two broad […]

30. *What are we doing?? - sustainability + mesustainability + me* →
October 19th, 2011 → 7:23 am
[…] up with? Well, if you found it a bit challenging to do so, then for inspiration, you might want to check out the incredible collection of how others have tried that was compiled by the folks at Computing […]

31. *marie.b | Pearltrees* →
January 17th, 2012 → 2:30 pm
[…] 2. OK, so there was a particular order, the strong sustainability circles had to go before the weaker (but much more common) Venn diagram, 3 circles (or triangles) This model is very very common (google search sustainability Venn). Visualising sustainability « Computing for Sustainability […]

32. *Running out of stuff « Wandering Gaia* →
February 23rd, 2012 → 2:24 am
[…] London: A lot has been written about sustainability – it's become fashionable in the past decade for everyone from marketeers and advertisers to policymakers, NGOs and world leaders to talk about the concept of sustainability in the way that they used 'eco' in the 90s. When a word is used this pervasively, it loses its meaning, so here's a – er – couple of hundred ways of looking at the concept, curtesy of Samuel Mann. […]

33. *Urban Systems: Integration and the Value of Intersections | PlaceShakers and NewsMakers* →
April 16th, 2012 → 5:35 pm
[…] if you'd like to dive head first into graphical representations of resilient practices, check out Sustainable Lens: a visual guide from Samuel Mann, which is precisely 255 ways to represent resilient human practices with […]

34. *Visualising sustainability « Think in a Blink* →
July 11th, 2012 → 2:17 pm
[…] on computingforsustainability.wordpress.com Share this:More Categories: Uncategorized | Leave a […]

35. *Visualising sustainability « Learning Sustainable Change* →
February 5th, 2013 → 11:26 pm
[…] Read […]

36. *Starfish Enterprises Network » Visualising Sustainability | Samuel Mann* →
June 5th, 2013 → 1:24 am
[…] Source: Computing for Sustainability Read more here… […]

37. *Ethical consideration for designers. | anotherdesignwebsite* →
December 19th, 2014 → 1:40 pm
[…] Fig 2: Product Lifecycle [Online Image]. Available From: https://computingforsustainability.com/2009/03/15/visualising-sustainability/ […]

38. *Sustainability Agenda and Sustainable Development | Contemporary Contextual Studies* →
February 5th, 2015 → 10:55 pm

[…] https://computingforsustainability.com/2009/03/15/visualising-sustainability/ […]

39. *Defining Sustainability |* →
July 7th, 2015 → 1:50 am
[…] times before. However, after Madan's talk, Berger assigned us a simple task. We had to look at this list of 255 ways to visualize sustainability and choose ones that were different but still valuable in the ways that they conveyed the […]

40. *Themes For Multiply.com | Powersun4* →
July 22nd, 2016 → 9:41 am
[…] Visualising sustainability | Computing for Sustainability – New (Dec 2011): "Sustainable Lens: A visual guide" published by NewSplash available through Amazon. How to convey the essence of sustainability in a few sketched lines? […]

41. *147 Connecting Economy Environment Society Sustainability Teaching Tip – mikileak.info* →
August 31st, 2016 → 3:55 pm
[…] Visualising sustainability | Computing for … – Amazing treasure trove of visuals for sustainability. I have been looking for this. I recently made a video called "Visualizing Sustainability" that is yet … […]