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2 **Section 2.4. Adaptation and Global Justice**

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6 **Section 2.4.2: Global Justice**

7 A relevant lens to use when considering the previously described forms of acceleration involves  
8 the issue of global equity/global justice. A good historical starting place comes from the 1996 World  
9 Commission on Environment and Development report [54] which states:

10 *The environment must be protected ... to preserve essential ecosystem functions and to provide the*  
11 *wellbeing of future generations; environmental and economic policy must be integrated; the goal of policy*  
12 *should be an improvement in the overall quality of life, not just income growth; poverty must be ended and*  
13 *resources distributed more equally; and all sections of society must be involved in decision making.*

14 There are two key concepts in this early report: 1) resources distributed more equally – this seems  
15 to be a vital need for achieving sustainability but currently we are rather far from this ideal. For  
16 example, the 2008 World Bank report [55] showed that for 2005, the world share of consumption can  
17 be broken down as follows:

- 18 • 75.6% is consumed by the Worlds' richest 20%
- 19 • 21.9% is consumed by the middle 60%
- 20 • 1.5% is consumed by the world's poorest 29%

21 This is anything but equal. An update to this situation is available from the 2013 Oxfam  
22 International Report and clearly shows inequality is rapidly rising. Indeed, that report claims we  
23 are moving toward a rather absurd situation in which the richest 1% of the world will own more  
24 than 50% of the world's wealth by the year 2016 (it will take some years to verify if this came true).  
25 In this situation, the richest 1% owns more wealth than the other 99%; the scale of inequality is thus  
26 staggering and every year the gap between the 1% and the rest widens. A useful visual  
27 representation of this is shown in Figure 21 where the land area of the world is converted to wealth:  
28 the bottom 50% (red) of the world owns only an area of the size of Mongolia; the middle 40% (red)  
29 can own most of the former Soviet Union; the remaining 10% (gold – naturally) owns all the rest.



30

31 Figure 21. Global conversion of wealth ownership into percentage ownership of the land surface. Colors are  
 32 described in the text.

33 The second point is that the quality of life has more importance than income growth. As long as  
 34 the personal perception of prosperity is related solely to income issues, which ultimately drive  
 35 consumption, then no move to sustainability is possible. This is one of the major challenges for the  
 36 more developed countries of the world – how to enlighten their citizens that the drive for steady  
 37 personal income growth is now less important than considerations which raise the probability of a  
 38 livable world for future generations. One potential litmus test involves our global attempts at CO<sub>2</sub>  
 39 stabilization. For instance, if policy advisors in the area of economics fundamentally believe that  
 40 increases in income growth or country GDP demand increasing fossil fuel burning then we clearly  
 41 have a clash of values if achieving this more livable world for future generations.

#### 42 Section 2.4.4 “Just” Sustainability

43 Our real-world behavior strongly suggests that we will live in the mechanical philosophy  
 44 system first championed by Descartes [66]. In that system, nature has no intrinsic value but serves  
 45 humans only as a resource. This must change. There is a strong need to make issues of equity and  
 46 social justice as prevalent as the issue of climate change. Sustainability is not about the more  
 47 efficient harvesting of resources, it’s about establishing a more equilibrium use of resources with  
 48 respect to the innate planetary cycles. This is well articulated here [67,68]

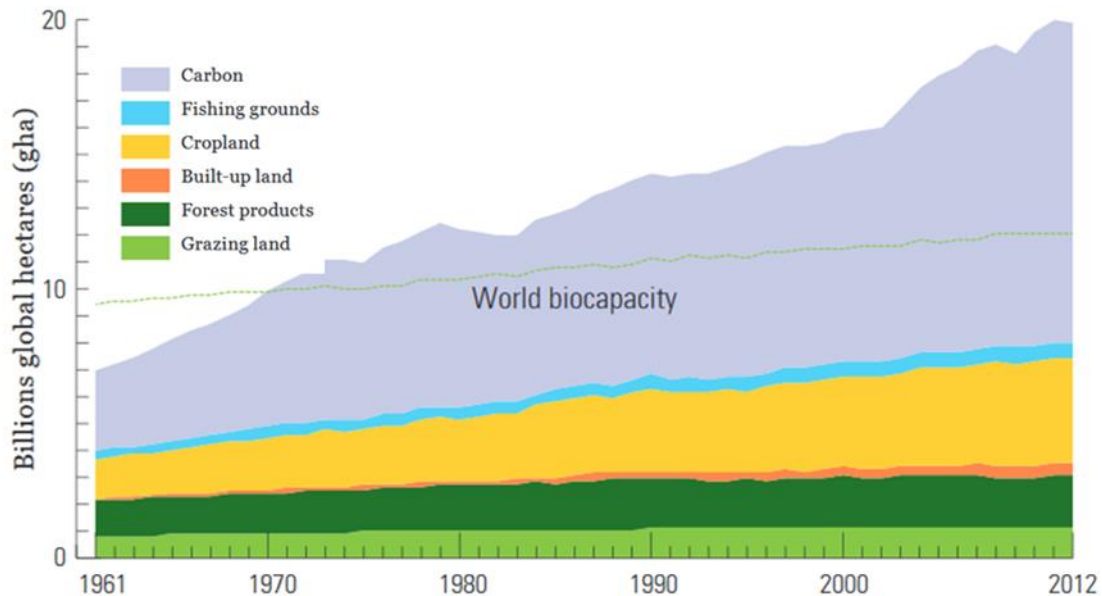
49 *“Sustainability cannot be simply a ‘green’, or ‘environmental’ concern, important though ‘environmental’*  
 50 *aspects of sustainability are. A truly sustainable society is one where wider questions of social needs and*  
 51 *welfare, and economic opportunity are integrally related to environmental limits imposed by supporting*  
 52 *ecosystems”*

53 *“The need to ensure a better quality of life for all, now and into the future, in a just and equitable manner,*  
 54 *whilst living within the limits of supporting ecosystems*

55 These two statements, which embody “just sustainability”, are in stark contrast to our systematic  
 56 heating of the oceans which has taken that system entirely out of equilibrium resulting in increasing  
 57 weather volatility. We are certainly not living within our environmental limits and are explicitly  
 58 and actively transcending them. As a result, we have invited disaster and are putting the entire  
 59 system in danger. This process of continually defining social needs by consumption leads directly  
 60 to a kind of social inequality that ultimately does significant damage to various social structures [69].  
 61 One of the frameworks for a just sustainability is then to replace consumption based social identity  
 62 with something considerably more meaningful.

### 63 Section 2.4.45 Overshooting Earth Boundaries

64 The most straightforward manner to characterize the rate at which we are living beyond our  
 65 environmental limits involves the concept of ecological debt and the global ecological footprint of  
 66 human resource use [70,71,72]. Tracking the evolution of this ecological debt with time has been  
 67 one of the principle outputs of the Living Planet Report [32]. Figure 23 offers the most recent view

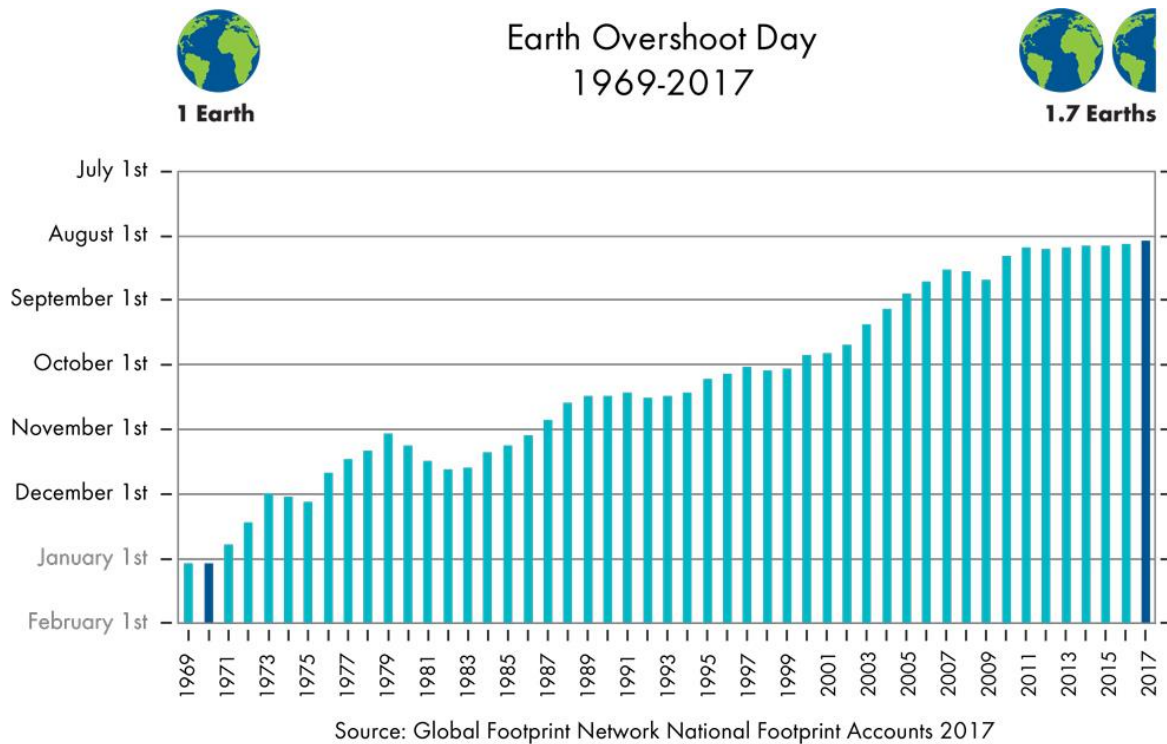


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69 Figure 23. Exceeding the world biocapacity on an annual basis. Image from the Living Planet Report 2016.

70 In Figure 23, the green line is the (slowly increasing) availability of Earth resources to support  
 71 annual consumption. If the total consumption were less than the green line, then we would be  
 72 consuming within our ecosystem limits. We have not been in this regime since 1970. Since 1970  
 73 we have been using Earth resources, on an annual basis, faster than they can be renewed. We are  
 74 effectively mining the Earth. Because of the presence of buffers (like the stored energy in fossil fuels)  
 75 in the system we can engage in this out of equilibrium behavior for some time. For example, we can  
 76 mine the ocean for decades, in the sense that we harvest more fish than the oceans can replenish.  
 77 But we have been engaged in this overshoot for 40 years by now and consequences in terms of  
 78 habitat and species loss are becoming noticeable [73]. The most direct manifestation of our  
 79 overshoot action is to displace Carbon from its natural earth reservoirs and relocate it to the  
 80 atmosphere where the accumulation is increasing as it cannot be removed as fast as we are  
 81 relocating it. Of particular note is the change in slope of the grey envelope occurring around the  
 82 year 2003 – this is when the Chinese economy emerged into the global consumer market and by 2006  
 83 GHG emission from China exceeded that from the US [74]. The economic meltdown of 2009 is but a  
 84 small blip in the overall increase. The small decreases in other particular years also mark short term  
 85 recessions (e.g. 1980-82 event), from which a quick recovery keeps us on the same escalating  
 86 trajectory, a situation that was first pointed out in 1972 [75] and well updated in 2009 [76].

87 The more colloquial way to represent the situation shown in Figure 24 is to use Earth masses for  
 88 the Y-axis. In this way our overconsumption is relative to how many Earth's would be needed to  
 89 provide resources for a particular year's consumption. Since we are in overshoot mode, then there  
 90 is the overshoot day, which is the day for a particular year when we have used more than 1 Earth  
 91 mass. Figure 24 represents our consumption data this way. For the current year, the overshoot  
 92 day was August 5 or day 216 of the year. Since that is approximately 60% of the year, then for the  
 93 full year we will use  $1/0.6 \sim 1.7$  Earth Masses.



94

95

Figure 24. Time history of Earth Overshoot day

96 Our demonstrable inability to consume within our global resource limitations clearly shows, as  
 97 Descartes originally argued, that the Earth is essentially a machine that offers us resources that we  
 98 can just use up. We simply do not acknowledge that our resources are finite and operate under the  
 99 implicit assumption that new technology will open up new resources. Indeed, there is some truth  
 100 to this idea as a variety of new (and old) techniques are still finding significant new deposits of oil  
 101 [77,78] with rapid plans for harvesting to maintain our dependence on fossil fuels through rapid  
 102 exploitation which continues our BAU trajectory. In turn this only serves to accelerate the overall  
 103 impact of climate change.

104

#### 105 Section 4: Summary Remarks

106 In this contribution we have used available data to support the view that most all forms of  
 107 global change are accelerating. We have also directly linked accelerating global consumption with  
 108 the observed accelerated ocean heating that in turn drives the overall climate system that determines  
 109 the regional severity of weather. Since the oceans are an enormous buffer in the system, that  
 110 buffer can accumulate various inputs until it is saturated. The data shown in section 2.1 indicates  
 111 that the rate of change of our climate system has now entered the non-linear regime, which is a direct  
 112 physical expectation for any system whose buffers have been saturated. In view of these more  
 113 rapid changes, climate change policy must become more aggressive. However, we have also  
 114 shown a very large differential in the ability for individual countries or regions to enact effective  
 115 steps against the rise of climate change. This has put us in the situation where we have created a  
 116 problem over a relatively long timescale (since the industrial revolution) which now requires a  
 117 solution implemented over quite a short timescale (a couple of decades) but we likely have  
 118 inadequate resources to make the requisite investments. But more telling is our collective failure to  
 119 adopt a proper global view in how we treat the planet and its resources. Currently, this failure  
 120 goes by the buzzwords of "environmental justice" or "ecological debt" or "global justice". While

121 these are laudable concepts there still is too little collective action on the ground that honors the need  
122 to adhere to these concepts as a hallmark of being better stewards of our planet.

123 The concept of justice is complex and nuanced [119] and was likely first mapped onto the idea  
124 of environmental justice in 1999 [120]. The meaning of environmental justice [121] is now widely  
125 discussed and has now expanded to the domains of climate justice and ecological debt [122,124]  
126 While this issue maybe complex and nuanced, it does seem to distill to one reality – the Earth’s  
127 climate and energy resources should be equally available to all its citizens if we truly have a just  
128 global society. Data clearly shows this is quite far from the case and differential consumption of  
129 resources, by individuals and countries, leads to the kind of enormous inequity discussed in section  
130 3.1.1. As long as the global playing field remains in this extremely unlevelled situation, progress on  
131 important environmental issues is likely to be strongly impeded. Moreover, it should be clear that  
132 we truly live in a world of finite resources to support escalating global consumerism. If, de facto,  
133 this is our collective priority then our end result lies in accelerated climate change, which the data  
134 suggest is now happening. No improved technology with more efficient resource extraction will  
135 overcome the basic problem that our current value system is skewed too much towards economic  
136 growth and too little toward the more fundamental values of environmental justice, social justice,  
137 equity and dignity for all the citizens of the Earth.

#### 138 **Section 4.1: The Insanity of maintaining Business as Usual**

139 Our collective value system and decision making needs to move away from purely economic  
140 considerations and towards a moral viewpoint that includes the overall cost of our choices. But  
141 why is a change in value system away from consumption and towards sustainability so difficult.  
142 To conclude we delve into this dilemma by using a well-known rubric in the business world for why  
143 the business culture cannot change.

- 144 1. There isn't any real need for the change
- 145 2. The change is going to make it harder for them to meet their needs
- 146 3. The risks seem to outweigh the benefits
- 147 4. They don't think they have the ability to make the change
- 148 5. They believe the change will fail
- 149 6. Change process is being handled improperly by management
- 150 7. The change is inconsistent with their values

151 Let’s now briefly map these 7 reasons onto various kinds of quick reactions against changing our  
152 cultural consumption habits; these reactions are the kind that are made in a data vacuum

153 1. Maps to: There is no evidence that suggests our current consumption habits are  
154 damaging in any way; consumption produces a better standard of living – why change that?

155 2. Maps to: Reducing material and energy consumption will significantly compromise my  
156 current lifestyle. Furthermore, since there is no evidence that compels me to make such a  
157 change, why would I/we do it?

158 3. Maps to: My short term economic security is far more important than any long-term  
159 benefit for the planetary ecosystem

160 4. Maps to: I am an individual, what can I do to make any impact?

161 5. Maps to: Since there is no evidence that changing our consumption habits will have any  
162 positive effect then any such mandate to change will surely fail and have significant negative  
163 consequences.

164 6. Maps to: We don't trust our government to make a fair set of regulations. We don't trust  
165 scientific advisors to the government to be unbiased. All policy recommendations serve only  
166 self-interests.

167 7. Maps to: We are not part of nature; we control nature; nature does not control us. We  
168 are not in partnership with nature. Nature is a machine that we are entitled to us as we are  
169 indeed "masters and possessors of nature" [124].

170 Well that certainly is a daunting list but it does seem to be a succinct expression of the basic obstacles  
171 that we, as individuals, communities or nations face in trying to change our consumptive waves to  
172 better combat emerging climate change. Of this list, point number 7 is key – we must change our  
173 value system away from economic gain and towards the notion that global equity and dignity as  
174 well as preservation of biodiversity and overall environmental health are more important. In a very  
175 real sense we must collectively regain the notion that the Earth is sacred and we need to respect its  
176 boundaries, not conquer them. And yet on the ground behavior is very much related to conquering  
177 nature: blowing the tops off of Appalachian Mountains to mine coal; drilling for possible oil  
178 located under 5000 feet of water and 15,000 feet of marine sediments (e.g. Deep Water Horizon).  
179 These are acts of desperation to maintain BAU. Drilling a 20,000-foot-long pipe into the ground, for  
180 instance, to sustain personal vehicle transportation while accelerating climate change, is likely  
181 insane and echoes an earlier and appropriate commentary by Mate [125]:

182 *We seldom consider how much of our lives we must render in return for some object we barely want,*  
183 *seldom need, buy only because it was put before us...And this is understandable given the workings of*  
184 *our system where without a job we perish, where if we don't want a job and are happy to get by we are*  
185 *labeled irresponsible, non-contributing leeches on society. But if we hire a fleet of bulldozers, tear up*  
186 *half the countryside and build some monstrous factory, casino or mall, we are called entrepreneurs,*  
187 *job-creators, stalwarts of the community. Maybe we should all be shut away on some planet for the*  
188 *insane. Then again, maybe that is where we are.*