Sustainable development as practical intragenerational and intergenerational justice: interpretations, requirements, and indicators.

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1. Introduction

Sustainable development (SD) is not a theoretical or purely philosophical conception of justice. It is a global political objective based on some informal intuitions regarding intra- and intergenerational equity and the strong feeling that owing to the limits of nature and the environment we can bear in mind only moderate ambitions in both respects. Actually, what is specific to SD, and which probably explains its astonishing success is that it focuses on the relationships between economic growth and the environment at the global level as a concern both of inter- and intergenerational equity.

The importance of the environment for human existence and welfare and the uncertainties about the limits it sets on the satisfaction of our material needs explain why SD is above all concerned with production and consumption patterns whose ecological efficiency and social equity it attempts to improve. However, as many after Jacobs (1999) have argued, SD is still a contestable concept. It allows many different interpretations notably concerning its precise requirements in terms of equity and how the likely trade-offs between the demands of its intragenerational and intergenerational conceptions of justice are to be dealt with. In what follows I discuss this issue as a problem of allocation of aggregate income between consumption (intragenerational dimension) and saving (intergenerational dimension). My opinion is that what characterizes SD’s solution of this long standing issue is its insistence on the priority of needs and of needs satisfaction in a just allocation of income between current and future generations. More exactly, it is argued that if SD can actually be interpreted as sufficientarian, prioritarian or even equalitarian, it cannot do without the distinction between needs and wants or desires, which is the building block of its strategy for arbitrating conflicts between intra and intergenerational equity requirements. This being said, I try to show how two indicators although frequently opposed one to the other can together help in orienting SD policies. The first, called Genuine Saving, can be mobilized for meeting SD requirements in terms of sustainability (intergenerational equity), while the second (called the Ecological Footprint) could help in discriminating between satisfaction of legitimate needs or of less legitimate wants.

2. What Brundtland really said…

The Brundtland report (WCED 1987) - in which the idea of SD was exposed at length for the first time - as well the various declarations and political agreements that followed, mainly at the UN Conference on Environment and Development held in Rio in 1992 (the Rio Declaration on Environment and Development, the two conventions on Climate Change and on Biodiversity and Agenda 21), are far from clear with respect to the ethical foundations and the exact requirements of sustainable development. This has to do with the fact, firstly that

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1 Actually WCED(1987:43) doesn’t incriminate the environment as such but “the limitations imposed by the state of technology and social organization on the environment’s ability to meet present and future needs”. This a strange formulation: it is not with the state currently reached at of technology and social organization that future needs will have to be met but with (hopefully) more productive and effective ones.
SD doesn’t claim to be a full-fledged theory of justice but only a political agenda to which existing governments could commit themselves and, secondly, that it aims at gluing together concerns with the future and with the present. Knowing that both intragenerational and intergenerational justice taken separately still pose some hard (if not intractable when for example variations in the size of the considered populations are taken into account) philosophical and political problems, it is not surprising if a doctrine that try to “rivets together the major concerns of inter- and intragenerational justice” (Benton 1999:202) lacks the elegance and consistency of a well-formed ethical theory.

According to Sen (2002:1) SD, at least from a cognitive point of view, is perhaps nothing more than “an starting point for simultaneously considering the future and the present” but, as he acknowledges, it is nonetheless an “illuminating and powerful” one. Indeed, SD remains open to interpretation. At first glance, the most obvious is the sufficientarian one (Gosseries 2005). It is amply supported by the most oft-cited definition of SD as “development that meets the needs of the present without compromising the ability of future generation to meet their own needs” (WCSD, 43). But a more thorough reading of the Brundtland report shows that:

- It is confused about the very definition of needs. At some places, needs are characterized as “basic” or “essential” while at others they refer to more than material needs (going as far as including aesthetical needs) as in the following sentence: “Sustainability requires views of human needs and well-being that incorporate such non-economic variables as education and health enjoyed for their own sake, clean air and water, and the protection of natural beauty”. (WCED, 53).

- It argues for more than just needs satisfaction. At several places, it is also question of “meeting the needs and aspirations” (WCED, pp.40, 43,) or of «meeting the basic needs of all and extending to all the opportunity to fulfill their aspirations for a better life” (WCED, p.8). The following sentence is even more explicit and elaborates somewhat on the distinction between aspirations and basic needs:” The satisfaction of human needs and aspirations is the major objective of development. The essential needs of vast numbers of people in developing countries – for food, clothing, shelter, jobs – are not being met, and beyond their basic needs these people have legitimate aspirations for an improved quality of life”. (WCED, p.8).

Actually, much of the ambiguity about the objectives of sustainable development is justified by the uncertainties about what the environment is able to support, now and tomorrow. SD is first of all committed to eradicate poverty today and ensure that everyone now and in the future will be able to satisfy at least its essential human needs. Of course, it is preferable, if possible, to satisfy aspirations, expand opportunities and decrease inequalities rather than just satisfy essential needs but nobody really knows what options the current and foreseeable states of our environment actually leaves us. So, taking into account the strain that even a minimalist but effective global justice policy would exert on the environment, SD is first of all directed at making possible that future generations will simply exist.

Far from clarifying these issues, the political declaration agreed upon at the Rio Conference makes things even more complicated. For example, the fifth and sixth principles of the solemn “Declaration on Environment and Development” state that:

"All States and all people shall cooperate in the essential task of eradicating poverty as an indispensable requirement for sustainable development, in order to decrease the disparities in standards of living and better meet the needs of the majority of the people of the world”. (Principle 5).
“The special situation and needs of developing countries, particularly the least developed and those most environmentally vulnerable, shall be given special priority”. (Principle 6)

Clearly, the sixth principle supports a prioritarian interpretation of SD as addressing by priority the situation of the least well-off countries (Principle 6). As a matter of fact, the Millenium Objectives for Development adopted in 2000 are the first really operational implementation of this prioritarian stage of SD. But principle 5 mixes sufficientarian and egalitarian objectives, legitimating an interpretation of SD as a kind of “needs-satisfaction egalitarianism” Indeed, as Norman (1992, p.144) put it in his discussion of basic income: "There is an obvious intuitive plausibility in the idea that if all people have enough to eat, are housed and clothed, are healthy, and (perhaps more problematically) have been educated up to the level necessary for them to participate fully in their society, they are in these respects in condition of equality. A society in which this had been achieved would one might think, have made a substantial advance in direction of equality”. Especially so, one would add, if we replace “society” with “world” in the last sentence...

Thus, from an intra-generational point of view, one could support a needs-satisfaction egalitarian conception of SD, all countries being more or less equals in their opportunities to satisfy the needs of their population. This can be stated in Roemer’s (1998) conception of equal-opportunity policies bearing on the distinction between circumstances and effort as the factors influencing individuals’ outcomes. As defined by Roemer, “circumstances” are the attributes of the person’s environment for which she should not be held responsible and “effort”, the choice variable for which she should be. Building on this distinction, Roemer characterizes an equal-opportunity (EOp) policy as an intervention (e.g., the provision of resources by a state agency) that makes it the case that all those who expend the same degree of effort end up with an equivalent outcome, regardless of their circumstances. Thus, EOp policies are geared at compensating individuals for the disadvantages for which they are not responsible (unfavorable circumstances) by giving them the additional resources necessary for neutralizing the effects of these unfavorable circumstances.

If it is possible to generalize Roemer’s theory at the international level, then SD could claim to be an equal-opportunity policy aiming at making the case that at equivalent level of effort, opportunities for need satisfaction should be as equal as possible between countries. This would entail compensating countries for the differences in the needs-satisfaction of their population attributable only to the circumstances they face. By the way, it is more or less what already happen when a country is victim of a natural disaster such as a drought, an earthquake or a tsunami. But circumstances should not be restricted to bad luck events like natural hazards, they should include many others more structural factors such as a colonial historical background, unfavorable climate or geographical situation, lack of resources, etc. I am aware of the difficulties (if not the impossibility) of evaluating circumstances at the country level. It would require normalizing, weighting and aggregating many and deeply incommensurable factors. It is easier to go the other way round, by assessing the efforts made. It might be possible to build an index of (public) efforts by adding up public expenditures in education, justice, health care, housing, human rights enforcement, environmental protection, water sanitation and other public services, children and family allowances, doles and transfers

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2 It is also a bit strange to present the fight against poverty as purely instrumental with respect to SD.
3 A maximin version of this would be that at an equivalent level of (public) efforts, the least well-off should have a more or less equal level of need satisfaction.
4 SD is concerned with equal opportunities between and inside countries. In the name of it, governments are committed to compensate for individual and social disadvantages inside their own borders.
5 Independently of any requirement of some compensatory justice.
to disabled, retired and unemployment, etc. The index would then be divided by the population and expressed as a proportion of the GDP per capita.

The problem is different with respect to the intergenerational dimension of SD. It is obviously impossible to compensate *ex ante* future generations for facing possible unfavorable circumstances. All can be done here is trying to make the case that the circumstances they will face will be as favorable as possible, *within the limits of what is required by intragenerational equity*. This is more or less what Barry calls the principle of responsibility: “unless people in the future can be held responsible for the situation that they find themselves in, they should not be worse off than we are. And no generation can be held responsible for the state of the planet it inherit” (Barry, 1999, 106).

SD is thus committed to ensure that future generations should not face circumstances such that they would have to make more effort than ourselves to be at least as well-off as we were, once reached the SD objective of intragenerational equity. Practically, it means that every generation could benefit from any level of well-being compatible with the following requirements:

1° Everyone has a good enough threshold level of what is necessary for quality of life (or for a life of quality?)

2° “Circumstances” left to future generations are such that they could reach the same level of quality of life with no more effort than what the preceding one had to expend.

What is important here is only to make sure that the circumstances will not be the limiting factor hindering the possibility for future generation to reach a good enough threshold of lifetime well-being. It is up to them to expand less effort if they want to insofar as they don’t do it at the expense of the circumstances they leave for their successors.

3°. Sustainable development as income allocation between consumption and saving

In order to get a clearer picture of how SD sees the relationship between intra and intergenerational equity, it can be useful to make use of a few very simple formulas.

Let $Y_t = f(K_t)$. Income ($Y$) is a function of aggregate capital only. In other words, the only limiting factor to income generation is capital ($K$).

Let $S_t$ represents the individual level of consumption corresponding to basic needs satisfaction for generation $t$ and $C_t$ represents its actual consumption. Let us call “want satisfaction” the surplus of $C_t$ on $S_t$ (if any) and the deficit of $C_t$ with respect to $S_t$ the “needs satisfaction gap”.

Let $N_t$ be the population of generation $t$. Actual overall consumption is therefore $C_tN_t$ while the level of income necessary for satisfying needs is $S_tN_t$.

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6 And subtracting military expenditures.
7 Be they primary goods (Rawls 1971), basic capabilities (Alkire 2001), basic needs (Braybrooke 1987, Doyal & Gough 1991) or what Barry refers to as “vital interests”, that is “objective requirements for human beings to be able to live healthy lifes, raises families, work at full capacity and take part in social and political life.” (Barry, 1999, 97).
8 Adam and Eve, before they were banished from paradise, faced circumstances such that they could enjoy maximum leisure (no effort at all) and sufficient levels of satisfaction of essential needs, except for knowing and understanding.
9 This leaves room for an evolution in the definition of basic material needs according to productivity, size of population and level of civilization.
Let $K_{t+1} = K_t + I_t$. Aggregate capital available for the generation $t+1$ is the capital available for the preceding generation plus (minus) additions (subtractions) brought about by it, symbolized by $I_t$. For the sake of simplicity we don’t take into account the depreciation of capital.

By definition, $I_t = Y_t - C_t$. It can be positive (savings) or negative (dis-savings).

There are three possibilities concerning the relation between generated income and needs satisfaction, keeping in mind that the level of outcome, by hypothesis, doesn’t depend on the level of effort expended by generation $t$ but only on the level of aggregate capital and/or circumstances for which it cannot be help responsible. Generated income can be just sufficient, insufficient or more than sufficient for enabling everyone to satisfy its essentials needs. It is implicitly assumed that governments are committed to redistribute the national revenue so as to ensure that nobody is unable to meet its essential needs insofar as it is sufficient for it. For the sake of simplicity, it is also assumed that $N_{t+1} = N_t$ in other words that generation $t$ just reproduces itself. What matter here are productive assets per capita so if generation $t$ wants to raise more children than the preceding one, it is up to it to save accordingly.

The symbols following “Intra” and “Inter” are easy to understand: ‘=’ means that equity is satisfied at the sufficientarian level, ‘-’ that is unsatisfied and ‘+’ that it is satisfied at a higher level than what sufficientarian justice would require.

1° $Y_t < S_tN_t$ (income is insufficient for needs satisfaction).
   1.a. $C_tN_t = S_tN_t$ $\Rightarrow$ $I_t = K_t - (S_tN_t - Y_t)$ $\Rightarrow$ $K_{t+1} = K_t - I_t$ Intra = Inter – Generation $t$ dis-saves in order to meet its essential needs. Future generation will be left with reduced assets (and will be also unable to satisfy its own needs).
   1.b. $C_tN_t = Y_t$ $\Rightarrow$ $I_t = 0$ $\Rightarrow$ $K_{t+1} = K_t$ Intra - Inter =\-
   Generation $t$ doesn’t dis-save and therefore doesn’t satisfy its essential needs. It sacrifices itself for the sake of next generation.

   1.c. $C_tN_t > S_tN_t$ $\Rightarrow$ $I_t = K_t - (C_tN_t - Y_t)$ $\Rightarrow$ $K_{t+1} = K_t - I_t$ Intra + Inter – Generation $t$ dis-saves for more than just satisfying its essential needs and do it at the expense of future generation.
   1.d. $Y_t < C_tN_t < S_tN_t$ $\Rightarrow$ $I_t = K_t - (C_tN_t - Y_t)$ $\Rightarrow$ $K_{t+1} = K_t - I_t$ Intra- Inter -
   Despite significant dis-savings, generation $t$ is still unable to meet its essential needs.

2° $Y_t = S_tN_t$ (income is sufficient for needs satisfaction)
   2.a. $C_tN_t > S_tN_t$ $\Rightarrow$ $I_t = K_t - (C_tN_t - Y_t)$ $\Rightarrow$ $K_{t+1} = K_t - I_t$ Intra + Inter –
   Same situation than in 1.c.
   2.b. $C_tN_t = Y_t$ $\Rightarrow$ $I_t = 0$ $\Rightarrow$ $K_{t+1} = K_t$ Intra = Inter =
   Generation $t$ uses all the income for satisfying its needs but doesn’t dis-save.
   2.c. $C_tN_t < S_tN_t$ $\Rightarrow$ $I_t = K_t - (Y_t - C_tN_t)$ $\Rightarrow$ $K_{t+1} = K_t + I_t$ Intra - Inter +

3° $Y_t > S_tN_t$ (Income can provide for more than basic needs satisfaction)
   3.a. $C_tN_t = Y_t$ $\Rightarrow$ $I_t = 0$ $\Rightarrow$ $K_{t+1} = K_t$ Intra + Inter =
   Generation $t$ consumes all the income and doesn’t add to the stock of productive assets.
   3.b. $C_tN_t = S_tN_t < Y_t$ $\Rightarrow$ $I_t > 0$ $\Rightarrow$ $K_{t+1} = K_t + (Y_t - C_tN_t)$ Intra = Inter +
   Generation $t$ doesn’t consume all the income and adds to the stock of productive assets.

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10 It is supposed that $K_t \geq S_tN_t - Y_t$
3.c. $C_t N_t > Y_t \Rightarrow I_t < 0 \Rightarrow K_{t+1} = K_t - (Y_t - C_t N_t)$ \hspace{1cm} Intra + Inter -

Generation $t$ consumes more than the generated income at the expense of next generation.

3.d. $S_t N_t < C_t N_t < Y_t \Rightarrow I_t > 0 \Rightarrow K_{t+1} = K_t + (Y_t - C_t N_t)$ \hspace{1cm} Intra+ Inter +

Generation $t$ consumes more than what is necessary for need satisfaction but less than its income.

Which cases does SD authorize, which does it prohibit? I think it authorizes 1.a., 1.d. 2.b. and 3.a. and prohibits 1.b., 1.c., 2.a., 2.c and 3.c. Cases 3.b. and 3.d are problematic unless one takes into account the existence of countries in situations 1 or 2, as will be shown later.

In other words, SD prohibits sacrificing needs satisfaction of current generation for the sake of future ones but also sacrificing needs satisfaction of future generations for the sake of wants satisfaction of current ones. In sum, SD holds that today’s needs trump tomorrow’s wants, that tomorrow’s needs trump today’s wants and that today’s needs trump tomorrow’s needs. It is unclear if tomorrow’s wants trump today’s one (the reason why situation 3.b. is problematic). However, the lesson from the different variants of situation 1 ($Y_t < S_t N_t$) is that if capital is the only limiting factor and is insufficient then there can be no intergenerational justice without a phase of accumulation and of compulsory savings like in Rawls’s phase 1 and this occurs necessarily at the expense of the first generations (Gossseries 2004). As a matter of fact, this is the exact situation of many underdeveloped countries today.

As Table 1 shows, most developed countries are in a kind of 3.d. situation. It can therefore be argued that, as long as the cause of situations of type 1 is a lack of productive assets ($K_t$ insufficient), SD asks for countries in situation 4 to transfer resources to countries in situation of type 1, instead of increasing the stock of capital bequeathed to their descendants.

On the other hand, the only policy compatible with SD for countries in situations 1.a., 1.b and 1.d. is to reduce fertility under the replacement level in order to increase the value of capital per capita.

To conclude on this:

1. SD cannot do without the knowledge of $S$, the adequate level of (material) need satisfaction. Indeed, what makes situation 1.a. acceptable and situation 2.a. unacceptable is that in the former $C_t = S_t$ while it is not the case in the latter. So in promoting SD one cannot eschew the difficult problem of the difference between needs and wants.

2. In order to assess SD it is necessary to know the sign of the ratio $K_{t+1}/K_t$ (growth rate of capital) or –what amounts to the same- the sign of the saving rate ($I_t/Y_t$) and the sign of the ratio $C_t/SN_t$. This means that neither alone is sufficient.

4. Evaluating the saving rate: the genuine saving

So, an adequate indicator of saving is indispensable for assessing the intergenerational equity dimension of SD. This raises a lot of (largely unresolved) issues going from very fundamental ones (what is to be saved, exactly) to more empirical (availability of data, measurement problems, normalization and aggregation issues, etc.). The best candidate to date is probably

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11 Needless to say, SD advocates don’t show much consideration for the non-identity problem…

12 EO policies aim at compensating unfavorable circumstances, not lack of effort. Likewise, the level of obligations of the rich countries towards the poor could depend also on the circumstances faced by the former. To take an example, it could be argued that Norway’s obligations in Official Development Assistance (ODA) must be (proportionally) greater than, say Switzerland’s ones, because the former faces more favorable circumstances (in terms of natural resources) than the latter.
the genuine saving (GS) indicator worked out by the World Bank (Hamilton and Clemens 1999, World Bank 2006). It consists in aggregating monetary evaluations of annual changes in three different assets: produced (economic) capital, human capital and natural resources. More precisely it is computed as follows:

Genuine Saving = Gross domestic saving - Consumption of fixed capital + Education expenditure - Energy depletion - Mineral depletion - Net forest depletion - Carbon dioxide and other pollutants damage.

Table 1 shows the genuine savings rates for a sample of countries.

<table>
<thead>
<tr>
<th>Country name</th>
<th>Gross national saving</th>
<th>Consumption of fixed capital</th>
<th>Net national saving</th>
<th>Education expenditure</th>
<th>Energy depletion</th>
<th>Mineral depletion</th>
<th>Net forest depletion</th>
<th>PM$_{10}$ damage(*)</th>
<th>CO$_2$ damage</th>
<th>Genuine saving</th>
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Source: World Bank 2006b. (*)PM$_{10}$ = population-weighted average of particulate matter less than 10 microns in diameter.

For the World Bank, a country whose genuine saving is negative is said to be on an unsustainable path. The rationale is this: welfare can be sustained indefinitely if gross saving just equals the sum of depreciation of produced assets, depletion of natural resources, and pollution damages. This is the well-known Hartwick rule. A persistently negative genuine saving rate implies that a country is on an unsustainable path and welfare must fall in the future. What is striking in the figures is that most (if not all) of the third world countries are on this unsustainable path while not being able to satisfy the essential needs of a majority of their population. Referring to our formulas above, they are in the 1.d. situation where even huge dis-savings aren’t sufficient for satisfying needs. On the contrary, all First World countries of our sample are in a 4.d. situation characterised by high saving rates and more than just need satisfaction of their population. The case of China is different and probably

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13 Except for social capital.
14 This holds only for a stationary population.
representative of the communist conception of justice which tolerates scarifying current
generations for the advent of a beaming future: though 46.7% of its population have to live
with less than 2$ per day (World Bank 2005), it is saving nearby one quarter of its income.
Therefore, according to the World Bank criteria, it would certainly be considered sustainable.
However, its situation corresponds to our 2.c or 3.e. cases, which in our interpretation of SD
would be prohibited.

The measure is far from perfect, however. It rests on a fundamental yet questionable
postulate: that it is always possible to substitute (at the margin) man-made capital to natural
capital and therefore to compensate losses of environmental resources with additional human
or produced resources insofar as a sufficient package of aggregate productive resources is
passed on. This is known in SD literature as “weak sustainability”. It contrasts with strong
sustainability” which holds that natural resources should receive a special status and cared for
independently of the other forms of resources and revenues. We will not enter in this
discussion here except for observing that as Neumeyer (2003) convincingly argues, science
cannot unambiguously support either position because they are non-falsifiable in the current
state of knowledge. It is therefore reasonable to adopt a more precautionary policy: don’t
consume more of renewable resources than their maximum sustainable yield, be as
parsimonious as possible with exhaustible resources, if possible replace them with renewable
ones, invest as much a possible in R&D on technologies of substitution and, meanwhile, act
as if they were not to be available before long. Furthermore, some natural resources are
ontologically non-substitutable for their very value is precisely their purely “natural nature”,
the fact that man has no part whatsoever in their existent (wilderness, natural scenery, etc.).
This amounts more or less to endorse Wissenburg’s (1999:193) extension to the “Rawlsian
Saving Principle”: “no goods shall be destroyed unless unavoidable and unless they are
replaced by perfectly identical goods; if that is physically impossible, they should be replaced
by equivalent goods resembling the original as closely as possible; and if that is also
impossible, a proper compensation should be provided.” Can formal education be such a
compensation? As Table 1 shows expenditures in education amounts to about 50% of the
genuine saving of countries such a Canada, Chile, Denmark, Sweden and USA and even more
for UK or Indonesia. But it could be argued that an important proportion of the formal
education now necessary comes form the fact that the more accessible environmental
resources (“low hanging fruits”) have been exhausted and that the remaining one are so
difficult to exploit that special skills and know-how (and a very complex social organisation)
have become indispensable. Indeed, once all the low-hanging fruits have been eaten, you have
to learn to climb in the tree if you want to get fed as before. Moreover, in more advanced
societies, education is for some part a positional good and it is difficult to believe that
positional good can compensate for environmental resources. One suspects that we are more
or less in a kind of Red Queen situation: "in this place it takes all the running you can do, to
keep in the same place.” (“Through the Looking Glass”)

There are other disturbing problems with the GS. One of them has to do with the under-
pricing of natural resources due to insufficient or un-enforced property rights in Third (and
Second) World countries, which are their principal producers (Chichilnisky 1994, Dasgupta
2002). As a consequence, they are induced to overexploit them in order to try to satisfy their
essential needs while the First World countries, on the other hand, can over-consume them
and still save an important proportion of their income.
5. Assessing need satisfaction: the ecological footprint

As argued here above, positive savings rate are legitimate only if it is not at the expense of the satisfaction of current generations’ needs. Likewise, wants can only be legitimately satisfied if everyone’s essential needs are already met. In order to assess sustainability, it is therefore necessary to distinguish between needs and wants satisfaction. Because SD is concerned with material needs and wants, i.e. those whose satisfaction consumes environmental resources (matter and energy), it would be convenient to express them directly in environmental terms, for instance, in terms of ecological footprint.

The ecological footprint indicator claims to be a measure of the part of earth’s carrying capacity spent in the material consumption of a country, a town, a firm or a household. It calculates “how much of the annual regenerative capacity of the biosphere, expressed in mutually exclusive hectares of biologically productive land or sea area, is required to renew the resource throughput of a defined population in a given year—with the prevailing technology and resource management of that year.” (Wackernagel et al., 2005, 4). Ecological Footprint accounts express the use of built-up areas, and the consumption of energy and renewable resources—crops, animal products, timber, and fish—in standardized units of biologically productive area, termed global hectares. Each global hectare represents an equal amount of biological productivity i.e. the average productivity of the 11.2 billions bioproductive hectares on Earth. EF is computed by identifying all of the individual items—goods and services—and amounts thereof, that a given population consumes then by assessing the Ecological Footprint of each component using life-cycle data that track its resources requirements from extraction to waste disposal, from ‘cradle to grave’. The EF is sometimes expressed as the number of earths that would be necessary if the world population adopted the consumption pattern of such or such country. For instance, should everyone on earth adopt the American way of life, 5.3 planets would be necessary. On the contrary, if everyone lived like an Indian, less than half a planet would suffice. All in all, if the figures are right, we are already consuming 1.2 planets. In other words, we are on an unsustainable path

I am not interested here with the technicalities of the EF computation. It has been abundantly discussed and some of its drawbacks are well known\(^\text{15}\). It is clear that it can probably be improved on many aspects. Amongst others, the way carbon dioxide emissions are incorporated is hugely contestable\(^\text{16}\) and knowing that it enters for about 50% in the total footprint, it should either be removed from the indicator - taking into account the fact that the problem is already addressed by the United Nations Convention on Climate Change and the Kyoto protocol - or more adequately tackled.

<table>
<thead>
<tr>
<th>Country name</th>
<th>Total food, fibre and timber footprint</th>
<th>Total energy footprint</th>
<th>TOTAL FOOTPRINT</th>
<th>Human Development Index</th>
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<tr>
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<td>0.499</td>
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<td>6.4</td>
<td>0.937</td>
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</table>

\(^{15}\) See the discussion Ecological Economics, 2000, vol.32, pp341-394.

\(^{16}\) It translates them in the surface of forests necessary to absorb them.
Table 2 shows the EF of the same sample of countries that in Table 1. The figures should not be taken without reserves but they convey nonetheless valuable information. For instance, that it is possible to reach more or less the same level of welfare (as measured by the Human Development Index) with rather different EF. The differences between Indonesia and Nigeria for instance, or between United States and Switzerland are illuminating in that respect. That different countries can reach almost equivalent levels of welfare with so different EF, means that some countries use more efficient technologies for needs and want satisfaction than others. The first objective of any SD policy is to make the case that every country uses the best available technologies, taking account of its specific resources and constraints. However this will not suffice. A variable portion of the total EF of each country must go to the consumption of environmental luxury goods, or mere want satisfaction. It should be possible to identify for every country the number of global hectares (at the household or individual level) corresponding to what people consider an acceptable level of needs satisfaction, above which no significant increase in well-being is achieved (or with decreasing marginal utility) and such that all additional global hectares consumed could be considered as going to the satisfaction of inessential (and not universalisable) wants. This EF could be set as a cap in the same way than the Kyoto protocol sets caps in GHG emissions. More precisely, one could imagine an international policy granting to each country a fixed amount of global hectares calculated as the EF it would have if all its inhabitants consumed no more (and no less) than the members of the household situated at a specified threshold (just above the poverty line, or occupying the median on the distribution of earnings, or any other threshold on any other relevant distribution function) corresponding to what is considered the good enough level of satisfaction. The overall EF of the country would be reported at fixed intervals and a system of penalties and rewards would be settled down giving the appropriate incentives for lowering the country’s EF. This could achieved either by special taxation on environmentally harmful consumptions, by adopting more efficient technologies or by limiting its population. Of course, any reduction of EF obtained at the expense of the consumption of those just at and below the threshold level should not be accepted. On the contrary, all households below the threshold level would be entitled to increase their own EF up to the that level insofar as those

<table>
<thead>
<tr>
<th></th>
<th>1.7</th>
<th>0.8</th>
<th>2.6</th>
<th>0.831</th>
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<td>6.1</td>
<td>9.5</td>
<td>0.937</td>
</tr>
</tbody>
</table>


17 The threshold would vary with the level of prosperity of the country. For example, the acceptable level of needs satisfaction could correspond to the 7th or 8th deciles of income distribution in Niger and to the 3rd or 4th in Switzerland.
18 Obviously, this level could be set only through a democratic deliberation at the national level.
above it reduce theirs in due proportion. An international system of tradable “consumption permits” similar to the CO₂ emission permits introduced with the Kyoto Protocol could also be worked out. The money raised by the different policy instruments used (taxes, fines, funds...) could be partly redistributed towards countries unable - despite their efforts (and proportionally to these) - to adequately satisfy the needs of their population and partly spent in projects and R&D aiming at lowering total EF.

6. Conclusions

Despite - or perhaps thanks to – its ambiguities, sustainable development have been hitherto a success story. I don’t know of other examples of global political agenda being as quickly adopted, generating as many discussions, efforts and commitments and attracting as much human and financial resources. All this would not have happened were not sustainable development something that speaks deeply and loudly to all of us. Most human beings do believe that there is a moral difference between needs and desires (or wants) and that we bear stronger obligations with respect to the former (if we can) than to the latter (even if we can). Likewise, most human beings do believe that one must find the right balance between our obligations to our contemporaries and our duties toward our successors. Lastly, there is a widespread feeling that no generation is entitled to appropriate more natural resources than what is necessary for living a decent human life.

This said, what makes a decent human life and where is the difference between needs and wants? These questions are crucial for sustainable development and, I believe, for any realistic conception of distributive justice. It is probable that future developments in neuro-sciences and in psychology, for one part, and in ethical theory for another will help us answering these questions, but only rational democratic deliberations will gives us final – albeit probably never definitive – legitimate answers.
References


