

IMPEDIMENTS TO SUSTAINABLE DEVELOPMENT: EXTERNALITIES IN HUMAN-NATURE EXCHANGES*

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Prologue

A problem in urgent need of attention in modern societies is to discover ways to de-link national income from recorded employment. If the loss were shared in a manner deemed fair by the general public, there would be nothing catastrophic for people in a country where the average income is 35,000 international dollars a year to suffer an income loss of even 25 per cent, let alone 5 per cent. Average income in the UK in 1990 was about 25 per cent less than in 2005. It is hard to maintain that UK citizens enjoyed significantly lower levels of personal well-being in 1990 than they did in 2005. Reports on “life satisfaction” suggest that a general rise in private consumption among a population already enjoying a high standard of living adds little to happiness (Oswald, 1997; Bok, 2009; Graham, 2009).

In contrast, employment is known to be a powerful factor in a person’s sense of well-being and self-worth.¹ It would be a catastrophe were a 25 per cent drop in average income in a rich country to be accompanied by a comparable drop in employment. Citizens would justifiably demand that if there is to be a significant drop in aggregate income, it should be shared by all. But that would require employment not to decline. Governments in modern economies have either been unable to or have chosen not to prevent inequities from appearing in employment and income, especially in hard times. The one route they have taken to achieve full employment is the design of policies that are thought to boost the demand for goods and services. That demand needs to keep rising if employment is not to decline is a view that

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¹ Layard (2011) contains a good summary of the findings.

appears to be shared by all decision makers, be they Keynesians or otherwise. Politicians and media commentators express anxiety when spending on High Street shows signs of decline. We are encouraged to think that to consume is to contribute to the social good. And we are not encouraged to ask whether the composition of output could be so altered as to weaken the link between employment and aggregate consumption. It is more than an irony that short run macroeconomic reasoning is wholly at odds with the now-universal desire for sustainable economic development.

The study of the demand for goods and services requires that we understand the processes operating at the interface of consumption, population, production, and use of the natural environment (we economists call the latter, “natural capital”). So it should come as a surprise that social commentators and public servants mostly avoid mentioning those processes even when paying homage to the idea of sustainable development. A prominent feature of the interface is the presence of *externalities*, which are the *unaccounted* for consequences for others – including future people – of decisions made by each one of us. Those consequences could be damaging to others, but as they are unaccounted for, people responsible for them aren’t obliged to compensate the victims. To be sure, any one person has only a very tiny effect on the global state of affairs, but when the effects that each of us has on others are added, the sum can be substantial. The socio-environmental system is not self-correcting, implying that the “invisible hand” does not work. Eliminating externalities requires collective action, variously at local, regional, national and international scales.

As a rule the presence of externalities implies wastage. In this paper I construct a unified account of a class of externalities whose presence signifies a possibly unsustainable use of key forms of natural capital (which by any measure is an enormous wastage). The source of those externalities includes both direct and indirect demands for nature’s services. That the demand involves politically sensitive matters may be the reason why, with but few exceptions – those related to directly to climate change, ocean acidification, and dead zones – externalities are mostly absent from public discourse.²

Economics textbooks often maintain that externalities are a symptom of market failure. That diagnosis was publicized in the *Stern Review of the*

² See any edition of the annual *World Development Report* of the World Bank or the annual *Human Development Report* of the United Nations Development Programme (UNDP). To the best of my knowledge neither publication has, for example, devoted a special issue devoted to the biodiversity loss that has been accompanying habitat destruction.

Economics of Climate Change, which contained the now oft-quoted claim that “climate change is the biggest market failure in history”. The remark misleads badly. Externalities are a symptom of *institutional failure*, not simply market failure. The destruction of the Aral Sea during the Soviet era was not caused by market failure, but state failure. When village slopes turn barren because the inhabitants collect firewood at an unsustainable rate, the cause is communitarian failure, not market failure. When people burn wood and dung to cook their meals and heat their homes, the agency inflicting externalities both indoors and outdoors isn’t “the market” but the household. And when we worry that the climate system could pass tipping points, we should blame the nations as a collective for continuing to be recalcitrant in negotiating a “climate policy”.³

The externalities I study here are mostly of a detrimental kind. Depending on the context, the group suffering from them could be a household, village, district, state, nation, or nations as a collective. Owing to differences in societal histories, institutions, customs, and ecologies, the externalities differ also in scale, magnitude, and speed. Nevertheless they have a common characteristic. In this paper I try to unearth that commonality.

Preliminaries

The use to which natural capital is put depends on humanity’s demand for goods and services. The demand in turn depends on population size and composition, incomes, the knowledge base, social practices, technologies in use, and so on. Many goods and services are produced (food, clothing, housing, transport, education), while others are supplied directly by nature (air for breathing, river water for drinking, micro-organisms for decomposing waste, birds and bees for seed dispersal and pollination). The aggregate demand for goods and services is tautologically the product of average demand per person (reflecting the degree of “affluence”) and population size. The “I=PAT” formula, made famous by Ehrlich and Holdren (1971), that the *Impact* on nature of human activity is a function of *Population*, *Affluence* and *Technology*, stands as a metaphor for a complicated set of relationships among reproduction, consumption, production, and our use of the natural environment.

The externalities discussed below amplify the “I” in the “I=PAT” equation, by affecting each of the elements on the right hand side of the formula. In decentralized societies the amplification is not self-correcting. Elimina-

³ See Dasgupta (2001), Barrett (2003), and Dasgupta and Ehrlich (2013).

tion, even dilution, of externalities requires some form of collective action. In contrast, what is required in a society that is not decentralized is a policy change by the agency responsible for the externalities.

In days when human population was thin and consumption was low relative to Earth's then capacity, the externalities I discuss here were far less pronounced at the global level than they are now. Currently over 45 per cent of the 45–60 billion metric tons of carbon that are harnessed annually by terrestrial photosynthesis is appropriated for human use (Vitousek *et al.*, 1986, 1997). Due in large measure to that (including the destruction of natural habitats), 15 of the 24 major ecosystem services examined in the Millennium Ecosystem Assessment were found to be either degraded or currently subject to unsustainable use (MEA, 2005a–d).

It would be absurd to claim that humanity's over-stretch over Earth has been intentional. Unravelling externalities enables us to discover the unintended reasons behind the over-stretch. Crude calculations suggest that if the 5.7 billion people in poor and middle-income countries today were to match the consumption patterns of the 1.3 billion people in the rich world, at least two more Earths would be needed to support everyone on a sustained basis (Rees, 2001). Because the consensus among demographers is that world population will be 9.5 billion or more by 2050, the demands made of Earth will prove to be even more unsustainable. If humanity is to have a fighting chance of achieving sustainable development, it behoves us at a minimum to identify the externalities that would have to be reduced, if not entirely eliminated.

Four classes of externalities are of interest in sustainability analysis. They are associated, respectively, with (1) consumption, (2) use of the natural environment, (3) reproduction, and (4) technology. We study them in turn.

1. Consumption

Consumption *habits* give rise to externalities that people inflict on their future selves. To the extent habit has a persistent influence (habits “die hard”), the past is ever present. This leads to path dependence in the pattern of consumption. That dependence in turn locks people into the desire for what could eventually be unsustainable consumption. Let us see how.

As social animals, we are both competitive and conformist. We want to attain status in our community in certain ways and yet want simultaneously to be like others in other ways. This leads to two types of consumption externalities.

1.1. *Competitive Consumption*

In his classic work on the Gilded Age, Veblen (1925) spoke of “conspicuous consumption” so as to draw attention to consumption as a status symbol (flashy cars, fineries, mansions). But if a commodity is to serve as a status symbol, its consumption must be observable by others; which explains the double-edged title of Veblen’s classic.

Veblen’s notion of status has been extended to cover the tendency of people to try to out-do the “Jones’s”. Social scientists have modelled such forms of consumption competition as “rat races”, where each household tries to beat all others in their consumption patterns in what is a self-defeating proposition (Duesenberry, 1949; Hirsch, 1977; Oswald, 1997). It’s rather like someone trying to walk up an escalator as it moves down at the same speed (the externality). The process creates yet another form of the “tragedy of the commons”. Everyone works harder and consumes more than they would if they all agreed to work less hard and consume less, but are unable to find a mechanism for enforcing such an agreement.⁴

But there are problems within problems. The use of automobiles is conspicuous and relies on an underpriced resource: oil. Add habits into the equation and a growing complementary infrastructure (gas stations, expanded network of highways), and we have a spiralling exploitation of natural capital that adds little to human well-being across time. The analysis points to the need for taxes and regulations on both conspicuous consumption and underpriced natural capital. Creating a culture of shaming for “anti-social” behaviour is not unknown in history. Today we are wary of any such practice; but devised with care, it could prove to be a useful complementary weapon for the problem of competitive consumption.

1.2. *Social Consumption and Conformism*

People also want to belong. In some spheres of our lives we adopt patterns of conspicuous consumption that reflect a desire to conform, not compete. Fads are brief occurrences of such patterns, but conformism can persist if it serves the need for social belonging (Bourdieu, 1984; Deaux, 1996).

Here I am not confining myself to cases where people merely desire to conform to their peer-group’s norm. It can be that people want to engage

⁴ Arrow and Dasgupta (2009) provides a formal proof. Schor (1998) contains an excellent narrative of competitive consumption and its consequences for work in the United States. The technically minded reader will recognise that competitive consumption in a market economy is akin to the Prisoners’ Dilemma in game theory.

in communal activities and identify commodities that serve as focal points. Commodities whose demand is in part an expression of the desire to relate to others have been called “relational goods” (Donati, 2011). In many cultures religious expenditures are built around them (Iannaccone, 1998; Ys-seldyk, Matheson, and Anisman, 2010). Club goods are other examples. Food and clothing and reading habits would appear to be driven at least in part by the human desire to belong (Sahlins, 1968; Bourdieu, 1984; Douglas and Isherwood, 1996; Warde, 1997; Pratt and Rafaeli, 1997; Warde and Martens, 2000). There are even cases where people join so as to show solidarity with their group even if they have no particular preference for the collective activities (joining protest marches, wearing conspicuous clothes). Unsurprisingly, Sunstein and Ullmann-Margalit (2001) call commodities that play an essential role there, “solidarity goods”. Hollinger (1996) observes that solidarity is what makes for a person’s social identity. As in the case of competitive consumption, the under-pricing of natural capital (a matter I come to below) would be expected to serve as a factor in determining which consumption practices prevail.

Conformism gives rise to an externality because each person’s choice of the amount of, say, a relational good, affects others’ choice of that good directly; and so on for all other people in the community. But conformist behaviour leads to a different social dynamic from competitive consumption. It can be that a community coordinates at one of many alternative consumption patterns. Some would be more intensive in their use of natural capital than others (frequent air travel for leisure as against forming reading groups). That carries with it the possibility that some potential outcomes are unambiguously better than others.⁵ However, unlike the case of competitive consumption, taxes and regulations would not be needed to improve matters. If people trust one another, a mere agreement would suffice. The problem here is one of co-ordination. One way to achieve the desired consumption behaviour would be to “nudge” one another so as to coordinate.

2. Environmental Resources

One underlying reason externalities are prevalent in humanity’s use of the natural environment is the latter’s tendency not to remain still. The wind blows, particulates diffuse, rivers flow, fish swim, birds and insects fly, and

⁵ For technically minded readers, the need to relate to others in market economies resembles “coordination games” in game theory. It will be recalled that such games possess multiple outcomes that can be unambiguously ranked in terms of their social desirability.

even earth worms are known to move. That makes property rights to prominent classes of natural capital difficult to define and enforce; which is another way of saying that environmental externalities abound. By property rights I mean not only private rights, but communitarian and public rights too. An absence of a tight set of property rights is the general reason why natural capital is typically underpriced in market economies and is regarded to be especially cheap in non-market economies. In extreme cases the market price of a piece of natural capital is nil even when it has considerable social worth. “Green” taxes would be a way to close the difference.

Two broad categories of environmental externalities may be distinguished: unidirectional and reciprocal. It is simplest to define them by considering illustrative examples.

2.1. Trade, Externalities, and Wealth Transfers

Externalities give us a reason to curb our enthusiasm for free trade. Imagine that timber concessions have been awarded in an upstream forest of a poor country by its government so as to raise export revenue.⁶ As forests stabilize both soil and water flow and are the habitat for birds and insects, deforestation erodes soil, increases water run-off downstream, and reduces pollination and pest-control in neighbouring farms. If the law recognizes the rights of those who suffer damage from deforestation, the timber company would be required to compensate downstream farmers. But compensation is unlikely when the cause of damage is many miles away and the victims are scattered groups of farmers. Problems are compounded because damages are not uniform across farms; their geography matters. Moreover, downstream farmers may not even realize that the decline in their farms’ productivity is traceable to logging upstream. The timber company’s operating cost would in those circumstances be less than the social cost of deforestation (the latter, at least as a first approximation, would be the firm’s logging costs and the damage suffered by all who are adversely affected). So the export would contain an implicit subsidy (the “externality”), paid for by people downstream. And I haven’t included forest inhabitants, who now live under even more straightened circumstances. The subsidy is hidden from public scrutiny, but it amounts to a transfer of wealth from the exporting to the importing country. Ironically, some of the poorest people in the exporting country would be subsidizing the incomes of the average importer in what could well be a rich country. That can’t be right.

⁶ The example has been taken from Dasgupta (1990).

2.2. *Pollution vs. Conservation*

Pollution and conservation have gone their separate ways in the economics literature; but pollutants are the reverse side of natural capital. Acid rains damage forests; industrial seepage and discharge reduce water quality in streams and underground reservoirs; sulphur emissions corrode structures and harm human health; and so on. The damage inflicted on each type of asset (buildings, forests, fisheries, human health) should be interpreted as depreciation. For the policy-maker the task is to estimate the depreciations.

By way of an example consider that damage to health caused by atmospheric pollution involves (a) loss in human productivity, (b) experiencing pain and discomfort, and (c) reduction in life expectancy. It is fortunate for humanity that good health offers the three benefits more or less as joint-products. But to the best of my knowledge, no one has estimated all three losses in studies of environmental pollution. The point remains though that there is no reason to distinguish resource management problems from pollution management problems. Roughly speaking, “resources” are “goods”, while “pollutants” (the degrader of resources) are “bads”. Pollution is the reverse of conservation.⁷

The mirror-symmetry between conservation and pollution is well illustrated by the atmosphere, which is both vital for human activity and a sink for pollutants. The atmosphere is a public good (if air quality is improved, we all enjoy the benefits, and none can be excluded from enjoying the benefits). It is also a common pool for pollution. That it is a public good means the private benefit from improving air quality is less than the social benefit. Without collective action there is underinvestment in air quality. On the other hand, as the atmosphere is a common pool into which pollutants can be deposited, the private cost of pollution is less than the social cost. Without collective action, there is an excessive use of the pool as a sink for pollutants. Either way, the atmosphere suffers from the “tragedy of the commons”.

3. **Reproduction**

There is a significant difference between fertility behaviour in rich and emerging economies on the one hand and poor countries on the other. They raise very different issues.

It is conventional today to worry about countries where the fertility rate has fallen below replacement rates. If the pattern continues for long, the age profile will become an inverted pyramid. Who will produce incomes

⁷ For a more extensive illustration of this way of looking at natural capital, see Dasgupta (1982).

when the bulk of the population becomes old? The worry presumes the working age to remain constant. That's a luxury that will have to go.

The problem is different in poor countries. I want to identify reproductive externalities in those societies, and I have Africa especially in mind.

It is useful to remind ourselves that the 17th-18th Century fertility transition in Northwest Europe has been traced to a then growing practice of establishing a new household on marriage. Couples had to have, by saving or transfer, sufficient resources to establish and equip their new household. The requirement led to late marriages (Hajnal, 1982) and meant that parents bore the cost of rearing their children. The fertility rate in England dropped to a low 4 in 1650-1700, which was a world where modern family-planning techniques were unknown and women were mostly illiterate (Coale, 1969). I stress that fact because in recent years demographic matters have been shunted aside by development economists and converted into the subject of female education. Below I show that other forces are at work in maintaining high fertility rates in poor societies.

3.1. Cost-Sharing

The fertility rate in sub-Saharan Africa remains well over 5 today. Population in sub-Saharan Africa is expected to treble to over 2 billion by 2050. Currently, the average annual income there is 1,200 international dollars.

There can be no question but that empowerment of women, a desirable end in itself, lowers fertility, other things being equal. There can also be no doubt that access to birth control facilities would help matters (Royal Society, 2012). But other things are not equal, and there are features of African societies that encourage high fertility.

Fosterage is a commonplace there. In parts of West Africa up to half the children have been found to be living with their kin at any given time. Nephews and nieces have the same rights of accommodation and support as do biological offspring (Caldwell and Caldwell, 1990). Fosterage is not adoption; it does not break ties between parents and children. The institution affords a form of mutual insurance protection in a region where formal insurance markets are non-existent. It is a wonderful, life-saving institution. But the institution does create a "problem of the commons": the private cost of rearing children becomes lower than the social cost.

Communal land tenure of the lineage social structure offers yet another inducement for men to procreate. Conjugal bonds are frequently weak, so fathers often do not bear the costs of rearing a child. Frequently, there is no common budget for the man and woman. Descent in sub-Saharan Africa is, for the most part, patrilineal and residence is patrilocal (an exception are the

Akan people of Ghana). Patrilineality, weak conjugal bonds, communal land tenure, and a strong kinship support system of children, taken together provide a powerful set of externalities lowering household well-being (Illiffe, 1987).

3.2. Conformity

As with consumption, traditional practices persist because of the desire to conform. One's peer group (kinship, village community) matters. That gives rise to a second category of externalities. Procreation in closely-knit communities is not only a private matter but also a social signal, influenced by both family experiences and the cultural milieu. Conformism means that every household's most desired family size increases with the average family size in the community.

Whatever the basis of conformism, there would be practices encouraging high fertility rates that no household would unilaterally desire to break. Such practices could well have had a rationale in the past, when mortality rates were high, rural population densities were low, the threat of extermination from outside attack was large, and mobility was restricted. But practices can survive even when their original purposes have disappeared. So long as all others follow the practice and aim at large family sizes, no household on its own wishes to deviate from the practice; however, if all other households were to reduce their fertility rates, each would desire to reduce its fertility rate as well (Dasgupta, 1993). The process here is very similar to the one involving conformism in consumption.

That said, society would not be expected to be stuck with high fertility rates forever. As always, people differ in the extent of their absorption of traditional practice. There would inevitably be those who, for one reason or another experiment, take risks, and refrain from joining the crowd. They are the tradition-breakers, and they often lead the way. Educated women are among the first to make the move toward smaller families. A possibly even stronger pathway is the influence that newspapers, radio, television, and now the Internet play in transmitting information about other lifestyles. The media are a vehicle by which conformism increasingly becomes based on the behaviour of a far wider population than the local community (Bongaarts and Watkins, 1996; Jensen and Oster, 2009).

3.3. Degraded Commons and Labour Needs

The poorest countries are in great part biomass-based subsistence economies. Much labour is needed even for simple tasks. Moreover, households in great numbers there do not have access to the sources of domestic energy available to households in advanced industrial countries; nor do they

have water on tap. In arid regions water supply is often not even close at hand; nor is fuel-wood near at hand when the forests recede. The relative prices of alternative sources of energy and water faced by rural households in poor countries are different from those faced by households elsewhere. In addition to cultivating crops, caring for livestock, cooking food and producing simple marketable products, household members have to spend as much as five hours a day fetching water and collecting fodder and wood. These are complementary activities and must be undertaken on a daily basis if the household is to survive. Labour productivity is low not only because manufactured and human capital are scarce, but also because natural capital is scarce. From the age of 6, children in poor rural households in the poorest countries mind their siblings and domestic animals, fetch water, and collect fuel-wood, dung (in the Indian sub-continent), and fodder. Mostly, they do not go to school. Not only are educational facilities in the typical school woefully inadequate, but parents also need their children's labour. In semi-arid regions of the Indian sub-continent and sub-Saharan Africa children between 10 and 15 years have been routinely observed to work at least as many hours as adult males.

The need for many hands can lead to a destructive situation when parents do not have to pay the full price of rearing their children but share such costs with their community. In recent years, mores that once regulated the use of natural capital have changed. In the past rural assets such as village ponds and water holes, threshing grounds, grazing fields, and woodlands have been owned communally. Communities protected their local commons from over-exploitation by relying on social norms, by imposing fines for deviant behaviour, and by other means. But the very process of economic development can erode traditional methods of control, the pathway to that being increased urbanization and mobility. Social norms are also endangered by civil strife and by the usurpation of resources by landowners or the State. Rules practiced at the local level have also not infrequently been overturned by central fiat. A number of States in the Sahel imposed rules which in effect destroyed communitarian management practices in the forests. Villages ceased to have authority to enforce sanctions on those who violated locally-instituted rules of use. State authority turned the local commons into free-access resources. Whatever the cause, as social norms degrade, parents pass some of the costs of children on to the community by over-exploiting the commons. This is another instance of a demographic problem of the commons.⁸

⁸ See Dasgupta (1993), Aggarwal, Netanyahu, and Romano (2001), and Filmer and Pritchett (2002).

4. Technology

Popular discourses on economic growth and development usually regard nature to be a fixed, indestructible factor of production. In fact nature consists of degradable resources. Agricultural land, forests, watersheds, fisheries, fresh water sources, estuaries, the atmosphere – more generally, ecosystems – are capital assets that are self-regenerative, but suffer from depletion or deterioration when they are over-used or toxified.

Entrepreneurs economize on the use of expensive inputs of production. Because natural capital is under-priced, research and development (R&D) is directed toward innovations that are rapacious in their use of environmental goods and services. The cumulative adoption of resource intensive technologies and consumption practices over the past two centuries has locked us into an infrastructure that will prove hard to dislodge. Taxes on the use of critical but degraded forms of natural capital (the atmosphere as a sink for carbon; biodiversity) will have to be augmented by subsidies for R&D in “clean” technologies. Marginal policy changes will be inadequate for kicking our production and consumption structure into a sustainable form.⁹

Discussion

Mainstream theories of growth and development ignore every one of the features of contemporary life I have sketched in this paper.¹⁰ But we should be sceptical of any theory of economic progress that places an overwhelming burden on an experience not much more than 250 years old. Extrapolation into the past is a sobering exercise: over the long haul of history (a 5000 years stretch, say, up to about 250 years ago), economic growth even in the currently-rich regions was for most of the time not much above zero. Until 1500 CE most people lived under the proverbial 2 dollars a day and world population remained well under 1 billion. Even though we live in an entirely different world now, the study of possible feedback between poverty, population growth, and the character and performance of both human institutions and natural capital remains absent in contemporary discussions.

The four sources of externalities that I have sketched in this paper, taken together, will prove to be an impediment to the realization of the idea of sustainable development. If we are to pay more than lip service to the idea, hu-

⁹ It may not be an exaggeration to suppose that, globally, nature’s services (including the service the atmosphere and the oceans provide in storing carbon) are underpriced to the tune of 3–4 trillion international dollars annually (Myers and Kent, 2000).

¹⁰ See for example, Helpman (2004) for an influential summary of the literature.

manity will have to find ways to cut back on our demand for nature's services. At a bare minimum that will require the consumption habits of people in the rich world to change substantially. Even a minimum concern for fairness would imply that the burden of that change should be borne by the 1.3 billion people or so in the rich world. That could in principle influence the desired consumption goals of the new middle classes in emerging economies. And that brings us back, full circle, to a central problem facing modern economies: How can we de-link aggregate consumption from employment?

We economists still know very little about the macroeconomic implications of economy-wide environmental policies. Applied economists mostly study taxes on externalities on a case-by-case basis. But externalities are present variously at local, regional, and global levels. Imagine that corrective taxes and subsidies were to be put in place by a government to combat externalities in a comprehensive manner. What would it mean nationally for output and employment?

The optimistic view is that resources would find themselves re-directed toward "green technologies", which are assumed to either exist in blueprints or expected to come into existence rapidly once venture capitalists and entrepreneurs put their minds to the task. It is then argued that the mix of technologies and the composition of household consumptions would come into line with changes in relative prices, but employment wouldn't be affected. This is the famous "win-win" view of environmental policy.¹¹

Macroeconomic models that include natural capital have mostly been designed to peer into the deep future (Dasgupta and Heal, 1979; Jones, 2004). The models assume the short run to be devoid of structural dislocations. Even the study of sectoral adjustments that could be expected to take place if environmental taxes were imposed in a country avoids modelling the structural problems of adjustment that would inevitably arise (Jorgenson *et al.*, 2013).

Problems are compounded when we imagine international efforts to counter environmental externalities. Barrett (1994, 2003) explained why in the absence of international transfers we shouldn't expect all countries to agree on optimum carbon taxes. His arguments extend naturally to global commons generally. But the theory of public economics urges countries to collaborate on an environmental policy (including taxes and subsidies)

¹¹ Starting with the *World Development Report* of 1992, the World Bank in its various publications has taken this line. Jorgenson *et al.* (2013) is a recent articulation of the view, albeit restricted to the imposition of carbon taxes in the US.

aimed at eliminating local, regional, and global externalities in a comprehensive package. To the best of my knowledge, no attempt has been made to uncover the structural problems the resulting shift in relative prices would create. We should expect there to be huge consequences to the distribution of income and employment within and across countries. But we don't know what they are likely to be.

Because natural capital is a stock, humanity can deplete it (either in quantity or in quality) for decades without feeling much global pain. And because extraction rates can exceed rates of natural regeneration for decades, the idea of "planetary boundaries" isn't useful. Several planetary boundaries have already been breached, but that hasn't moved governments or their citizens to act. There is abundant record of local disasters in recent decades in Africa, South Asia, and Latin America. That they may be a mirror to large-scale tipping points lying in wait is something most people don't like to acknowledge.

The absence of discussion on the tug of war being played out by humanity's drive for conventional economic growth and nature's frequent complaint about it is a sign that we think ecologists are wrong. But owing to the presence of widespread externalities, the world economic system doesn't have error-correcting mechanisms in place to avert large-scale societal meltdowns. Until we bring these matters on the agenda, policy analysis will remain crippled and sustainable development will continue to be a notion we admire but cannot put into operation.

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