

Sustainable Development and OPEC¹

Herman E. Daly
School of Public Affairs
University of Maryland
College Park, MD 20782, USA
(hd22@umail.umd.edu)

Abstract/Introduction :- In Part I the meaning of sustainable development, along with basic arguments for its desirability and long-term necessity, are considered. The economy is viewed in its physical dimensions as an open subsystem of a containing ecosystem that is finite, nongrowing, and materially closed. The ecosystem is open with respect to solar energy, but the solar flux is also finite and non growing. Sustainable development of the economy means qualitative improvement (development), without quantitative increase in matter-energy throughput (growth) beyond the absorptive and regenerative capacities of the sustaining ecosystem. Growth in physical throughput will become uneconomic long before it becomes physically impossible, in the sense that the extra environmental costs provoked by growth will be greater than the extra production benefits provided by growth. In sum, the economy has an optimal scale relative to the environment. Growth beyond the optimal scale is in reality uneconomic growth, even if we continue to call it economic growth. The idea of sustainable development is to avoid uneconomic growth, and to move the path of progress from quantitative expansion to qualitative improvement.

Part II speculates about how OPEC might take a leading role in developing a global policy and fiduciary institutional framework in the service of sustainable development. The failure of Kyoto and the inability of high consuming countries, especially the US, to limit their energy throughput, opens an opportunity for OPEC to provide the missing discipline. OPEC could serve many of the functions of Kyoto by using its monopoly power over the petroleum source to collect a surcharge reflecting atmospheric sink scarcity. The sink rent surcharge would go into a special fund to be redistributed as aid to poor countries to finance sustainable development projects and technologies. Petroleum source rents would continue to belong to producing countries who own the petroleum deposits. Since no one owns the atmosphere its sink rents would be global public revenue, collected and redistributed by OPEC as a fiduciary, perhaps with UN participation.

I. The Goal of Sustainable Development.--Sustainability is not a new idea in economics—it is embedded in the very concept of income. As defined by Sir John Hicks, income is the maximum that can be consumed in a given year without reducing the capacity to produce and consume the same amount next year. By definition income is sustainable consumption. Whatever part of consumption is unsustainable is by definition not income but capital consumption. If income is by definition sustainable, then so is its growth. Why all the fuss about sustainability? Because, contrary to the theoretical definition of income, we are in fact consuming productive capacity and counting it as

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income in our national accounts². Natural capital lies outside the accounting domain and is being used beyond the natural capacities of the environment to regenerate raw materials and to absorb wastes. Depletion of natural capital and consequent reduction of its life-sustaining services is the meaning of unsustainability.

OPEC countries have certainly been faced with the question of how much of their net receipts from petroleum can legitimately be counted as income in the Hicksian sense, and how much is a draw-down of inventories, or capital consumption, requiring compensating investment in alternative assets. In a sense, the issue of sustainable development is a broadening of this question to include all forms of natural capital—forests, croplands, grasslands, fisheries, mines, wells, atmosphere, water, etc.—not just petroleum. I will not go further into this specific matter of the proper accounting of income from a depletable asset since it has been admirably discussed by my former World Bank colleague, Salah El Serafy, in the references given.

Instead, I will begin by asking--Why has natural capital depletion been ignored for so long? Because the macroeconomy has been envisioned as the Whole rather than a Part. In standard economics nature is just a sector, a part of the macroeconomy—forests, fisheries, agriculture, extractive industries, eco-tourism, etc. It is not a containing, provisioning, biophysical envelope that sustains the entire macroeconomy. In ecological economics, by contrast, we envision the macroeconomy as an open subsystem of the enveloping ecosystem. The containing ecosystem is finite, non growing and materially closed. It is open with respect to solar energy, but that flux of energy is itself finite and non growing. In this view, the physical growth of the economic subsystem (i.e., growth in population and per capita resource use) encroaches on the space and functions of the larger system. Consequently growth of the macroeconomy incurs an opportunity cost (the most important sacrificed natural service). (See Fig. I). Opportunity cost of expansion is zero for the Whole, but positive for the Part as it encroaches on the Whole. So if one thinks of the macroeconomy as the Whole, then its expansion is into the Void, encroaching on nothing. There is no opportunity cost of growth in this vision, and the obvious policy is growth forever.

The same practical result is reached even if one considers the economy as a subsystem of the ecosystem, as long as the subsystem is very small relative to the larger system. In this “empty-world vision” (Fig. I) the environment is not scarce and the opportunity cost of expansion of the economy would be negligible. But continued growth into a finite and non growing ecosystem will eventually lead to the “full-world economy” in which the opportunity cost of growth is significant. We are already in such a full-world economy, contrary to the opinion of many economists.

In the ecological economics vision the opportunity cost of encroachment is of two kinds: the emptying of environmental sources [depletion], and the filling up of environmental sinks [pollution]. The economic subsystem lives by a metabolic flow, an

² See Salah El Serafy, “The Proper Calculation of Income from Depletable Natural Resources”, in Environmental Accounting for Sustainable Development, edited by Yusuf J. Ahmad, Salah El Serafy, and Ernst Lutz, Washington D.C., World Bank, 1989; also Salah El Serafy, “The Environment as Capital” in R. Costanza, ed., Ecological Economics (The Science and Management of Sustainability), New York: Columbia University Press, 1991; and Salah El Serafy, “Green Accounting and Economic Policy”, in Ecological Economics, June, 1997. For a general critique of GNP accounting, see Roefie Hueting, New Scarcity and Economic Growth (More Welfare through Less Production?), Amsterdam: North Holland Publishing Co., 1980.

entropic throughput from and back to the environment. Low entropy resources are taken from the environment (depletion) and eventually are returned to the environment as high entropy wastes (pollution). Just as an animal lives from its environment by its metabolic flow, so the economy lives from the environment by its entropic throughput. As the economic subsystem continues to grow, it grows relative to the total system and eventually would approach the dimensions of the total system. As it does it must approximate ever more closely the characteristics of the total system, namely non growth --an approximate steady state consisting of the entire earth maintained by an entropic throughput of solar energy. The planet earth is non growing in its physical quantitative dimensions, but of course it evolves and changes qualitatively. Likewise the economic subsystem, as its scale approaches that of the containing ecosystem, must cease physical growth, although qualitative evolution continues. The path of progress must shift from quantitative growth to qualitative development, if it is to be sustainable. Sustainable development is, therefore, qualitative improvement without quantitative growth beyond the assimilative and regenerative capacities of the ecosystem.

Growth has moved us from an empty-world economy to a full-world economy. The pattern of scarcity has changed, but the rules of economics remain the same. The rule remains to economize on the limiting factor in the short run, and to invest in increasing its supply in the long run. We have moved from an empty world in which manmade capital was limiting, to a full world in which remaining natural capital is limiting. For example, the fish catch used to be limited by manmade capital (fishing boats), but now it is limited by the fish remaining in the sea (natural capital). We have an excess of fishing boats. Similarly, production from irrigated agriculture is no longer limited by well drilling or river diversion capacity (manmade capital), but by the size and recharge capacity of aquifers and the flow rates of rivers (natural capital).³

The list of examples could be extended, but for now the most relevant example is petroleum. The limiting factor for the throughput of petroleum is no longer the manmade capital of drilling equipment, pipelines, tankers, refineries, and combustion engines, but the natural capital of remaining sources of petroleum in the ground. Even more limiting is the sink capacity of the atmosphere to absorb the CO₂ resulting from petroleum combustion. Sink capacity is also natural capital. Economic logic says we should economize on and invest in the limiting factor. Economic logic has not changed, but the pattern of scarcity has. More and more it is remaining natural capital that now plays the role of limiting factor. We have been very slow to change our economic policies accordingly and refocus our economizing and investing on natural capital. Instead we have treated natural capital as a free good and accounted its draw-down as income rather than unsustainable capital consumption. To avoid a write-off on the value of excess manmade capital that should result from the increasing scarcity of its complementary factor (natural capital), we continue to increase the rate of draw-down of natural capital, hoping for future geological discoveries and technical advances. Hence, US President George W. Bush's energy policy remains that of the Spindletop era in Texas--find more oil, pump it out, and burn it now.

³ When factors are complements, the one in short supply is limiting. Manmade capital and natural capital are only substitutable over a very small margin, and are overwhelmingly complements, as evident in the examples given above. Nevertheless, neoclassical economics generally assumes that manmade and natural capital are substitutes. With substitutability there can be no limiting factor.

The WTO, the World Bank, and the IMF, while intoning the term “sustainable development” at every opportunity, continue to support the goal of infinite growth for the world, including especially the high consumption societies. They cannot imagine poor countries doing anything other than selling their products to rich countries. How else can they earn the foreign exchange to pay back World Bank and IMF loans? Therefore they think it is vital for rich countries to become ever richer, so they can buy more from the poor. Global trickle down remains their solution to poverty.

Of course sustainability cannot be our only goal. If it were then we could easily attain it by returning to a hunter-gatherer economy with a low population density and low per capita consumption. The economic goal is to attain sufficient per capita resource consumption for a good life for all the world’s people, for a long time. If the product of current per capita resource use and population is so large that it cannot be attained without consuming the earth’s capacity to support future life in conditions of sufficiency, then we must reduce per capita resource use, or population, or both. Of course this will be easier to do if we can also improve resource productivity. But improved resource productivity will be slow to happen in a regime of cheap resources. The best way to improve resource efficiency is to make it more necessary by restricting the resource throughput (lowering per capita resource use). This means higher resource prices. Yes, that is a hardship for the poor, and consequently makes serious reduction in income inequality all the more necessary. However, continuing a subsidized price for petroleum means a greater subsidy to the biggest user, which is itself a regressive shift in real income distribution.

Technical improvements in resource efficiency, by themselves, will simply lower demand for resources, resulting in lower prices, which will stimulate further uses. It is fine to have cars that get twice the miles per gallon, but not if it simply means that we travel twice as much and burn the same throughput of petroleum in more, albeit more efficient, cars on more crowded roads. Efficiency is more miles per gallon. Frugality is using fewer gallons. A policy of “frugality first” stimulates efficiency. A policy of “efficiency first” does not stimulate frugality—indeed it fosters the perception that frugality has become less necessary. With lower resource prices even efficiency becomes less necessary.

The goal of sustainability, then, is not by itself sufficient. We must seek an optimal scale of the macroeconomy relative to its containing and sustaining envelope, the ecosystem. The concept of an optimal scale of the macroeconomy does not exist in current macroeconomics because, as we have seen, the macroeconomy is conceived as the Whole. But in fact the macroeconomy is a Part of a larger Whole, the ecosystem. The physical expansion of the economic subsystem does encroach on the rest of the Whole and does incur an opportunity cost. At some point, perhaps already passed, it is possible that the extra opportunity cost of disrupted environmental services resulting from encroachment will begin to exceed the extra production benefits. In other words we will have reached and passed the optimal scale of the macroeconomy relative to the ecosystem. So-called “economic growth” (growth of the economic subsystem) would then in reality have become uneconomic growth—literally growth that costs us more than it benefits us at the margin. In the prescient words of John Ruskin (Unto this Last, 1862), “That which seems to be wealth may in verity be only the gilded index of far-reaching ruin...”

Although unknown to macroeconomics, the concept of optimal scale or extent of an activity is the very heart of microeconomics. The “marginal cost equals marginal benefit” rule of optimization has aptly been called the “when to stop rule”—i.e., when to stop growth in the activity in question. The common sense logic of microeconomics says that an activity should stop expanding when further expansion begins to cost more than it is worth—to require the sacrifice of alternatives that are more important than the added benefit. But when we turn to macroeconomics, there is no analog to the “when to stop rule”. The rule is to grow forever. This is, to put it bluntly, an intellectual disgrace. The only excuse I can think of is the one already discussed—that the macroeconomists’ preanalytic vision is that the macroeconomy is the whole, not a part of a larger whole. If there is no opportunity cost of growth there can be no optimal scale, and so uneconomic growth is impossible. But such a vision is contrary to reality and urgently needs correction.

A policy of sustainable development first aims at an optimal scale of the economy relative to the ecosystem. One of the features of an optimal scale is that it is sustainable—i.e., the source and sink demands of the resource throughput necessary to sustain that scale are within the regenerative and assimilative capacities of the ecosystem. Second, once the scale of the resource throughput is limited, the distribution of ownership of this newly scarce function must be decided. In the case of petroleum we know specifically who owns the sources in most cases, but not who owns the sinks. This must be decided politically. In third place, after we have a socially defined sustainable scale and a just or at least acceptable distribution of ownership of sources and sinks, then we can allow the market to determine the efficient allocation of resources among competing uses.⁴ How might OPEC fit into the emerging vision of sustainable development? Permit me to speculate.

II. Some Speculations on a Leadership Role for OPEC in Promoting Sustainable Development.

Sources of petroleum throughput derive from private or public (national) property; sinks are in an open access regime and treated as a free good. Therefore, rents are collected on source scarcity, but not on sink scarcity. Different countries or jurisdictions collect scarcity rents in different ways. In the US, for example, Alaska has a social collection and sharing of source rents, institutionalized in the Alaska Permanent Fund whose annual earnings are distributed equally to all citizens of Alaska. Other states in the US allow private ownership of sources and private appropriation of source rents.

New institutions are being designed to take the sink function out of the open access regime and recognize its scarcity (Kyoto). Tradable rights to emit CO₂, requiring first the collective fixing of scale and distribution of total emission rights, are actively being discussed. Ownership of the new scarce asset (emission rights) could be distributed in the first instance to the state, which would then redistribute the asset by gift or auctioned lease.

Ideally sink capacity would be defined as a separate asset with its own market. This would require a big change in institutions. Assuming it were done, the source and sink markets for petroleum throughput, though separate, would be highly interdependent.

⁴ See Herman E. Daly, Beyond Growth, Boston: Beacon Press, 1996; and Steady-State Economics , Washington, D.C. : Island Press, 1991, for further discussion of these issues.

Sink limits would certainly reduce the demand for the source, and vice versa. The distribution of total scarcity rent on the petroleum throughput between source and sink functions would seem to be determined by the relative scarcity of these two functions, even with separate markets. Alternatively, sink scarcity rent could also be captured by a monopoly on the source side, or source scarcity rent could also be captured by a monopoly on sink side.

To give an analogy, municipal governments, in charging for water, frequently price the source function (water supply) separately from the sink function (sewerage), thus charging different prices for inflow and outflow services related to the same throughput of water. In deciding their water usage consumers take both prices into account. To them it is as if there were one price for water, the sum of the input and output charges. Likewise the petroleum throughput charge would be the sum of the price of a barrel of crude oil input from the source and the price of CO₂ output to the sink from burning a barrel of petroleum. One could consolidate the two charges and levy them at either end, since they are but two ends of the same throughput. This would be a matter of convenience. Since depletion of sources is a much more spatially concentrated activity than pollution of sinks, it would seem that the advantage lies with levying the total source and sink charge at the source end. This is especially so since the sink has traditionally been treated as an open access free good, and changing that requires larger institutional rearrangements than would a sink-based surcharge on the source price. OPEC, given sufficient monopoly power over the source, would be well positioned to function as an efficient collector of sink rents for the world community. Could it also serve as a global fiduciary for ethically distributing those rents in the interests of sustainable development, especially for the poor?

OPEC, assuming it could increase its degree of monopoly of the source, may be in a position to preempt the function of the failing Kyoto accord by incorporating sink rents (and even externalities) into prices at the source end of the petroleum throughput. Of course OPEC does not have a monopoly on petroleum, much less on fossil fuels. It does not, even indirectly, control non petroleum sources of CO₂. So it would be easy to overestimate OPEC's monopoly power, and the scheme suggested here does require an increase in its monopoly power. However, modern mass consumption nations such as the US apparently do not have the discipline to internalize either externalities or scarcity rents into the price of petroleum. Exclusion of developing countries from the Kyoto discipline, while understandable on grounds of historical fairness, undermines the prospects for accomplishing the goal of the treaty, namely limitation of global greenhouse gas emissions to a more sustainable level. OPEC, assuming it had sufficient monopoly power, might be able to provide this discipline for both North and South. The South, as well as the North, would have to face the discipline of higher petroleum prices in the name of efficiency, but would, in the name of fairness receive a disproportionate share of the sink rents. There would be a net flow of sink rents from North to South. The size of those rents would depend on OPEC's degree of monopoly power. The distribution of the rents would be in large part decided by OPEC—a large ethical responsibility which many would be unwilling to cede to OPEC, and which OPEC itself may not want. The obvious alternative to such a global fiduciary authority, however, has already failed. The inability to reach an agreement on international distribution of CO₂ emission rights was the rock on which Kyoto foundered. It is hard to see how such an agreement could be

reached, either as a first step toward emissions trading, or as a fixed non tradable allocation.

It is in OPEC's self-interest to preempt the emergence of a separate market for sink capacity, which could surely lower source demand and prices. While this gives OPEC a motivation, it also calls into question the legitimacy of the motivation as pure monopolistic exploitation. A legitimating compromise, as indicated above, would be for OPEC to behave as a self-interested monopolist on the source side, but as a global fiduciary on the sink side—i.e., as an efficient collector and ethical distributor of scarcity rents from pricing the sink function. OPEC countries own petroleum deposits, but not the atmosphere. OPEC has a right to its source rents, but no exclusive right to sink rents. However, it may well have the power to charge, and redistribute sink rents as a global fiduciary—exactly what Kyoto wants to do, but lacks the power to do. In addition to effecting this transfer, the expanded role of OPEC as global fiduciary might increase the willingness of other petroleum producers (e.g. Norway) to join OPEC, thus increasing its monopoly power and ability to function as here envisioned. In addition the fiduciary role might provide ethical reasons for OPEC members to adhere to the cartel, when tempted by short-term profit opportunities to cheat.

Actually the existing OPEC Development Fund is already a step in this direction. Expansion of this fund into a global fiduciary institution for collecting and distributing sink rents, as well as the existing source rent contributions generously made by OPEC countries, is what is envisaged in this suggestion.

Just how total rents are determined and divided between source scarcity and sink scarcity is a technical problem that economists have not tackled because they have not framed the problem this way. Economists have focused on capturing source rents through property rights, and then internalizing the external sink costs of pollution through taxes. Only recently has there emerged a theoretical discussion of property rights in atmospheric sink capacity-- whether these should be public or private, the extent to which trade in such rights should be allowed, etc. As an initial rule of thumb we might assume that, since the sink side is now the more limiting function, it should be accorded half or more of the total throughput scarcity rents. In other words, sink rents should be at least as much as source rents. Sink rents would go to an expanded OPEC Development Fund dedicated entirely to global sustainable development in poor countries (especially investments in renewable energy and energy efficiency). Source rents would continue to accrue to the country that owns the deposits, and presumably be devoted to national sustainable development. The focus here is on a new public service function for OPEC of efficiently collecting and ethically distributing sink rents in the interest of global sustainable development. Where Kyoto has failed, OPEC might succeed as a stronger power base on which to build the fiduciary role—a power base that sidesteps the inability of nations to agree on the distribution of CO₂ emission rights among themselves.

Although any exercise of monopoly power is frequently lamented by economists, the early American economist John Ise had a different view in the case of natural resources: *“Preposterous as it may seem at first blush, it is probably true that, even if all the timber in the United States, or all the oil, or gas, or anthracite, were owned by an absolute monopoly, entirely free of public control, prices to consumers would be fixed*

lower than the long-run interests of the public would justify".⁵ Ise was referring only to the source function. The emerging scarcity of the sinks adds strength to his view. The reasonableness of Ise's view is enhanced when we remember that for a market to reflect the true price, all interested parties must be allowed to bid. In the case of natural resources the largest interested party, future generations, cannot bid. Neither can our fellow non human creatures, with whom we also share God's creation, now and in the future, bid in markets to preserve their habitats. Therefore resource prices are almost certainly going to be too low, and anything that would raise the price, including monopoly, can claim some justification. Nor did Ise believe that the resource monopolist had a right to keep the entire rent, even though the rent should be charged in the interest of the future.

The measurement of the two different rents presents conceptual problems. The source rents are in the nature of user cost—the opportunity cost of non availability in the future of a nonrenewable resource used up today. Assuming that atmospheric absorptive capacity is a renewable resource, the sink rent would be the price of the previously free service when the supply of that service is limited to a sustainable level. If we assume separate markets in both source and sink functions we would theoretically have a market price determined for each function. Since the functions are related as the two ends of the same throughput, the source and sink markets would be quite closely interdependent. The separate markets could be competitive or monopolistic, and differing market power would largely determine the division of total throughput rent between the source and sink functions. For example, if, following a Kyoto agreement, the total supply of sink permits were to be determined by a global monopoly, that monopoly would be in a stronger position to capture total throughput rent on petroleum than would a weak cartel that controls the source. OPEC is surely aware of this.

What might the WTO and the World Bank think of such a suggestion? Since these two institutions are well represented at this conference, this question is more than just rhetorical. So far the WTO and the World Bank have been dedicated to the ideology of globalization—free trade, free capital mobility, and maximum cheapness of resources in the interest of GDP growth for the world as a whole, including mass consumption societies. In their view maximum competition among oil-exporting countries resulting in a low price for petroleum is the goal. Trickle down from growth for the rich will, it is hoped, someday reach the poor. I suspect the free-trading globalizers consider themselves morally superior to the OPEC monopolists. But which alternative is worse:

(1) price- and standards-lowering competition in the interest of maximizing mass consumption by oil importing countries by minimizing the internalization of environmental and social costs with consequent destruction of the atmosphere, and ruination of local self-reliance by a cheap-energy transport subsidy to the forces of global economic integration, or

(2) monopoly restraints on the global overuse of both a basic resource and a basic life-support service of the environment, with automatic protection of local

⁵ John Ise, "The Theory of Value as Applied to Natural Resources", 1925 (June), [American Economic Review](#).

production and self-reliance provided by higher (full cost) energy and transport prices, and with sink rents redistributed to the poor?

Monopoly restraint results not only in conservation and reduced pollution, but also in a price incentive to develop new petroleum-saving, and sink-enhancing, technologies, as well as renewable energy substitutes. Unfortunately there would also be an incentive to non petroleum fossil fuels such as coal which would be a very negative effect from the point of view of controlling CO₂. Independent national legislation limiting emissions from coal may well be a necessary complement.

Ideally most of us would prefer a genuine international agreement to limit fossil fuel throughput, rather than a monopoly- based restriction imposed as a discipline by a minority of countries only on petroleum. But the Western high consumers, especially the US as resoundingly reconfirmed in its recent election, have conclusively demonstrated their inability to accept any restrictions that might reduce their GDP growth rates, even in the likely event that GDP growth has itself become uneconomic, as argued in Part I. The conceptual clarity and moral resources are simply lacking in the leadership of these countries. Perhaps the leadership reflects the citizenry. But perhaps not. The global corporate “growth forever” ideology is pushed by the corporate-owned media, and rehearsed by corporate-financed candidates in quadrennial television-dominated elections.

A lack of moral clarity and leadership in the mass consumption societies does not necessarily imply the presence of these virtues in the OPEC countries. Do there exist sufficient clarity, morality, restraint, and leadership in the OPEC countries to undertake this fiduciary function of being an efficient collector and an ethical distributor of sink scarcity rents? As argued above, there is surely an element of self-interest for OPEC, but to gain general support OPEC would have to take on a fiduciary trusteeship role that would go far beyond its interests as a profit-maximizing cartel. But a strong moral position might be just what OPEC needs to gain the legitimacy necessary to increase and solidify its power as a cartel. Could such a plan, put forward by OPEC, provide a stronger power base for the goals that Kyoto tried and failed to institutionalize? Might the WTO and World Bank recognize that sustainable development is a more basic value than free trade, and lend their support?⁶ I do not know. Maybe the whole idea is just a utopian speculation. But given the post-Kyoto state of disarray and the paucity of policy suggestions, I do believe that it is worth initiating a discussion of this possibility. If sustainability is to be more than an empty word we have to evolve mechanisms for constraining throughput flows within environmental source and sink capacities. Petroleum is the logical place to begin. And OPEC is the major institution in a position to influence the global throughput of petroleum.

⁶ Such recognition might be stimulated by the plans under discussion by some NGOs to bring suit against the US under the WTO for granting wholesale protection to its domestic producers by refusing to join the Kyoto agreement. The extra cost for internalizing CO₂ emissions paid by Kyoto signatories is equivalent to a discriminatory tax on imports to the US, or a discriminatory subsidy to US producers.

A "Macro" View of the Macroeconomy

