

4-1-1998

Can Trade Promote an Ecologically Secure World—The Global Economy from an Ecological Footprint Perspective

Mathis Wackernagel Ph.D.
Universidad Anáhuac de Xalapa

Follow this and additional works at: <https://digitalcommons.law.buffalo.edu/belj>



Part of the [Environmental Law Commons](#), and the [International Trade Law Commons](#)

Recommended Citation

Mathis Wackernagel Ph.D., *Can Trade Promote an Ecologically Secure World—The Global Economy from an Ecological Footprint Perspective*, 5 Buff. Envtl. L.J. 179 (1998).

Available at: <https://digitalcommons.law.buffalo.edu/belj/vol5/iss2/1>

This Article is brought to you for free and open access by the Law Journals at Digital Commons @ University at Buffalo School of Law. It has been accepted for inclusion in Buffalo Environmental Law Journal by an authorized editor of Digital Commons @ University at Buffalo School of Law. For more information, please contact lawscholar@buffalo.edu.

**Can Trade Promote an Ecologically Secure World?
The Global Economy from an Ecological Footprint Perspective**

Mathis Wackernagel, Ph.D.*

Table of Contents

The Current Ecological Context	180
Trade and Ecological Stability	184
Trade as a Weapon to Defend "Islands of Wealth"	192

* Centro de Estudios para la Sustentabilidad, Universidad Anáhuac de Xalapa, Apdo. Postal 653, 91000 Xalapa, Ver., MEXICO; tel.: ++52 (28) 14-96-11, fax: 19-04-53; e-mail: mathiswa@edg.net.mx

The Current Ecological Context

The argument for an ecologically sound and socially safe future is widely accepted and supported - but the world's current path of development indicates that humanity is moving away from such a "sustainable" future. The need for a change of direction, or "sustainable development" as it is officially called, has been continually called for since at least the 1970s by a growing number of social and natural scientists and large organizations of civil society and, most recently, since the Rio "Earth Summit" in 1992 by civil society, governments and businesses. Still, five years later, we live in a more risk-laden world with more consumption, more waste, more people and more poverty, but with less biodiversity, less forest area, less available fresh water, less soil, and less stratospheric ozone layer.¹

Why is progress so slow? Some point to the conceptual complexity of the idea of sustainability. However, this excuse is rather weak as the essence of the sustainability proposal is so obviously simple. According to the more recent definitions from various organizations, such as the Union of Concerned Scientists or The World Conservation Union,² sustainability requires decent and equitable living within the means of nature. Not living within our ecological means will lead to the destruction of humanity's only home. Having insufficient natural resources and not living decently and equitably will cause conflict and degrade our social fabric.

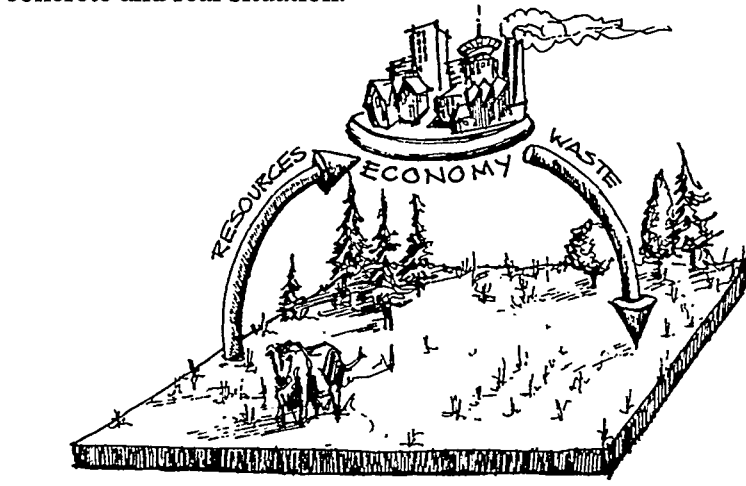
Therefore, we need to know whether people's quality of life improves over time. Even more urgently, we need to start monitoring whether we are living within our ecological means or at what rate humanity is depleting the biosphere. After all, people are a part of

¹ See, e.g., WORLD RESOURCES INSTITUTE (WRI), WORLD RESOURCES (1996); UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP), HUMAN DEVELOPMENT REPORT (1996); WORLD WATCH INSTITUTE, STATE OF THE WORLD (1997A, 1997B).

² See generally The World Conservation Union (IUCN), Caring for the Earth: A Strategy for living Sustainability (1991).

nature and depend on its steady supply of the basic requirements for life: energy for heat and mobility, wood for housing, furniture and paper products, fibers for clothes, quality food and water for healthy living, ecological sinks for waste absorption and many life-support services for securing living conditions on our planet. As we consume the products and services of nature, every one of us has an impact on the Earth. This is not tragic as long as the human load stays within global carrying capacity. But does it?

To find out, we should ask how much nature humanity, our country or our household uses to sustain itself. The concept of “appropriated carrying capacity” (popularly known as the “ecological footprint”) is a tool to answer this question.³ It does this by measuring how much nature, expressed in biologically productive space in various ecosystem categories, is necessary in order to produce all of the resources a given population consumes and absorb all of the corresponding waste it generates, using prevailing technology (Figure 1). In other words, the ecological footprint is a simple accounting tool which documents current ecological flows through society. Hence, it is not an extrapolation, nor does it explain why these flows occur - rather it provides an ecological picture of a concrete and real situation.



³ See generally MATHIS WAKERNAGEL & WILLIAM E. REES, OUR ECOLOGICAL FOOTPRINT: REDUCING HUMAN IMPACT ON THE EARTH (1996).

Fig. 1: People and their economies are a dependent subsystem of nature. There are no activities of the human economy that fall outside of nature's economy. Nature supports cows, cities or entire economies by dispensing resources, absorbing waste and securing life-support services. A population's "*appropriated carrying capacity*" or "*ecological footprint*" corresponds to the aggregate land and water area in various ecosystem categories that is claimed by that population to produce all the resources it consumes, and to absorb all the waste it generates on a continuous basis, using prevailing technology. (Illustration by Phil Testemale).

Ecological footprint calculations are based on two simple facts: first, we can keep track of most of the resources we consume and many of the wastes we generate; secondly, most of these resource and waste flows can be converted to a corresponding biologically productive area. Thus, the ecological footprint of any defined population (from a single individual to a whole city or country) is the total area of land and water in continuous production to provide all the resources consumed and to assimilate all the wastes produced by that population, *wherever that land and water may be located*.

Our newest estimates show that the average Canadian requires approximately 7 hectares of ecologically productive land and 1 hectare of ecologically productive sea space to provide for his or her current level of consumption.⁴ These add up to 7.7 hectares or 77,000 square meters (770 times 100 meters) or more than seven football fields. In comparison, the average American lives on a footprint about 30 percent larger, the average Italian on less than two thirds the size. The average Swede occupies close to 6 hectares. These figures may still be underestimates of the ecologically productive areas truly necessary to sustain these people.

⁴ See Wackernagel, et al., *Ecological Footprints of Nations: How Much Nature Do they Have?*, INTERNATIONAL COUNCIL FOR LOCAL ENVIRONMENTAL INITIATIVES (ICLEI), (visited April 30, 1998) <<http://www.iclei@iclei.org>>.

These footprints can now be compared to the available eco-capacity on the planet, in a country or in a region. Dividing all the ecologically productive land and sea on this planet by the number of people inhabiting it results in a statistical average of 2.3 hectares per person, less than one third of what is necessary to accommodate a typical Canadian footprint.⁵ If we put aside, as suggested by the Brundtland Report: *Our Common Future*, 12 percent of the biologically productive space for preserving the other 30 million species with whom we share this planet, the available space per capita shrinks to 2 hectares.⁶ With the anticipated global population of 10 billion for the year 2050, the available space will be reduced to 1.2 hectares, including the sea space. Already, the average Italian uses 210 percent more than what is available on a per capita basis worldwide, or 320 percent more than what is at hand per Italian within their national territory. Sweden is still among the lucky few countries who have ecological footprints that are smaller than their ecologically productive space. Worldwide, however, humanity's footprint may exceed global carrying capacity by 30 percent - in other words, humanity consumes more than what nature can regenerate and is draining the globe's natural capital stock. This points to the challenge of leaving ecological space for other people's footprints and undisturbed habitat for other species.

⁵ See FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO), *FAO YEARBOOK: PRODUCTION 1994* (1995A); FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO), *STATE OF THE WORLD'S FORESTS* (1995B).

⁶ THE WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT (WCED), *OUR COMMON FUTURE* (also known as the "Brundtland Report") 147, 166 (1997).

Trade and Ecological Stability⁷

While most of the trade and environment debate restricts its focus to the compatibility of international pollution standards,⁸ far more significant is the role of trade in depleting natural capital. Other social and ecological problems of trade liberalization have been discussed elsewhere.⁹

In essence, technology and trade allow for the acceleration of society's ecological throughput, i.e., the flow of energy and resources through the human economy, far beyond local (and even global) eco-capacities: better financing schemes, more cheaply convertible currencies, faster money transfers, fewer trade taxes, more reliable international legal frameworks, better communication networks, more potent transport capacity and more efficient resource extraction machines all help access the remaining resources more quickly. This expedites not only society's resource throughput but also its capacity to amplify its technological capacities for exploiting resources.

Today, these technological enhancements allow humanity to ever more quickly and easily access these still less used resource stocks. In fact, it becomes easier more quickly than humanity's demands for these resources increases. It is no wonder that resources' prices are still going down, while the global market will not feel any scarcity or physical limits. Obviously market scarcity and ecological scarcity are increasingly separate phenomena, the former representing the immediate supply on the market (as expressed in its market price),

⁷ This section builds on parts of M. Wackernagel & W. Rees, *Perceptual and Structural Barriers to Investing in Natural Capital*, 20 *ECOLOGICAL ECONOMICS* (1997).

⁸ See, e.g., *Trade Competitiveness* (John Kirton & Sarah Richardson eds., 1992); *The Environment and Free Trade* (AnnaMaria Bengtsson et al., eds. 1994).

⁹ See, e.g., J. SINCLAIR, *CROSSING THE LINE* (1992); B. COOTE, *THE TRADE TRAP: POVERTY & THE GLOBAL COMMUNITY MARKETS* (1992); H. Daley & R. Goodland, *An Ecological-Economic Assessment of Deregulation of International Commerce under GATT* (1992) (unpublished manuscript on file with the Environment Department, The World Bank, Washington, D.C.).

the latter giving an indication of total existing stocks (as expressed in biophysical accounts). As global trade delinks market scarcity and ecological scarcity, the healthy and necessary feed-back loop between ecological capacities and human consumption is broken, allowing modern society to lead the dangerous life of an ecological invader. These invaders, as one can learn from well documented cases in biology and ecology, enter new niches and consume everything they can get hold of. Finally, once the niches' capacities are lost through overexploitation, the population and its consumption collapses to significantly lower levels. The difference between yeast in a sugar rich environment or rabbits coming to Australia (prototype situation of ecological invasion) and human beings is merely that people have the intellectual capacity to foresee their potential demise. Most people find such a collapse unacceptable. Humanity's reaction? We deny that such collapses can happen and fool ourselves by extending our expansion time: Siberia has opened up, the Amazon basin will soon be fully exploited, and Canada's forests can still be clear-cut for a while. With these short-term strategies, humanity appears to be buying time, but humanity is actually wasting time by following the same self-destructive path. The outcome of such "invasion" behavior should not come as a surprise. Humanity will reach an even higher level of consumption from which to fall down from - even further once the last ecological niches are pillaged.

Still, there are economic theories which legitimize economic integration, portraying it as a source of true wealth. The majority of these intellectual efforts make reference to David Ricardo's theory of comparative advantage. This theory provides a model of trade in which mutual benefit accrues to individuals and firms who specialize in those things they produce most efficiently.¹⁰ This model, which is often assumed to apply to nations, presumes that:

¹⁰ See HERMAN E. DALY & JOHN B. COBB, JR., FOR THE COMMON GOOD 209-218 (1989); PAUL A. SAMUELSON & WILLIAM D. NORDHAUS, ECONOMICS 831-56 (International Student Edition) (12th ed. 1985).

- a) The trading partners are engaged only in barter trade and that their national currencies are not freely exchangeable;
- b) Economic production is proportional to labor input alone.

Thus while an economy might be limited by labor shortages, there is no consideration of limits imposed by finite resources and sinks.

In the modern world of convertible currencies, this model deflates with the violation of its first assumption. Investment flows are now governed by comparing potential absolute profitability between countries, not by the "comparative advantage" of particular industries within countries.¹¹ Some countries (and their workers) lose out as capital leaves in search of absolute advantage. Moreover, it is apparent that natural capital is once again more likely to impose limits on the scale of the economy rather than labor shortages. This makes the ecological "Law of the Minimum" and the concept of appropriated carrying capacity essential to any interpretation of the sustainability implications of international trade.

In the middle of the last century, the German agro-chemist Justus von Liebig postulated the "Law (or Doctrine) of the Minimum" for plant growth. He observed that essential plant nutrients occur naturally in varying concentrations from overabundance to insufficiency in cultivated fields. However, he found that "it is by the minimum that the crops['] growth is] governed".¹²

This insight, that systems and processes are governed by that *single necessary factor* in least supply, led to the use of more specific fertilizers in agriculture. For example, if plant growth is stunted by the lack of phosphate, one need only fertilize with phosphate. The crop can now continue growing and accessing more of its required nutritive substances until some other factor becomes limiting; such as water, so higher productivity will still need irrigation, etc.

¹¹ See DALY & COBB, *supra* note 10, at 214 (1989).

¹² J. VONLIEBIG, NATURAL LAWS OF HUSBANDRY (John Blyth trans., D. Appleton & Co. 1989) (1863).

For modern industrial farmers, supplying only the limiting factors seems to make farming more efficient: farmers overcome ecological barriers to crop productivity by adding those few factors which are scarce in the natural environment. However, there are ecological drawbacks. In nature, limiting factors serve to regulate production systems. The shortage of only one essential requirement prevents plant growth from exhausting the entire resource base. The effect of chemical fertilization, therefore, is to accelerate the depletion of successive components of the soil, a potentially renewable form of natural capital, while creating dependencies on increasingly scarce non-renewable resource stocks such as phosphate or fossil fuel. This amounts to the short-circuiting of natural biological fuses.

The Law of the Minimum can also be applied to economic growth: economies physically expand until they reach some limiting factor. Thus, an economy might be stunted by inadequate human capital (e.g., labor and education); cultural capital (e.g., social institutions and political stability); human-made capital (e.g., plant, machinery, physical infrastructure); or natural capital (e.g., resources and biodiversity).¹³ Conventional economics however, considers only labor and human-made capital to be potentially limiting: ". . . the tacit justification has been that reproducible capital is a near-perfect substitution for land and other exhaustible resources."¹⁴ Today, however, natural capital is emerging as a major bottleneck¹⁵ and more liberal trade is perceived as the best way to overcome related local limits.¹⁶

Unfortunately, unregulated trade acts like excessive fertilizer: it can short-circuit ecological fuses which historically kept economic

¹³ See F. Berks & C. Folke, *A Systems Perspective on the Interrelations Between Natural, Human made and Cultural Capital*, 5 *ECOLOGICAL ECONOMICS*, 1, 8 (1992); PAUL EKINS, *et al.*, *WEALTH BEYOND MEASURE: AN ATLAS OF NEW ECONOMICS* 42-61 (1992).

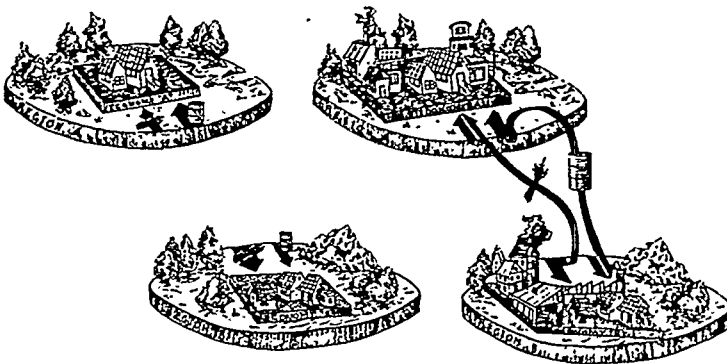
¹⁴ W. NORDHAUS & J. TOBIN, *IS GROWTH OBSOLETE?* (1972).

¹⁵ See Wackernagel, *supra* note 4.

¹⁶ W. CATTON, JR., *OVERSHOOT: THE ECOLOGICAL BASIS OF REVOLUTIONARY CHANGE* (1980).

throughput in balance with local bioproductivity. Most economists explicitly support unrestricted trade precisely because it enables local economies to overcome its material barriers to growth. This contributes to our prevailing cultural mythology which assumes a world in which "carrying capacity is infinitely expandable."¹⁷

Consider a model of two economies dependent on two resources. Economy "A" can produce surplus foodstuffs (X) but lacks adequate energy supplies (Y); economy "B" has abundant hydrocarbon reserves but little agricultural potential. Obviously it is to their mutual advantage if A can import oil from B in exchange for food (see Figure 2). This commercial exchange allows both economies to expand further until some other factor becomes limiting. The growth of these economies most likely entails higher populations, greater resource throughputs, accelerated stock depletion, and intensified pollution. The question is, at what point do their people cease being better off than before? Each economy is still contained by a (second) limiting factor and in addition is now dependent on an essential resource supplied by another economy. To this extent, the gains are only transitional: a short period of economic growth during which, in the best case, distributional conflicts may be eased.



¹⁷ H. DALY, *Sustainable Development: From Concept and Theory Towards Operational Principles*, 1990 POPULATION AND DEVELOPMENT REVIEW, reprinted in H. DALY, *STEADY-STATE ECONOMICS* (2nd ed. 1991).

Fig. 2: Ecological implications of trade in a two-resources economy. From self-sufficiency (left) to trade (right). Importing resources that are locally limiting appears to increase local carrying capacity while actually lowering it. As a result, trade induced expansion undermines the local and ultimately the global ecological stability. (Illustration by Iliana Pámanes).

In the modern world of course, both A and B can find new trading partners to overcome the latest limiting factor, and so on. The result is, just as economists expect, expansive growth of the various economies as successive locally limiting factors are eliminated. Both economies expand their economic footprint (represented in Figure 2 by increased size of the economies). However, once again important ecological consequences flow from global economic integration. First, material growth anywhere necessarily increases the throughput of energy and material resources, including those which have not historically been limiting. In consequence, more and more countries are running an ecological deficit (see Table 1). These deficits can only be covered by either depleting one's own natural capital stock or by importing ecological flows from somewhere else.

Material growth raises the general level of both consumption and residuals output. Secondly, globalization exposes all local resource stocks to the largest possible market. In the case of regionally unique or generally scarce resources, this may increase demand, driving up prices and exploitation rates. Conversely, in a competitive market, it may drive down prices, encouraging both overconsumption by importers and overexploitation of stocks as exporters strive to maintain revenue flows. In either case, the result is more rapid natural capital depletion. Thirdly, trade allows for the pooling of risks, thereby lowering the incentives to protect one's own resource base. For example, access to low-priced agricultural imports makes people less averse to the long-term risks associated with the urbanization of locally limited agricultural land. In the absence of negative feedback on their economy or life-styles, there is no direct

TABLE 1: The ecological footprints of nations: For each country, this table lists its 1997 population, ecological footprint, available bio-capacity and national ecological deficit - the last three on a per capita basis. All areas are expressed in bioproductive average areas with world-average yields.¹⁸

	population in 1997	nation's average ecological footprint (in ha/cap)	nation's available bio-capacity (in ha/cap)	nation's ecological deficit (if negative) (in ha/cap)
Australia	18'550'000	9.0	14.0	5.0
Bangladesh	125'898'000	0.5	0.3	-0.2
Brazil	167'046'000	3.1	6.7	3.6
Canada	30'101'000	7.7	9.6	1.9
Chile	14'691'000	2.5	3.2	0.7
China	1'247'315'000	1.2	0.8	-0.4
Colombia	36'200'000	2.0	4.1	2.1
Egypt	65'445'000	1.2	0.2	-1.0
Ethiopia	58'414'000	0.8	0.5	-0.3
France	58'433'000	4.1	4.2	0.1
Germany	81'845'000	5.3	1.9	-3.4
Hong Kong	5'913'000	5.1	0.0	-5.1
Hungary	10'037'000	3.1	2.1	-1.0
India	970'230'000	0.8	0.5	-0.3
Indonesia	203'631'000	1.4	2.6	1.2
Israel	5'854'000	3.4	0.3	-3.1
Italy	57'247'000	4.2	1.3	-2.9
Japan	125'672'000	4.3	0.9	-3.4
Korea, Rep	45'864'000	3.4	0.5	-2.9
Malaysia	21'018'000	3.3	3.7	0.4
Mexico	97'245'000	2.6	1.4	-1.2
Netherlands	15'697'000	5.3	1.7	-3.6
New Zealand	3'654'000	7.6	20.4	12.8
Nigeria	118'369'000	1.5	0.6	-0.9
Pakistan	148'686'000	0.8	0.5	-0.3
Philippines	70'375'000	1.5	0.9	-0.6
Poland, Rep	38'521'000	4.1	2.0	-2.1

18

From WACKERNAGEL, et al., ECOLOGICAL FOOTPRINTS OF NATIONS (1997).

New Zealand	3'654'000	7.6	20.4	12.8
Nigeria	118'369'000	1.5	0.6	-0.9
Pakistan	148'686'000	0.8	0.5	-0.3
Philippines	70'375'000	1.5	0.9	-0.6
Poland, Rep	38'521'000	4.1	2.0	-2.1
Russian Federation	146'381'000	6.0	3.7	-2.3
South Africa	43'325'000	3.2	1.3	-1.9
Spain	39'729'000	3.8	2.2	-1.6
Sweden	8'862'000	5.9	7.0	1.1
Switzerland	7'332'000	5.0	1.8	-3.2
Thailand	60'046'000	2.8	1.2	-1.6
Turkey	64'293'000	2.1	1.3	-0.8
United Kingdom	58'587'000	5.2	1.7	-3.5
United States	268'189'000	10.3	6.7	-3.6
Venezuela	22'777'000	3.8	2.7	-1.1
WORLD	5'892'480'000	2.8	2.1 (2.0 for 1997)	-0.7 (-0.8 for 1997)

The net effect is becoming self-evident in the modern world. "Surplus" natural capital stocks everywhere are drawn down and global sinks are filled to over-flowing. Humanity's global safety net is being shredded as the "Tragedy of the Commons"¹⁹ is played out on a global scale. All countries now face the same potentially limiting factors simultaneously (e.g., ozone depletion, exhausted fisheries, atmospheric change) in a geopolitically uncertain world.

Global ecological stability will be more likely if each region must live within its own ecological capacity, similar to the vision put forward by bioregional thinkers.²⁰ Not only would ecologically balanced regions add up to a balanced planet - more importantly, they would re-establish the feedback loop between local bio-capacities and local consumption and make it harder to externalize ecological

¹⁹ See Garrett Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243 (1968).

²⁰ See KIRKPATRICK SALE, *DWELLERS IN THE LAND* (1985).

costs.²¹ People would find out immediately when too many resources are used as the ecological productivity within their region declines.

This is in no way an argument, *per se*, against trade - only against ecologically unbalanced trade. While current trade schemes balance the value of imports and exports (within a few percentage points) they need not be balanced in ecological terms. Some countries may constantly export ecological capacity (e.g., timber) while buying imports that require few ecological resources (e.g., computer programs). A bioregional economy, however, would need to balance its trade also in ecological terms. Regions that can grow apples but not oranges can trade their apples for the same amount of oranges from other regions (who, too, would like to have more apples). In this way, in both regions people could enjoy apples and oranges and the regional ecological balances would not be disturbed.

Trade as a Weapon to Defend "Islands of Wealth"

The current development paradigm that dominates not only debate, but practice as well, tries to sustain an impossibility: permanent economic growth. A solid majority of politicians and development engineers everywhere live by selling the illusion that poorer societies can reach industrial standards of living and that richer societies can continue to expand their economic purchasing power. Both are dependent on higher ecological throughputs and are ecological impossibilities: not everybody can be a net importer of ecological capacity. It is possible, however, to expand for some time beyond the globe's regenerative capacity, which according to our latest calculations humanity is doing already.²² The cost of such "overshoot" is the depletion of the global natural capital stock and a

²¹ See T. Princen, *The Shading and Distancing of Commerce when Internalization is not Enough* (1996); KARL STEINGER, *SPACIAL DISCOUNTING AND THE ENVIRONMENT: AN EMPIRICAL INVESTIGATION INTO HUMAN PREFERENCES* (1998).

²² *Supra* note 4.

reduced regenerative capacity of the biosphere. This will impose even more severe constraints on the economic possibilities of future generations.

These misguided development strategies may serve the interests of those who already live resource intensive lifestyles. Hoping to achieve industrial standards of living too, the periphery is liquidizing their natural capital assets. Recent history has shown that financial assets from resource liquidation is quickly spent (or even facilitates debt creation), while little of it trickles down to those in need. These people will ultimately lose out but in the mean time, these common liquidation policies guarantee a flow of cheap resources from the periphery to the center. Obviously, this resource liquidation undermines the possibility of securing, now and in the future, satisfactory quality of life for those most in need.

Even the political mainstream has started to realize that today we live in an ecologically overloaded world. For example two years ago in Switzerland, my native country, industrialists, including the president of the World Business Council for Sustainable Development Stephen Schmidheiny, sponsored a controversial and much discussed report called "*Mut zum Aufbruch*" (Courage to get going again) in which they made the case that Switzerland's well-being depends primarily on a competitive economy, in a world whose economies are increasingly integrated. Therefore, they advocated a more liberal economic policy for Switzerland to accelerate economic growth. Even though there is no explicit reference to global ecological scarcity in the report, it represents an implicit recognition that Switzerland, with its large ecological deficit (or resource dependence), can only secure its "sunny spot" in the global markets if it continues to be among the few winners of the global negative-sum game (also known as the "global economy"). And the winners are those who can secure high income levels and positive growth rates. In essence, this underlines once more that global trade has become a weapon of the privileged to access resources from all over the world at the cost of humanity as a whole.

A detailed ecological footprint study of Sweden has underlined this effect.²³ Sweden is one of the few countries in Europe which does not run an ecological deficit. Its economy has a significant resource extracting sector and energy intensive industry. One may expect that with all the pulp and cars they produce, Sweden would export more ecological capacity than it receives through imports. However, the contrary is the case. Through trade, wealthy Sweden appropriates approximately one additional hectare per citizen through global trade. In other words, it gives up one hectare less through exports than it receives through imports. One hectare may seem little; still, it is half the capacity that is available per capita world wide.

The good news, however, is that in an ecologically overloaded world, economic competitiveness may increasingly be correlated with the absence of an ecological deficit.²⁴ For those countries with ecological deficits that are still competitive, it may be increasingly difficult to maintain this competitiveness as resources get scarce. This will force those with an ecological deficit to reduce it in order to decrease their risk exposure and secure their future well-being. Countries without ecological deficits will be enticed to become more protective about, and give more care to, their strategic ecological reserve as it becomes an ever more valuable asset. Luckily, both of these strategies strengthen global sustainability.

This argument which points out that competitiveness - or the capacity of a country to maintain itself in the global economy - is linked to not having an ecological deficit is, I concede, rather nationalistic. Still, or perhaps because of that, it could be a major support for getting sustainability back from the list of second-class, feel-good issues onto the prime national agendas. Key to this renewed

²³ See Mathis Wackernagel & Lillemore Lewan, *The Ecological Footprint Concept Applied to Malmohus County and the Kavlinge Watershed, Southern Canada* (Jan. 9th, 1998) (unpublished manuscript, on file with author).

²⁴ See K. Muller *et al.*, *Competitiveness and Ecological Deficits* (1998) (unpublished manuscript, on file with author).

interest would be that the argument is now focused on the benefits of becoming sustainable, rather than solely building on a moral imperative.

Without shifting to such national sustainability agendas, trade will continue to maximize economic output and accelerate natural capital depletion. Indeed, some people will continue to defend the liquidation of local stocks as something advantageous, if not even absolutely necessary, to maintaining growth and competitiveness. Thus, for them trade *appears* to extend carrying capacity. However, by encouraging all regions to exceed local limits, by reducing the perceived risk attached to local natural capital depletion, and by simultaneously exposing local surpluses to global demand, deregulated and ecologically unbalanced trade eventually reduces global carrying capacity, increasing the risk to everyone. Luckily, trade schemes are not "just happening", but being forged by people (often behind closed doors as is the case right now with the MAI or Mutual Agreements on Investments). Hopefully, such arguments that show the national benefit of sustainability and reduced ecological deficits will help to develop a new generation of ecologically more enlightened trade agreements.

