

THE NORTH-SOUTH ENVIRONMENTAL CRISIS: AN UNEQUAL ECOLOGICAL EXCHANGE ANALYSIS

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ABSTRACT

This paper offers a political economy problematisation of the current trends of production towards environmental degradation, while offering an environmental critique of mainstream economic thought and capitalist exchange and production. A case is made for a re-appraisal of ‘unequal exchange’ analysis of international trade. First, this essay explains the evolution of economic thought on trade, offering a brief explanation of where ‘unequal exchange’ analysis comes from. In Part two, unequal ecological exchange is introduced and a political analysis of how and why the South¹ allows its environmental capacity to be appropriated is discussed. Part Three discusses the ecological impact of the current global trading system, and Part Four looks at the phenomenon of ‘Perverse Subsidies’ and their influence on free trade arguments. Finally Part Five examines responses to the environmental crisis, by questioning mainstream economists’ optimism about the ecological crisis. Further addressing the ‘ecological modernization’ paradigm and the Red-Green approach, in order to show the salience of an unequal ecological exchange methodology for understanding the links between the expansion of global capitalism, environmental degradation and international inequality.

I INTRODUCTION

At every step we are reminded that we by no means rule over nature like a conqueror over a foreign people, like someone standing outside nature—but that we, with flesh, blood and brain, belong to nature, and exist in its midst, and that all our mastery of it consists in the fact that we have the advantage over all other creatures of being able to learn its laws and apply them correctly (Engels 1876).

This paper offers a political economy insight into the environmental crisis; it draws attention to the political and economic driving forces of environmental degradation. The analytical tool of ‘unequal ecological exchange’ offers a critical analysis of the extensive, hidden ecological costs of international trade.

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Part One explains the evolution of economic thought on trade, including the justification of producing according to comparative advantage, structuralist critiques of this approach, and the rise of the dependency theory school, offering a brief explanation of where ‘unequal exchange’ analysis comes from.

In Part Two unequal ecological exchange is introduced, and the overwhelming evidence for unequal ecological exchange is presented. Ecological Footprint data shows the geographical locations of aggregate energy consumption, while Esty’s (2005) Environmental Sustainability Index draws attention to the geographical locations of environmental degradation. Unequal ecological exchange analysis is used to draw attention to the causality between these two sets of data. This is followed by an analysis of the externalization of the negative environmental effects of production, with the aim of elucidating the mechanism by which Southern ecosystems are degraded by Northern consumption patterns. A political analysis of how and why the South allows its environmental capacity to be appropriated is discussed, from intra-national and international frames of analysis.

Part Three discusses the ecological impact of the current global trading system. A materialist historical analysis of international trade is used to highlight the global trading system’s inherent inequality. Trade liberalization is critiqued from an environmental perspective; Polanyi’s (2001[1944]) analysis of the rise of ‘market freedom’ as the disembedding of the economy from its social and environmental ties is used to explain the contemporary trading system’s tendency towards environmental degradation. In this context, attention is drawn to the lack of institutional capacity in the South to manage the environment responsibly, and that this, combined with trade liberalization, allows for an unhealthy scale of appropriation of the South’s bio-capacity.

Part Four looks at the phenomenon of ‘Perverse Subsidies.’ These subsidies are not only inefficient but also environmentally damaging. The weight of these subsidies and their influence in informing ‘free trade’ parameters is drawn attention to. These subsidies permit the market to be especially environmentally irresponsible, and reinforce patterns of unequal ecological exchange.

Part Five examines responses to the environmental crisis; it questions mainstream economists’ optimism about the ecological crisis, and their belief that humanity will somehow be able to come up with a technical solution to the degradation of ecosystems is questioned. The ‘ecological modernisation’ paradigm is examined and we argued that while its recommendations of a re-orientation of capitalism towards ecological sustainability are valid, it will not solve the problem highlighted by the scale of Northern aggregate consumption, which is fuelling the majority world’s ecological devastation. Finally the ‘Red-Green’ approach is commented upon, and the analytical strength of its deconstruction of ‘use-value’ and ‘exchange-value’ in relation to the environmental crisis and as an alternative critique of capitalism is highlighted.

I EVOLUTION OF TRADE THEORY

a *Comparative Advantage*

Neo-classical trade theory is based on the notion of comparative advantage conceived by David Ricardo, which explained that the allocation of capital and labor within a country into areas with which it has a ‘comparative advantage’ in production would lead to economic efficiency, and therefore success. The premise is based on the assumption that “As long as the cost ratios differ between countries in the absence of trade, every country will have a comparative advantage, an ability to find some good it can produce at a lower relative cost than others” (Muradian and Martinez-Alier 2001: 282).

b *Competitive Advantage*

The Ricardian free trade theory was updated by Heckscher and Ohlin (H-O); economists whose trade model assumes that “trade should be based on the comparative advantage of countries, which in turn is determined by the relative abundance of production factors” (Derinayagala 2005: 100).

In the 1950s, the Structuralist School, led by Latin American Raul Prebisch and the economists of the United Nations Economics Commission for Latin America, critiqued the neoclassical theory of comparative advantage as a development strategy. Their critique was a direct response to neoclassical economists’ espousal of comparative advantage “who favored planning and the non-market-allocation of resources through a variety of controls and government incentive for domestic investment, and foreign trade” (Auty 2001: 6).

Because of the resurgence of neoliberalism during the late seventies and early eighties, the free trade argument became mainstream economic policy: ‘The neoliberal resurgence in international economics since the early 1980s gave almost axiomatic status to the optimization potential of free trade, a view which has now come to represent the conventional wisdom on trade policy’ (Deraniyagala 2005: 99).

c *Unequal exchange*

In the late sixties and early seventies, a theory rooted in the structuralist critique of comparative advantage, and a materialist historical perspective emerged, the ‘dependency theory’ school. While their analysis has been critiqued (notably by Brenner 1977), it is perhaps more salient than ever in its ability to deconstruct neoliberal globalization. One of its proponents, Emmanuel Wallerstein proposed that

The trade-induced world division of labor will, in turn, give rise to an international structure of unequally powerful nation states: a structure which, though maintaining and consolidating the world division of labor, determines an accelerated process of accumulation in certain regions (the core), while enforcing a cycle of backwardness in others (periphery) (Brenner 1977: 30).

The process Wallerstein describes is ‘the development of underdevelopment’, a concept first developed by Andre ‘Gunther’ Frank in 1966. The dependency theory analysis builds on structuralist critiques of trade, and emphasizes that the current system of

international trade is inherently unequal, and severely detrimental to the majority of people in the poor world.

The continuing underdevelopment of the ‘South’ was complementary to the continuing development of the countries of the ‘North’. For skeptics about mutual benefit, economic relations between developed and underdeveloped countries were seen as necessarily ‘unequal’ (Sutcliffe 1995: 201).

‘Unequal Exchange’ is associated with Arrighi Emmanuel (1972) who attempted to put a ‘development of underdevelopment’ hypothesis into a Marxian labor-centric theoretical framework. He saw the relationship between wages in the peripheral areas and core areas of the world as being a defining feature and cause of the dynamic of underdevelopment in the periphery².

For elementary economists, the concept of unequal exchange is fundamentally problematic. Exchange is defined as what the buyer is willing to pay is equal to what the seller is willing to accept. Therefore,

Few mainstream economists would recognize ‘unequal exchange’ as an acceptable and objective category of economics. . . .As long as exchange is conducted in terms of monetary exchange values, and prices are understood to reflect the rational, or even benevolent logic of market forces, there is no way—other than under conditions of monopoly—that a market transaction can be classified as ‘unequal’ (Hornborg 2003: 4).

II UNEQUAL ECOLOGICAL EXCHANGE

a *Sustainability*

There is a salience of an unequal ecological exchange methodology for understanding the links between the expansion of global capitalism, environmental degradation and international inequality. We can clearly see the existence of unequal ecological exchange through global ecological footprint data country by country. ‘The global Ecological Footprint—humanity’s consumption of natural resources expressed in land and sea surfaces necessary to renew them—is an average of 2.2 global hectares (5.4 global acres) per person, while the area available to support the global population (6.3 billion) is an average of 1.8 global hectares (4.4 global acres) per person’ (www.globalfootprint.org).

On average high-income countries consume an average 6.4 global hectares of bio-capacity per person, while low-income countries consume 0.8 hectares per person. The inequality of ecological consumption is striking. The United States consumes 9.7 global hectares per person, while its national bio-capacity is only 4.7 hectares, thus the ecosystemic overshoot of the United States overshoots its bio-capacity by 4.9 hectares per person. Data from 2002 data shows that throughout the world, humanity is overshooting the regenerative capacity of the world’s ecosystem by 0.4 hectares of ecologically productive land per person on the planet.

Levels of ecosystemic sustainability on the other hand, are higher in the North than in the South. Yale University’s measures of ecological sustainability—the Environmental Sustainability Index (ESI) ranks Finland first, the United States forty-fifth, and Haiti one-hundred-forty-first out of a total of 146 countries, out of a total of 146 (Esty et. Al. 2005).

Haiti's global footprint is only 0.6 hectares per person, well within the total bio-capacity of 1.8 hectares per person while the average Finn uses 6.8 hectares each.

b *Unequal Ecological Exchange*

Unequal Ecological Exchange is an analytical key to understanding the discrepancy between the concrete data of global footprints and ecosystemic sustainability results. This analysis draws on the works of the 'unequal ecological exchange' school that is seen in Bunker and Ciccantel (2005), Hornborg (1998, 2003), Jorgenson (2004), Jorgenson and Rice (2005), Lipke (2004), Martinez-Alier (various including 2002, 2003), Murandian and Martinez-Alier (2001) and Odum (1988).

Exactly how is this 'environmental surplus' extracted from the periphery? Odum (1988) conceptualized unequal ecological exchange in terms of energy and argued that the North imports 'embodied energy' (emergy), or 'energy memory' from the South, to explain the unequal exchange of energy between nations (Hornborg 1998: 130). The inequality of this exchange arises from the periphery's exportation of the energy content of its natural resources, which are not factored into prices: 'Odum believes that the periphery is being underpaid for the energy memory content of its natural resources because free gifts of nature and thus not properly evaluated on the market' (Hornborg 1998: 131). Odum's 'energy memory' theory broadly captures the root of the problem but we need to look at what is actually driving this energy exchange.

c *Obligatory Unequal Ecological Exchange*

As poor countries have no alternative but to export their environmental resources at prices dictated by the market, unequal ecological exchange may be better understood as 'obligatory unequal ecological exchange'. If we consider the factors of a developing country's structural limitations to autonomous policy decisions, it is clear that these countries are in no position to dictate conditionalities on the foreign cash inflows, which they receive in exchange for natural resources. "Conditionality" includes fiscally crippling external debt, an internalization of the Washington Consensus doctrine of an export led economy based on factor endowments, and the lack of a military deterrent to foreign imperialism.

These countries are in fact 'locked-in' to a path of ecological destruction to supply the voracious consumption of the richer segments of the capitalist world economy. A power discourse analysis highlights the importance of bargaining power differentials between economically powerful states and economically disempowered states.

From an ecological perspective, Frank's 'development of underdevelopment' theory (first mentioned in 1966) regains salience in light of the ecological footprint and ecosystemic sustainability evidence.

The ecological footprint data and geographical location of environmental degradation unequivocally demonstrate that the North's development path (albeit unsustainable ecologically) relies on the South exporting its bio-capacity to the North. Thus, the North's development path is dialectically responsible for environmental degradation in the South.

d *The mechanism of under-valued exchange*

We have now established a macro level justification for the consideration of unequal ecological exchange. Joan Martinez-Alier, explains the actual mechanism by which unequal ecological exchange takes:

By ecologically unequal exchange we mean, then, the fact of exporting products from poor regions and countries, at prices which do not take into account the local externalities caused by these exports or the exhaustion of natural resources, in exchange for goods and services from richer regions (Martinez-Alier 2002: 214).

Unequal can also refer to ‘ecological dumping’, which means—‘selling at prices that do not include compensation for the exhaustion of resources’ (Martinez-Alier 2003: 19). This occurs when negative environmental ‘externalities’, i.e. ecosystemic costs that are attributable to production, are not factored into prices. Some examples are a mining process that pollutes a river system with its waste product but is not held accountable for it or the effects of subsidized industrial agricultural water consumption on aquifers and the spiraling ecosystemic costs of large-scale production:

In order to extract one ton of aluminum, major inputs of bauxite are necessary, and in order to extract and move the bauxite a great deal of material and vegetation is destroyed. Then the large input of electricity for the smelting of aluminum has its own material rucksack (Martinez-Alier 2003: 23).

The World Watch Institute, estimates that the amount of gold produced for a single 0.33 ounce, 18 karat gold ring leaves at least 18 tons of mine waste in its wake. (Radhika 2007).

e *A Political Economy understanding of Unequal Ecological Exchange*

Approaching unequal ecological exchange from a political economy perspective, we are drawn to analyze the political and economic power struggles regarding environmental externalities.

A country’s ecosystemic resources, its ‘natural capital’ does not translate to a one to one ratio to money capital. In the process of changing natural capital into liquid capital, the aggregate economic effects of ecosystemic degradation exceed, in money terms even, the returns from the original conversion of ecosystemic use-value into profit.

From a political perspective, it is clear that the economic benefits of activities which degrade ecosystems usually benefit small powerful groups of individuals, whereas the economic costs of degrading the ecosystem are spread in a more aggregate way among society’s members. Therefore, unequal ecological exchange represents a ‘cost shifting success’ for more powerful members of global society. Unequal Ecological Exchange’s marginalisation of ecosystemic value runs parallel to McMurty’s (2002) critique of neoliberal business practice: ‘The unstated but ruling principle of business ‘cost efficiency’ is to externalize all possible costs of for profit commodity cycles onto those who do not profit from them’ (McMurty 2002: 151, his italics).

f ***The Value of Ecosystems***

A few recent studies attempted to set a value on the ecosystem. Costanza *et al.* estimated fundamental ecosystemic services to have a value of US \$33 trillion a year. (1997: 255). However, mainstream economist critics such as Sagoff (1997) believe this effort to assign prices to ecosystems is inherently flawed because these services cannot be traded in open commerce. Nevertheless, ecosystems do have an inherent value—such as soil formation, nutrient cycling, and water regulation and supply (Constanza *et al.* 1997: 255). Neoclassical economics provides an insufficient framework for internalising these values, which are essential for sustainable human development.

In the current economic framework for the environment, the guidelines for factoring in externalities into prices could be brought about by classifying them as a social marginal cost of production or extraction (Martinez-Alier 2003: 15). For example, the detrimental costs to society of a polluting industry could be internalized through a payment to compensate society for its negative environmental effects. McMurty (2002) also offers a solution to the built-in blindness of market accounting, a type of full cost accounting. In his analysis of the problematic ecosystemic externalities to production, he recommends a reconnection to reality that either prohibits corporations by law from ecosystemic degradation, or makes externalized costs internal to the businesses imposing them. A framework for the comprehensive internalization of the effects of production on ecosystemic sustainability is needed, but for such a scheme to work, a very strong environmental policy network would have to be in place.

g ***The Natural Resource Puzzle***

Unequal ecological exchange draws attention to the political economy relationship between extractive economies and the economies that consume their resources. When Richard Auty (2001) compared per capita incomes of developing countries from 1960 to 1990, he found that

Resource-poor countries grew at rates two to three times faster than those of the resource-abundant countries and the gap in growth rates widened significantly since the 1970s... Moreover the mineral driven resource-abundant countries have been among the weakest performers (Auty 2001: 3, his italics).

Ascher (1999) explains that the widespread abuse of natural resources in developing countries poses many perplexing riddles. He attributes poor-resource practices to government policy failure, but argues that this cannot be simply attributed to incompetence or ‘short-sightedness’ of government officials. He explains that the resource rich developing countries’ policy failures are illogical, arguing that ‘Governments chronically ignore the first principle of resource economics for public lands, namely, that they should charge the users the full value of the resources they extract, lest the users overexploit ‘cheap’ resources’ (Ascher 1999: 16). An unequal ecological exchange perspective explains this developmental conundrum which we will address from both the intra-national and international perspective.

h *The Intra-national level of analysis*

The intra-national level of analysis enhances our understanding of the under-valued ecological exchange involved in natural resource extraction. The environmentally degrading effects of mining for example does not happen in the analytical category of ‘periphery’, i.e. poor country, but in the ‘periphery of the periphery’ as in the marginalized areas of these already poor countries. Ascher (1999) writes that the sites of resource exploitation are often geographically and economically marginal, and inhabited by marginal groups.

In these areas, property or user rights tend to be poorly defined or have passed into state control... [Therefore,] the political costs are also low because the losers from poor resource exploitation are often economically marginal people who have little voice to protest the manipulations, as well as future generations who will suffer the loss of resource wealth and healthy ecosystems (Ascher 1999: 22).

An analysis of intra-national political economy dynamics captures the class perspective of environmental degradation. Resource extraction, depletion, and pollution do not happen at the aggregate level of countries, but affect the lives of individuals. The benefits and costs of environmental degradation happen at different places. ‘For example, revenues and environmental costs from oil exports or from copper exports in Nigeria and Indonesia are enjoyed by and fall upon different sectors of the population’ (Muradian and Martinez-Alier 2001: 288).

From this perspective it becomes clear that social inequalities within developing countries facilitate unequal ecological exchange. Unequal power relationships are not only socially damaging for a country, but ecologically damaging as well.

i *An International Perspective*

Bunker and Ciccantel (2005) explain why peripheral countries apply detrimental resource policies. They believe that securing access to cheap and abundant flows of natural resources is so important for powerful nations, that powerful nations’ corporations, policy makers and consultants try to influence resource-rich states’ policies.

Competing core states strove to influence economic and political policies of resource-rich nations in ways that allowed them to adapt to and exploit the materio-spatial characteristics of the new extractive peripheries at low costs (Bunker and Ciccantel 2005: 56).

A way that core states have subtly gained access to the South’s resources is through influencing the economic understandings of the peripheries policy-makers, to realise the benefits of exporting their environmental resources. Bunker and Ciccantel (2005) refer to this process as promotion of the ‘hegemonic ideologies of the core’.

For students of development studies, this manipulation of hegemonic economic discourse is well known and there are many critical works deconstructing the myths of neoliberalism including Chang (2002), Chang and Grabel (2004), Saad-Filho and Johnston (2005). The developing country experience with neoliberal restructuring has been uniformly one of following policies originating in Washington, which was expected

to bring welfare gains and economic growth, but failed to do so. Instead, they succeeded in improving the terms of trade for core countries and the interests of financial capital. The lobby that supports this anti-developmental strategy domestically is often the elite (with stakes in primary commodity exports), or those who internalized the above 'hegemonic ideology of the core' from their foreign education.

The dependence of the North on Southern biosystems to maintain current consumption and energy use levels mean that the North uses all its bargaining power advantages (debt, debt conditionality, military force, international trade agreements, etc.) to maintain and reinforce this unequal relationship.

The analysis of unequal ecological exchange is based on an awareness of production's 'cost-shifting' of environmental externalities. The ecological burden of consumption of the North shifts to the South. What is also clear is that unequal ecological exchange is facilitated by social inequality, the social inequality of Southern nations' societies, and the inequality between consumers from the North, and producers from the South. Therefore, high levels of social inequality are integral to the global environmental crisis.

III. AN ANALYSIS OF THE ECOLOGICAL IMPACT OF THE GLOBAL TRADING SYSTEM.

a *International trade in historico-materialist perspective*

Ecologically unequal exchange is essentially a matter of trade and we will review how the current global trading system perpetuates and contributes to inequality driven environmental degradation. Materialist historical analysis reminds us that the global trading system has always been an imperial structure designed to maintain the core's hegemony in trade

Trade-dominant nations create formal regimes of administration and finance that govern relations with their peripheral suppliers—colonization, free trade, rights to foreign investment, autonomous joint ventures, structural adjustment programs, and organizations to monitor world trade and guarantee continued cheap and stable access to adequate and expanding supplies of raw materials (Bunker and Ciccantel 2005: 233).

Historically, the 'colonial contract' was used as a mechanism to keep the colonies at a level of underdevelopment in order to ensure that they could not compete with the imperial centre; trade restrictions were the tool used to maintain it.

According to Bairoch (1997), the 'colonial contract' was the main cause of non-transmission of industrial revolution outside Europe since it implied that (a) colonies could import only products from the metropolis and tariff rates had to be low, normally 0%, (b) colonial exports could be made only to the metropolis from which they could be re-exported (c) production of manufactured goods that could compete with products of the metropolis was banned and (d) transport between colony and metropolis was conducted only on metropolis' ships. Economic policy of the colonies was therefore entirely subjugated to the interests of the metropolis, the most important objective being to prevent industrial competition from the colony (Milanovic 2003: 671).

Trade liberalization is promoted as beneficial by mainstream economists because it forces the logic of comparative advantage to become universal, allowing the market freedom to bring efficiency gains, and force countries to promote innovation by ‘keep[ing] abreast of the latest technical advances’ (Neumayer 2001: 104). However, the mainstream argument that trade liberalization could be beneficial to the environment is naively optimistic.

b *The Disembedded Market and the environment*

A salient way of understanding the trade liberalization process is that of the ‘disembedding’ of the market. Karl Polanyi (1944[2001]) eloquently analyzed the rise of the global market economy as an example of the market ‘disembedding’ itself from social and environmental constraints through the rise of the market economy. This separation of market transactions from social and ecological considerations is obviously to going to have unforeseen environmental consequences as market decisions prioritize profit, in terms of maximum financial capital appropriated, rather than concerns about maintaining the functionality of ecosystems.

The ecological and social effects of disembedding the market from its social and ecological grounding belie neoliberalism’s optimism about the economic and social gains of greater efficiency and innovation accruing from a disembedded market economy. The global economy refuses to acknowledge the natural limits of production because it is disembedded from any ties to a particular place.. Corporations can ride roughshod over the environment, moving from one place to another, leaving destruction in their wake.

Unlike earlier modes of production, whose reproduction was often tied to particular local or regional eco-systems, capitalism can afford to ruin ecosystems—leaving deep and broad ‘ecological footprints’ in its wake and then move on over time and space in a slash and burn fashion (Burkett 2006: 136).

c *Obscuring Ecosystemic Sustainability*

International trade allows the product of one area to be consumed in another, and advances in international trade allow economically and politically powerful countries to overstep their own ecological limits of resource consumption. This process has facilitated over-consumption patterns, allowing them to be perceived as normal in the North, thanks to mechanisms of unequal ecological exchange. Outsourcing obscures the causal link between the North’s consumption of resources and the South’s environmental degradation. The danger of this approach is that the link between consumption and degradation is forgotten. Environmental degradation remains out of sight and out of mind.

With economic globalization, the market makes digital what was analogue; production processes spread out all over the globe from the absolute advantage in complex production chains. Therefore production processes are digitalized and disembedded. Danger lies when there is no causality between the ‘digitalization’ of the consumption of the finished product and the environmental degradation inherent in its production. It allows production to exceed scale limits and causes the majority world’s ecosystems to malfunction. There exists an avoidance of responsibility for environmental degradation which the process of unequal ecological exchange which must be redressed.

d ***Ecological Cost-Shifting***

Muradian and Martinez-Alier (2001) argue that the import of environmentally intensive products is an example of environmental ‘cost-shifting’. The present situation of a world market disembedded from environmental limitations allows environmental cost shifting to occur on a massive scale. From a business efficiency perspective, factoring out the costs of environmental ‘externalities’ is representative of ‘cost-shifting successes’ through social asymmetries in the distribution of (mostly de facto) property rights, income and power” (Muradian and Martinez-Alier 2001: 289).

e ***Southern Property Rights and Trade liberalisation***

Chichilnisky (1994, 852) argued that a lack of property rights in the South gives the illusion that the South has a comparative advantage in the export of resource intensive goods. In reality, however, the South exports environmentally intensive products because control over natural resources is not defined (or not controlled) properly.

The idea that market prices accurately represent scarcities and that factor endowments should inform what a country exports are fundamental free market ideology. However, Chichilnisky points out the opposite: the market does not accurately represent environmental scarcities—institutional limitations such as lax property rights, and an inability to understand the true value of ecosystems—give developing countries the appearance that they have an advantage in natural resource exports. Therefore the externalities associated with their production renders their export uneconomical in the mid- or long-term from a national accounting perspective. In the South an institutional lack of capacity means that the environment is degraded because those who suffer the ill effects of environmental degradation are not empowered to complain that their neighbor’s environmental externalities are infringing on their property rights.

Developing countries also have a very weak bargaining position regarding the appropriation of their natural capital by Northern interests. While they have a relatively abundant level of natural capital, they also have a great scarcity of financial capital. Their weak bargaining position on the issues of natural resources and negative environmental externalities of production, forces them to undersell their natural capital.

The South’s lack of sufficient institutions coupled with a free trade regime leads to a wasteful allocation of environmentally intensive goods. Neumayer argues that:

Trade liberalization can lead to a global increase in resource depletion and to a global increase in environmental pollution. These effects are more likely to occur and be stronger if property rights over resources are ill defined and if the environment is not managed optimally (Neumayer 2001: 109)

From Neumayer’s analysis and the institutional lack of capacity in the South, trade liberalization in the current context should not be extended until strong institutional controls over natural resources are in place. Chichilnisky succinctly draws attention to the central problem of the environmental crisis, where the North over-consumes and the South overproduces (1994: 863).

The mainstream economists' approach to institutions and governance is to highlight the importance of creating institutions to enable the market (such as institutions that will protect private property rights), and market enabling bureaucratic reform, including downsizing government influence on business transactions with the goal of lowering the transaction costs of doing business, while enabling investment. However, in the context of the rapid, irreparable damage of Southern ecosystems, private property rights need to be re-examined to include what private owners are prohibited to do. At present, environmental externalities represent 'cost-shifting successes' where the rights of those who are negatively affected by production externalities need to be enforced by a strong institutional framework. It is clear that a more equitable distribution of property rights in developing countries would facilitate a more conscientious framework for environmental management in the South. From a policy perspective, a more integral consideration of both the right to impact on a given territorial ecosystem inferred by property ownership, and the right of access to continued ecosystemic integrity that property ownership could include would facilitate ecological considerations be factored into a legalistic framework.

f Trade liberalization

It is our contention to have a policy reform debate on international trading practices with a pragmatic understanding of social activities impacts on the world's ecosystems. We find a consensus among economists that increases in trade liberalization leads to increases in environmental degradation.

A developing country's natural capital accounts desperately need enforceable property rights alongside government accountability and intervention in the market for eco-sustainability. Stronger institutions and policies that cap the ecosystemic appropriation inherent in exports are a step in the right direction. Terms of trade could be re-orientated towards the full-cost accounting of Southern exports.

If developing countries collectively adopt reasonable environmental standards in commodity production and increase the prices to include the cost of environmental compliance, their terms of trade would improve because northern consumers, whose demand is relatively insensitive to prices in the primary sector, would be paying a larger share of the environmental costs associated with their consumption (Muradian and Martinez-Alier 2001: 283).

IV PERVERSE SUBSIDIES AND THE PLAYING FIELD OF ECOLOGICAL EXCHANGE

By taking a critical look at the structure of markets, whose extension into developing countries the mainstream purports as development 'best practice', while ignoring the reality of Northern subsidies to production. The weight of environmentally subsidized production causes unequal ecological exchange by artificially altering the parameters of the market toward ecological degradation.

Myers and Kent define a subsidy as 'Any government expenditure that makes a resource such as energy or water cheaper to produce than its full economic cost, or make a product, notably food or education cheaper to consumers' (Myers and Kent 1998: 3). We define Perverse Subsidies as those that 'exert adverse effects of both environmental and economic sorts over the long run' (Myers and Kent 1998: 1). Not only do these 'perverse' or 'environmentally damaging' subsidies wantonly deplete the natural resources where

their production takes place, but their existence has a negative effect in other areas as Perverse Subsidies form the gradient of the playing field of international trade. Perverse Subsidies cause other countries exporting the same product, through price competition to intensify production in a weak environmental policy environment to become more competitive. They essentially calibrate the market towards environmental degradation because ‘A country that internalizes environmental costs into its prices will be at a disadvantage, at least in the short term, in unregulated trade with a country that does not internalize environmental costs’ (Daly and Goodland 1994: 78).

Myers and Kent’s extensive research shows the influence of subsidies on trade and estimate that ‘Overall subsidies are estimated to be almost \$1.9 trillion per year and Perverse Subsidies almost \$1.5 trillion per year’ (Myers and Kent 1998: 135). Beers and Bergh also find the Environmentally Damaging Subsidies’ effect on international striking. ‘The three sectors receiving most of the subsidies (81.5% of global subsidies) affect 66.1% of total world trade. If manufacturing is added, 87.3% of subsidies affect 96.7% of world trade’ (van Beers and van den Bergh 2001: 483).

The above figures show the extent to which international trade externalizes the natural inputs to production. The prevalence of Perverse Subsidies highlights the fact that the international trading system has an under-valuation of nature built into its structure. This is not international trade’s fault. Blame the governments who choose to increase their own countries’ economic bargaining power through subsidies, while protecting their market share from foreign competitors.

Perverse Subsidies have the negative environmental effect of over-stimulating production where ‘In a typical year of the early 1990s the Department of Agriculture obliged farmers to squander 1 billion oranges, half a billion lemons, 100,000 tons of raisins and 30,000 tons of almonds’ (Myers and Kent 1998: 34).

a *Perverse Subsidies and Environmental Externalities*

Essentially Perverse Subsidies and environmental externalities not factored into prices are two sides of the same coin, as both represent a free appropriation of ecosystemic value in production. ‘Not all environmental externalities can be readily attributable to subsidies, but any externality being an uncompensated cost, is effectively a subsidy paid by society’ (Myers and Kent 1998: 21). But, the question is: What or whom does society represent? The externalization of environmental factors, whether through subsidy or free appropriation, represents gratis value gains to capital. Capital reaps profits while the environmental costs are born by the aggregate population—‘society’. ‘Any form of production or consumption that generates an environmental externality is in effect being under-priced and is consequently implicitly subsidized.’ (Deacon and Mueller 2004: 36). For example, in agriculture, by cost-shifting the negative environmental externalities of production, the long term costs of soil erosion and pesticide usage are paid for by society, rather than the company profiting from production. To illustrate, the externality costs of soil erosion are estimated at \$150 billion a year and the externalities of the use of pesticides have been estimated at \$100 billion a year (Myers and Kent 1998: 44).

While the market has ‘disembedded’ itself from its social and economic humus, Perverse Subsidies have embedded themselves in the foundations of liberalized trade. ‘That these

policies have persisted in many instances for decades has created a system of ‘lock-in’ a situation of distorted comparative advantage patterns and thus the international distribution of economic activities’ (van Beers and van den Bergh 2001: 476). This process of “‘lock-in’ situation of distorted comparative advantage” means that the market is needlessly geared to be especially environmentally destructive. This situation is objectionable to both the defenders of the economic model of capitalism, and those of a more socialist orientation. If a competitive advantage can only be obtained by subsidizing production (as in the North) or externalizing ecosystemic value (as in the South) policy interventions at the highest level need to be undertaken, to recalibrate the global market away from a spiral of environmental degradation and the wasteful use of state resources.

From the size of Perverse Subsidies, we can observe that governments have a very large fund of resources readily available to prop up inefficient national industries, and to shift the costs of production onto freely appropriated ecosystems. Eliminating Perverse Subsidies and redirecting the money instead towards institutions of environmental management or the transition costs to a more ecologically sustainable economy (by subsidies and government investment) would be an economically simple way of reducing the negative ecological impacts of production. Not only that, but lessening Perverse Subsidies would allow the prices of some Southern environmental exports (such as agricultural exports) to rise, giving developing countries more money with which to internalise the negative ecological externalities of production.

V RESPONSES TO THE ENVIRONMENTAL CRISIS.

a *Mainstream economics’ response to the environmental question*

Solow, in 1974 offered an economic approach to the environment that emphasized the inter-changeability of natural resources for reproducible capital:

The finite pool of resources . . . should be used up optimally according to the general rules that govern the use of reproducible assets. In particular earlier generations are entitled to draw down the pool (optimally, of course!) so long as they add (optimally, of course!) to the stock of reproducible capital (Solow 1974: 41).

Solow’s view remains currently the view of the mainstream. For example, the OECD’s criteria for environmental sustainability (2005) states that: ‘Non-renewable resources should be used efficiently, and their use limited to levels which can be offset by their substitution by renewable resources or by other forms of capital’ (OECD 2005, my italics).

A contemporary defender of mainstream economics’ approach to the environment is Sagoff (2004) who argues that humanity has the potential to innovate around the environmental crisis. Defending the mainstream economists’ response to environmental degradation he writes that,

These economists argue that we can ‘choose among an indefinitely large number of alternatives.’ They believe that the earth’s ‘carrying capacity’ cannot be measured scientifically because it is a function or artifact of the state of knowledge or technology (Sagoff 2004: 155).

According to Sagoff, necessity is the mother of invention, and when the need is pressing enough, the market is self sufficient and will fix itself, “either by increasing reserves, substituting between flows or making resources go further” (Sagoff 2004: 174). He is strikingly optimistic regarding the ability of the disembedded economy to innovate around environmental problems. Sagoff dismisses the arguments of ecological economists about nature imposing limits to production (such as Daly 1999) as flawed, because he is confident that “the formal cause of production, that is design, knowledge, innovation, and ingenuity, can always overcome shortages in resources or materials.” (Sagoff 2004: 165).

The scale of this environmental degradation of China’s water problems belittles Sagoff’s optimism that ingenuity will bring a solution. Wen and Li (2006) report that 60 per cent of the water in seven major river systems—the Yangtze, Yellow, Huai, Liao, and Pearl Rivers—are classified as grade IV or worse (meaning not suitable for human contact). It is estimated that 25 per cent of aquifers are being polluted and 75 per cent of lakes suffer from various degrees of eutrophication (Wen and Li 2006). Wen and Li detail that despite the Chinese government spending billions trying to clean up the Huia river, improvement of the water quality remains an illusion. (Wen and Li 2006). Even with the incentive of an investment of billions of dollars, the market has been incapable of providing a solution to China’s irreversibly polluted rivers.

More specifically in relation to production, an ecological perspective forces us to recognise that Capital is ‘an amalgam of natural, manufactured, human, and cultural capital’ (Burkett 2006: 103). Therefore, the idea that the input of nature can be substituted for the input of capital is flawed, as financial investment, labour, and nature are needed as production inputs.

b *The Ecological Modernization argument*

Vlachou (2004) argues that with enough state regulation and market incentives capitalist businesses could become environmentally responsible. Strong state regulation would guide them into better environmental practice, through the use of emissions standards, emissions taxes, and subsidies for pollution reduction (Vlachou 2004: 931). This perspective she refers to as ‘mainstream ecological modernization’, a perspective promoted by Hawken (1997), and Porter and Linde (1995).

The key argument for ecological modernization is that there is money in it for business... State regulation can strengthen the incentives for business to expand their focus beyond short-term profits to long term competitiveness and profitability (Vlachou 2004: 943).

There are two problems with the ecological modernization paradigm. First, the analysis of Esty’s (2005) Environmental Sustainability Index data together with the Ecological footprint data implies that richer nations’ environmental legislation and regulation often lead to a simple relocation of environmentally costly activities. Anderson (2006) questions the potential geographical ‘cost-shifting’ of ecological modernization’s environmental improvements ‘Some of the reported improvements at the geographical scale of individual countries are achieved by spatially displacing damaging activities such as pollution to other (typically third world) countries’ (Anderson 2006: 252). Muradian and Martinez-Alier also warn that: ‘Imports of semi-manufactured materials may imply

larger environmental cost-shifting compared to imports of non-processed materials because they embody the environmental impacts of both extraction and processing' (Muradian and Martinez-Alier 2001: 28). Thus the environmental policy legislature of the ecological modernization paradigm requires a global, multi-lateral regulatory accord in order to avoid the problem of side stepping regulation by outsourcing.

Vlachou's ecological modernization somewhat resolves one of capitalism's environmental failings, but ignores the others. The environmental modernization perspective highlights the potential for stricter regulation to improve the environmental technique and composition of capitalist production, but the problem of scale remains. 'Technique' is defined as the effects of cleaner production processes due to increased wealth and 'composition' refers to shifts in preference towards cleaner goods (following Esty 2001). 'Scale' effects however, refer to the 'increased pollution due to expanded economic activity and greater consumption made possible by more wealth' (Esty 2001: 115). The scale effects of large consumption orientated economies vastly outweigh the benefits of more conscientious production processes. A demand reduction in the aggregate use of environmental resources is urgently needed.

The ecological modernization paradigm misses the essential political mechanism that is driving the world's ecosystemic destruction so that the ecological overshoot of the North is paid for by the South's ecosystems (as documented by the data from the Ecological Footprint and Sustainability Index). This is the essential message of unequal ecological exchange. The scale of energy and resource consumption needs curbing dramatically, as well as improvements made to the environmental efficiency of production.

The late J. K. Galbraith (2001) eloquently pointed out that the modern economy is calibrated towards consumer demand, and the relationship between consumption and environmental degradation simply 'reflects the higher preference of the people for the goods being produced as opposed to the protection of air, water and landscape' (Galbraith 2001: 121). Bunker and Ciccantel (2005: 48) highlight that environmental degradation in peripheral economies is driven by the difference between capital enabling socially constructed demand, and capital disabling natural limits to production. This expresses Galbraith's point, and shows that Northern consumers do not care about the impact on Southern environments of the production processes inherent in the goods they consume. The consumer demand of the North for the South's resources overloads the Southern countries' ecosystemic ability to sustain this demand, leading to a marked productivity decline of Southern ecosystems (Bunker and Ciccantel 2005: 48).

Lele (1991) defines sustainability as 'the existence of the ecological conditions necessary to support human life at a specified level of well-being through future generations' (Lele 1991: 601). While both mainstream and heterodox economists espouse enabling economies of scale as a growth strategy for developing countries, the planet's ecosystems do not subscribe to their logic, because 'natural production resists increased scale and speed' (Bunker and Ciccantel 2005: 48). The logic and application of economies of scale in processes that rely on natural inputs, puts too much pressure on ecosystems capacity and is therefore ecologically unsustainable because "social production can expand much more rapidly than natural production, even if it remains absolutely dependent on it. The reiterated expansion of social production thus overshoots, degrades, depletes and destroys the material basis that enables it to exist (Bunker and Ciccantel 2005: 227).

c ***The Salience of a Red-Green approach.***

Negative ecosystemic externalities created by capitalist production and consumption processes are difficult for a capitalist value system to conceptualize because ecosystems have a ‘use-value’ and not so much an ‘exchange-value’. Saad-Filho (2003) defines value in the capitalist system as ‘not a product of nature or a substance physically embodied in the commodities. Value is a social relationship between commodity producers that appears as exchange value, a relationship between things’ (Saad-Filho 2003: 35).

Costanza *et al.* estimated fundamental ecosystemic services to have a value of US\$33 trillion a year (Constanza *et al.* 1997: 259). However, these values are inherently difficult to exchange in a market setting; for example, the economic value of a clean river has a use-value, but it does not have an exchange-value. The usefulness of Marxian analysis is not least in its deconstruction of value. Marxian analysts point out that use-value is subordinate to exchange-value.

Broadly speaking, capital represents that regime in which exchange-value predominates over use-value in the production of commodities—and the problem with capital is that once installed, this process becomes self-perpetuating and expanding (Kovel 2002: 39).

The obsession with fitting all natural and social process into an ‘exchange-value’ framework—the fetish of the disembedded market system—accounts for the incompatibility of the disembedded market with ecological sustainability. An ecosystems complex web of functions cannot be addressed by such a system because the laws of nature are internal relationships are violated by conversion to the money form. ‘Ceaseless rendering into commodities, with its monetization and exchange, breaks down the specificity and intricacy of ecosystems’ (Kovel 2002: 40).

A key to understanding the environmental crisis offered by a Marxian perspective is the recognition that it is the ‘exchange-value’ of Southern environments that are exported as the effects of removing the parts of a natural system which has an ‘exchange-value’, with no concern for their inherent ‘use-value’ leads to environmental degradation. Understanding this phenomenon, Northern producers and consumers, and Southern exporter elites are directly implicated in appropriation of the use-value of Southern ecosystems, and should be made to compensate the South for this social and ecological injustice.

A brief Marxian aside into the social roles of worker and capitalist offers us a profound insight the roots of the environmental crisis. Burkett (2006) explains that the goal of the capitalist is to accumulate capital for capital’s sake, whereas the goal of the worker is to exchange their labor power for the use-values that can be obtained with the money. Burkett concludes that the difference between the capitalists’ ‘maximum monetary accumulation’ and workers’ use of money is how they socially reproduce themselves (Burkett 2006: 139).

Marx once said ‘Capital is dead labor which, vampire-like, only lives by sucking living labor, and lives the more, the more labor it sucks’ (Marx 1995). Not only does capitalism appropriate labor in this manner, it does the same with the environment. Capital

accumulation (as exchange value, not use-value) occurs at the expense of environmental crises. Cycles of over-consumption and overproduction allow for huge financial capital concentrations that serve to increase capital's political influence while heaping negative externalities onto already overtaxed ecosystems and unsuspecting governments and their taxpayers.

A Marxian critique of capitalism's inherent ecological destructiveness is very strong, but unfortunately, this approach remains confined to the margins of academia. The lobby for ecological modernization is laudable, as they offer salient ways of restructuring production to be less environmentally destructive, which is urgently needed. An analysis of unequal ecological exchange makes us aware that an overwhelming driver of the environmental crisis is global social inequality and a wanton consumption driven economy.

VI CONCLUDING REMARKS

We recognize and are optimistic about the capacity of humanity to innovate in times of necessity. Therefore, there must be a solution to environmental degradation. A major issue is that time is of the essence as the negative effects of production on ecosystems are irreversible and the damage sustained will already affect future generations. The most important scientific innovations are not of the technical solutions but ones that recognize the flaws in the structure of social organization. True innovation would mean we put to practice the scientific critique of the negative environmental externalities generated by the structure of the disembedded market.

There are two fundamental conclusions of this paper; First, we have observed that the mechanism of the appropriation of Southern bio-capacity by the North, and of Northern 'cost-shifting' of its ecological overshoot leads us to conclude that the dynamic of global social inequality, and Northern over-consumption of global resources is a main driver for the degradation of Southern ecosystems.

Global social inequality means that a small section of the world's population consumes most of the world's resources, and is responsible for most of the pollution. The majority of the world's population consumes very little of its resources, but faces dwindling ecosystemic sustainability because their exports to their richer neighbors do not take into account of environmental externalities. We are beginning to see the aggregate effects of these externalities

Institutional inequality within poor countries, such as the inequitable distribution of property rights and weak political representation informs their policy environment, and allows exporter elites and their foreign allies to freely appropriate their nation's bio-capacity for a very cheap transaction cost, and high financial reward.

Second, the development trajectory of Northern countries is one of accumulating maximum aggregate energy usage per capita. This development path urgently needs to be recognized as drastically irresponsible in light of scientific finding regarding the earth's limited bio-capacity. Development practitioners who have a genuine compassionate desire to improve the majority world's population must acknowledge that a dramatic 'de-development', in terms of aggregate energy usage of privileged countries' populations

and industries, is necessary from a Southern development perspective. The North's bio-avaricious lifestyle is only possible by 'cost-shifting' its immense negative ecological effects onto others who do not deserve them.

We need a new, reflexive paradigm of development that focuses on developing countries by improving their economic growth, ameliorating their poverty, and improving their institutions. We need a paradigm that is equally critical of the developed countries. Their over-development from their energy usage and consumption, and the societal organization that allows this to happen should be questioned. The sustainability of their development path, and the impact that their level of development has on other countries should be included in the study of development. If development is to be at all synonymous with improving this dialectical relationship between the North and South, we need to recognize the harsh reality that our current level of development is only possible because of their level of underdevelopment.

END NOTES

¹ The political economy analytical categories of 'The North' and 'The South' are used to capture the dynamics of unequal ecological exchange. The North refers to the economically and politically powerful countries geographically concentrated in the Northern Hemisphere. The South refers to the economically and politically disempowered countries of the world concentrated in the Southern hemisphere.

² The unequal exchange refers to the periphery exporting a lot of low paid low-skilled hours of labour for much fewer but high-skilled hours of labour from the core. In the core, the benefits of increased productivity stays in the country because of strong union power, while in the periphery the existence of a reserve army of labour means that productivity gains translate to a lower export price rather than a rise in income for the general population.

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