

Sustainable Development and North-South Trade

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The global environment today

Human beings, or their close genetic relatives, have lived on Earth for several million years. Yet only recently has human activity reached levels at which it can affect fundamental natural processes such as the concentration of gases (CFCs, carbon dioxide) in the atmosphere of the planet, the stability of the global climate, and the complex web of species which constitute life on earth. There is no consensus about the magnitudes and the impacts of the changes which humankind is causing, but it is known that industrial activity has for the first time in history reached levels at which it can alter the planet's atmosphere and destroy its biodiversity. It is now feared that humanity's survival may be at stake due to the environmental risks that it itself has induced. The June 1992 Earth Summit in Rio de Janeiro, attended by more than 150 countries, underscored this concern. The Summit chose three major areas in which *concerted international action* is urgently needed: Biodiversity, Climate Change and Sustainable Development. The three are so closely connected as to be inseparable in real as well as in conceptual terms. Three corresponding Framework Conventions were assigned the task of designing international policies which can avert major damage in these areas.

Major Concerns and Little Action

Two years have passed since the three conventions were charged with their task at Rio, but little action has been taken so far. Two major factors hinder the negotiations. The first are the *differences in the perceptions* of global environmental problems by industrial and by developing countries. A second contributing factor is that our *scientific knowledge* of global environmental issues is poor.

Global environmental problems are relatively new; because they are global in nature, traditional physical sciences are ill-equipped for understanding them. However, scientific uncertainty about physical phenomena should not by itself detain the negotiations; after all, one often undertakes decisions

under uncertainty - in this case, under scientific uncertainty. It is the first problem, of North-South differences, which hinders the negotiations. These differences go to the root of the global environmental problem, and lead us to question fundamental issues about economic development, international trade, and the distribution and use of resources in the planet. These issues are the subject of this paper.

North-South Issues

Developing countries (the South) view global environmental issues in a historical perspective, and observe that most of the damage to the global environment originates, currently and historically, in the industrial countries. The industrial countries (the North) are called, for obvious geographical reasons. The South observes that most of the greenhouse gas emissions originate currently and historically in the industrial countries. In fact 70% of the world's carbon dioxide is emitted currently by the industrialised countries. This is because carbon emissions arise from the use of energy: the more energy is used, the more carbon is emitted. Energy consumption is proportional to the level of production, and most production takes place in developed countries. Therefore, the North consumes most of the energy produced in the world. It is notable that the North houses a very small part of humanity: less than 1/5 of the planet's population. By contrast, most of the biodiversity and forests remaining in the planet are in the South, which houses also most of the planet's people. The developing countries account for 4/5 of the total world population. In per-capita terms the emission of carbon is 10 times larger in industrial countries than it is in developing countries. This pattern is also true in historical terms, in fact it is more pronounced: historically - 77% of the carbon emissions originated in industrial countries. The perspective of developing countries is that the North is fundamentally responsible for the current situation, and that nothing short of changing the North's pattern of development and environmental use can change matters. The

problem, of course, is that restricting emissions requires restricting energy use and output. Therefore nothing short of decreasing the North's pattern of resource use can make a dent in the problem. Industrial countries have a different perspective of the global environmental problem: they focus not in the past and the present, but in the future, a long-run future. They fear the rapid population growth in developing countries and the damages which this could cause to the environment in the future. China and India, countries with enormously large populations and fast growth rates, have large coal deposits and are expected to burn coal and emit carbon into the atmosphere in substantial amounts as their industrial growth proceeds. In the case of China, generally accepted projections indicate that it could approximate US levels of carbon emissions in about 50 years. At present the US emits about 27% of all carbon emissions and consumes about 25% of the petroleum produced in the whole world, even though its population is less than 5% of the world's population. The fear is that replicating such a pattern predicates disaster.

Population and the Global Environment

Much rhetoric has focused on population growth as a source of environmental problems. In a sense the problem is real: without humans the problem that concerns today would not exist. However, it is incorrect to blame matters on population growth. At present, and historically, those regions of the world which have the lowest population growth, namely the industrial countries, account for most of the damage to the global environment. Global environmental damage is not related to population growth; in fact just the opposite is true.

This is not to say that in the future this trend will not be reversed, and that regions with rapid population growth could not produce the largest damage fifty years from now: they could. However, scientists are clear on the observed facts: the regions with lower population growth have been historically, and are at present, those which have caused most damage to the global environment, more destruction of biodiversity, most emission of carbon and other greenhouse gases, and followed the less sustainable patterns of development in the planet.

Over consumption and Overproduction of Resources: the Role of the International Market

The world's energy use, and the concomitant use of the atmosphere to absorb carbon emissions, is symptomatic of a larger problem: the use of natural resources as a whole. Most exhaustible resources such as minerals, and most renewable resources such as wood and the agricultural products obtained from fertile land, are consumed in the North.

On the whole, the situation today can be described as the North over consuming resources which are to a large extent overproduced in the South. The whole process of over consumption and overproduction of fossil fuels can be described as a North-South process: for example most of the carbon emissions originate from the burning of fossil fuels, most of which are exported by developing countries, and are imported by industrial countries.

The most prominent of the fossil fuels is petroleum, and its overproduction and over consumption clearly implicates the international market. The general consensus is that the world's rapid rate of consumption of fossil fuels is linked to low petroleum prices. Of course, the lower the prices, the higher is their consumption. Petroleum prices in the US are 2.5 to 3 times lower than those paid by the German and Japanese consumer. Corresponding to this, the US uses petroleum much less efficiently than do Japan and Germany: a unit of GDP in the US has approximately a 40% higher petroleum content. The US uses currently about 25% of all the petroleum produced in the world, and contributes about 25% of the world's total carbon emissions. The US imports its petroleum from Latin America: Mexico, Venezuela and Ecuador, despite that it is rather rich in deposits: about 50% of the recoverable petroleum deposits in the world are in US soil. Today 2/3 of Latin American exports are resources.

While this North-South pattern of use of resources is known, it has not been considered a problem until recently; in fact many economists see this pattern as a manifestation of efficient markets functioning. More on this below. What is less clear, however, is how this situation evolved, how it came to be that in the last fifty years humanity has settled into this pattern of over-production and over-consumption of the

world's resources beyond the point of sustainability. The concept of basic needs recently became a cornerstone of the definition of sustainability in the Brundtland Report while it seems fair to say that many economists have not thought about this question often, because it does not fit easily with traditional economic views of the world, and in particular with the standard vision of economic development and international trade based on resource intensive exports by developing countries.

Economic Causes and Ecological Consequences

The environmental question is difficult because it falls in a gap joining several different disciplines: economics, biology and earth sciences. In simple terms: the causes of the phenomenon that we face are economic: we destroy biodiversity and its habitat the forests for economic reasons, for example to use land to grow cash crops. In fact 90% of the deforestation that takes place in the tropics, which house about 60-70% of the world's biodiversity, is for the clearing of land to grow cash crops, most of which for the international market. The Amazon forest is being cleared in Ecuador for the exploration and extraction of petroleum by US companies destined to the international market, despite protests from its indigenous people; oil accounts for 50% of Ecuador's exports. In Brazil the Amazon forest is used as a source of wood, such as mahogany of which 50% is exported to the UK, and cleared to grow coffee and soya beans, also for the international market. The Korup forest between Cameroon and Nigeria, at 60 million years old the oldest forest in Africa, is used as a source of palm oil, also sold in the international market. The world burns fossil fuels, petroleum and coal, to produce energy and increase industrial output. In other words: the causes are economic, but the results are biological and physical.

This means that one discipline, economics, observes the causes, and others, such as biology and geophysics, observe the results. The driving forces are economic, the consequences are physical. Each side misses a crucial side of the equation. One can only deal with the global environmental dilemma by looking at the two sides of the equation. This requires interdisciplinary cooperation, a subject that does not come easily in our traditional University system.

The last 50 years

The issues which hinder today's negotiations are tightly knit with a question which is central to the problem, but is seldom asked directly: what are the main causes of today's environmental problems? Why is it that after millions of years on the planet, humans now perceive a global environmental crisis which could threaten the species' survival? Have matters really changed in recent years?

Most scientists now agree that matters have changed in recent years, and they give a date for the onset of today's global environmental problems. The last fifty years are seen as the period when most of the damage to the planet's biodiversity and the change in atmospheric concentration of greenhouse gases has occurred. Biologists claim that extent of destruction of biodiversity is one of the main four or five incidents of destruction of life on earth, comparable with the fall of a meteorite which is held responsible for the disappearance of the dinosaurs. There is wide agreement that the level of emission of greenhouse gases in the last fifty years has also exceeded the extent of emissions in recorded history. What happened fifty years ago?

The Post-War World Order

Fifty years ago World War II was won by the Allies. For the first time the United States of America, which led the victory, dominated the world economy, producing 40% of the world product: this followed from the war's destruction of the Japanese and the European economies. Today the US is back to a much lower level, approximately 25% of the world economy measured in terms of Gross National Product.

After the war was won, a new world order emerged with its norms punctuated by the creation of three major international organisations which have had a tremendous impact in implementing a new vision of trade and development: the International Monetary Fund (IMF), the World Bank and the General Agreement on Trade and Tariffs (GATT). These organisations followed and implemented the leader's vision of economic growth: a very resource-intensive growth corresponding to a rapidly expanding frontier economy, with an enormous consumption of resources, and the domination of nature through rapid

technological change.

In the last 50 years since the end of the War, the world grew at a very rapid pace. Moreover, international trade grew much faster: in fact three times faster than the overall growth of the world economy during the same period.

At the same time that these three major international organisations were created to implement a new world order, two major theories of trade and growth were developed and implemented. One was the neo-classical theory of optimal economic growth which originated in the US and which views as a long run steady state a path of development with exponential rates of population growth and with the corresponding exponential increase in the use of resources. This is an unlimitedly expanding view of the economy and of its use of resources which parallels the US pattern of development. The second economic theory was complementary to the first, and originated in Sweden, although it was widely applied and developed also in the US: the theory of comparative advantages in international trade, which recommends that developing countries should emphasise resource exports and exports of labour intensive products, and that they should trade these against capital and technology intensive products produced by the industrial countries. The vision of development which these theories advanced was one based on unlimited and inexpensive resources. Even today this view is prevalent in the US: inexpensive oil is seen as the basis for healthy economic growth, almost a birthright of its citizens, a right for which wars can be, and are, fought. Any rational attempt to redress this view meets with political failure. These two theories of growth and trade which have prevailed since the 1950's have had major implications in the way we use and trade resources since then. These theories were implemented by international organisations such as the World Bank and the IMF, both of which provided strong incentives to developing countries to follow resource-intensive development patterns and recommended exporting more and more resource intensive products as a precondition for loans and other important economic incentives. At least as importantly, the economists and civil servants from those developing countries which are in the area of influence of the US were imbued with a sense of finality in the way

things are: developing countries are only good for resources, cash crops, and cheap labour products. This proposition is largely uncontested today in Latin America and Africa, the two areas which have fallen behind in terms of economic growth in the past two decades. It underscores the heavily resource intensive patterns of production and exports in these two regions. These theories have never, however, taken hold in the east Asian economies such as Taiwan, Korea, and Singapore. Japanese business people and government officials never quite adopted this way of thinking.

I shall argue here that unless we shift away from this form of economic thinking into other trade and developing strategies which are consistent with the environment, it will be difficult to find a solution to the global environmental problem. I shall also offer an alternative theory of trade and development which is consistent with the environment, and which can lead to sustainable growth. And I shall argue that the strategy of sustainable development proposed here has already been tried and found successful in the world economy, as it follows the example set by the main east Asian economies in their extraordinary growth performance of the last twenty years.

Traditional Comparative Advantages and North-South Trade

Why do developing countries overproduce and over export resource intensive products such as cash crops, which require extensive land clearing, and minerals such as petroleum, which also affect the health of many forested areas? Why do developing countries export environment-intensive products at prices which are below social costs? Is it true that developing countries have a comparative advantage in environment-intensive products, such as cash crops, minerals and dirty industry, which uses clean air intensively? If so, doesn't efficiency dictate that this comparative advantage should be exploited, and shouldn't this lead to everyone's gain? In sum: is there a fundamental contradiction between economic gain and environmental preservation?

The answer to this latter question is: no. The export patterns we observe in practise in developing countries do not follow the law of comparative

advantages, nor any other law of economic efficiency. Nor is the world better-off in economic terms when the South specialises in the export of resource intensive products which damage the environment. The whole thing is a tragic misunderstanding of growth and trade. The correct answer to this question is simple, and it leads to a new theory of why countries trade. All this is found by analysing the behaviour of competitive international markets taking into account important institutions, such as property rights for common property environmental resources. These are typically different in industrial and developing countries. I shall explain this in the context of property rights regimes on environmental resources in the post-colonial period.

Property-Rights and International Trade

Before industrialisation, many traditional societies have for a long period of time managed their common property resources such as fisheries and forests, using traditional forms of local governance. Common property is a term which refers to ownership which is shared by a group, rather than individual ownership. An example is Valencia's *Tribunal de las Aguas*, a local Court in Spain which is 1,000 years old, and which still meets today on a weekly basis to administer costs and allocate the use of the regions' water network. Other examples are the Iriaichi system of managing common lands in Japan, and Bahia's system of sea tenure in the North East of Brazil. These traditional systems require, however, a population which is stable in the sense that successive generations remain in the same area, and which is not too large so that penalties from antisocial use of resources can be administered effectively and if necessary across generations.

Such systems of resource management tend to break down in the period of industrialisation in which outsiders move into the common property area, outsiders who can easily move out and avoid penalties. During the process of industrialisation populations become large and mobile and can easily escape penalties from overuse. Well-managed common property is then treated as unmanaged "open access" resources, which can be had for the taking. A "first come first serve" system prevails.

In many of now industrialised countries, industrialisation was preceded by the privatisation of common property resources. For example, in the United Kingdom, industrialisation was preceded by a major change in major property rights: the privatisation of the commons. With large and mobile populations, private property regimes often work better in the conservation of *local* resources than do common property regimes; the privatisation laws for oil the "Hot Oil Act" of 1936 in the US is an example. The US extracts little oil compared with the levels of extraction in developing countries with less well defined property rights on this resource, such as Mexico. This is true even though the US has enormous deposits, which Mexico does not have (more below). But the fact that the US uses its local oil resources more carefully, does not mean that it consumes less oil: the difference between production and consumption is made up by imports and the US economy is today the largest single importer of oil in the world, consuming about 25% of the world's production yearly.

Why do property rights matter? When a pool from which a resource is extracted, such as a forest or a lake, is treated as open access, the only cost computed in the extraction of the resource, such as trees or fish, is the cost from extracting the tree or from fishing. The responsibility for the cost of managing the system, which is often substantial, are not computed. In such cases, non-co-operative systems of exploitation emerge: at each market price, more is extracted under open access regimes than under traditional managed systems or under private property regimes. The resource is over extracted and can dwindle and even disappear.

It has been shown rigorously that if a traditional economy treats a pool from which a natural resource is extracted as open access, then at each market price it will offer more of the resource, and apparent comparative advantages in resource intensive products emerge where there are none in reality. More resource intensive products will be produced at each market price than is socially optimal. In particular, more is available for exports at each price. A typical example of this phenomenon emerges in societies where resources are unregulated national property and treated effectively as open access. This in turn leads to an *apparent* comparative advantage in

Traditional Comparative Advantages and External Economies of Scale: Asian Tigers and Latin America

After disclosing the negative effects that North-South trade has had on the global environment, the natural question that arises is whether a solution can be found which does not conflict with free markets. Some policy makers, for example, advise import substitution, tariffs, or other practises which restrict trade. It is true that in emergencies a ban on the trade of certain species which are close to extinction may be necessary: examples include trade in elephant tusks, trade in tigers, and more recently in US box turtles. Humans' irrational cruelty to animals admits on occasion no other redress. The problem however goes beyond the restriction of animal trade: the over exploitation of minerals and forested land inflicts damage not only to their producers but also to their consumers.

It is however possible to reorient patterns of trade and development without hindering or interfering with international trade. The positive example of such strategies is offered by the Asian Tigers, and a negative example by Latin America and Africa. The former are very export-oriented, but moved away swiftly from traditional comparative advantages such as labour intensive and resource-intensive products, into knowledge-intensive products. Such products include microprocessors, consumer electronics, financial products, and other sophisticated technology-based products. The term *economies of scale* refers to the fact that such products are produced more efficiently at larger scale levels. An example is provided by the well known concept of "learning by doing", where the more one produces, the more productive one becomes. This means that their prices drop as their supply increases: a typical case of economies of scale is the computer industry. "External economies of scale" is a term used to characterise production processes where there are efficiency gains at larger scales, but these gains are not restricted only to a firm. They are instead distributed throughout the whole industry or the whole economy. In other words: the more is produced, the more productive *all* producers are. These type of economies of scale is typical of

industries which require knowledge as an important input. The reason all firms are more efficient at larger scales of production is that a better trained labour force benefits all firms, not just one of them.

Knowledge diffuses across the whole industry. Examples are: electronic products, hardware and software, biotechnology, electronic based services such as communication of data, consumer electronics, and financial services, all of which are based on knowledge. These are the most dynamic sectors in the world economy today. An important aspect of external economies of scale is that they are not connected with monopolistic behaviour of firms, and do not require large capital outlays, or large sized plants. On the contrary: external economies of scale occur typically in industries within many competitive firms, a typical example being the electronic industry which has economies of scale but is very competitive, and they require skilled-labour rather than abundant capital or large plants and equipment.

The type of skilled-labour required for industries with external economies of scale is available in many developing countries. Mexico is currently a producer of electronic products such as microchips and software; India is becoming one of the largest exporters of software in the world, having produced the software which manages the entire United Kingdom train system. Software is very labour intensive and fits the Indian and Mexican economies quite well; it does not require large capital outlays either.

Many authors are concerned that educational conditions in developing countries such as the Caribbean would not allow the transition from resource intensive production to knowledge based production in the near future. However recent empirical work at the Inter American Development Bank in Washington D.C. shows that the initial conditions found in Caribbean countries twenty years ago, in terms of education and generally satisfaction of basic needs, matched those of the east Asian economies at the same period; however the Asian countries followed knowledge intensive practices and won. The Caribbean, and indeed the whole of Latin America, emphasised instead resource-intensive growth and lost. The most important aspect of knowledge intensive forms of development as far as this presentation is concerned, is that it is not

environmentally intensive. Knowledge intensive growth is not only more successful in pure economic terms: it is also more compatible with the global environment.

NAFTA, the EC and the GATT

External economies of scale can also play a positive role in reconciling potential conflicts between regional trade agreements (EC, NAFTA) and the liberalisation of world trade (GATT, and soon the World Trade Organisation or WTO).

These conflicts can be summarised as follows: a region with more market power has generally more incentives to raise tariffs on outsiders, because it is in a better condition to win a "trade war". This means that a regional trading block such as NAFTA would typically conspire against the overall liberalisation of the world's trade.

Yet this traditional proposition breaks down with external economies of scale: economies of scale take the wind out of the protectionists' sail. This happens because anything that restricts trade such as tariffs, also decreases efficiency and increases domestic costs of production when there are economies of scale. Therefore a major incentive to raise tariff barriers is gone.

It is widely believed that the main rationale for the formation of the EC was the exploitation of economies of scale among European countries: the fact that each producer could be more efficient when producing for the whole European market than when planning production for their smaller domestic market. Yet none of this has permeated the logic of NAFTA, which is solidly based, instead, on traditional comparative advantages.

The complete mobility of labour in the EC is a clear indication: it demonstrates that the EC trading block does not see its gains in trade of labour intensive goods from labour rich countries such as Portugal against capital intensive goods from capital rich countries such as Germany. By contrast, NAFTA does, and again the lack of mobility of labour within NAFTA is an indication of this fact.

Another negative aspect of regional trade blocks is that they can induce "diversion" of trade, which means that they may lead a country to purchase from a higher cost producer who is within the region, as opposed to from a more efficient lower-cost producer

who is outside the region. This occurs simply because the outsiders have tariffs on their products, which makes them appear less competitive.

However, economies of scale can also defeat this problem. The higher cost producer within the region may be so because it produced for a small market, and did not benefit from economies of scale: by offering an opportunity to produce on a larger scale for the whole region, the regional trade block may change matters. The high cost producer can thereby turn into an efficient, low cost producer. And if so, there is no trade diversion.

Resource Intensive vs. Knowledge Intensive Growth

We have seen that a move from trade based on traditional comparative advantages to trade based on external economies of scale is a move from resource intensive patterns of growth to knowledge intensive patterns. Traditional comparative advantages have shown themselves unsuccessful during the last twenty years and threaten to destroy our global environment. Furthermore they lead to contradictions between the formation of trade blocks and the liberalisation of world trade.

Economic growth based on external economies of scale, and trade based on knowledge-intensive products has proven itself successful in the East Asian economies during last twenty years, and is more consistent with the environment. The time has come to adopt knowledge intensive patterns of development and trade and change our international organisations (IMF, WB, GATT) to regard this as a major goal of development. If such patterns are adopted we no longer need fear a contradiction between free trade and the environment.

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