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# Trade and the Environment

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## ABSTRACT

The paper discusses the current developments concerning the environment and trade, as well as its implications for South Africa. This is followed by a brief outline of the threats and opportunities that are created for the economy by this renewed emphasis on sustainable development

# 1. INTRODUCTION

At current world growth trends, the per capita income will double by 2035 and quadruple by 2070. Given these numbers, and the associated tendency in environmental degradation, one can appreciate the view that, based on past experience, such growth would be unsustainable.

The optimists put their faith in technology. Such technological developments will allow for continued growth and at the same time reduce pollution and inputs of virgin resources. This will be realised by the use of more efficient abatement equipment, less resource demanding production processes and recycling rather than disposal. This outlook presupposes that incentives are set according to the objective of sustainable development.

A pessimistic view is that of the continuing growth in population with majority of births occurring in the developing countries. With low per capita income levels their priorities might be such that the resources to pay for new or cleaner production technologies and pollution abatement equipment will not be available. To the extend that there is validity to this view it will have to be factored into mechanisms to deal with sustainable development

This paper attempts to provide the rationale for more research in South Africa on a topic that so far attracted limited attention. The relationship between trade and the environment has received some attention( Goldblatt, Cassim, Frimpong & Visser, 1999) but further research is necessary. This is an emerging field of study internationally and the authors believe it could be very important to the economic future of South Africa.

The paper begins with a short summary of current developments concerning the environment in the international trade arena, concentrating, amongst others, on how the World Trade Organisation(WTO) may be affected in the foreseeable future by changing public attitudes to the environment in the developed countries. Two broad issues are identified that need to be examined more rigorously in subsequent discussions and research. Taken together these issues can provide the starting point for the much-needed further studies referred to previously.

These issues, if substantiated, lead to the conclusion that South Africa may be overlooking both threats and opportunities in its economic policies that in turn can affect its international trade flows. An example is provided of an issue of international concern namely, climate change mitigation, where it appears as if South Africa is failing to identify both threats and opportunities, where policy makers are "missing the boat". Finally, the paper offers some suggestions for addressing this situation that may be worth further examination.

# 2. THE ISSUES RELATED TO TRADE AND THE ENVIRONMENT

In this section the challenges flowing from concerns about environmental degradation and its relation to trade will be explored.

### 2.1 The origin of the problem

Global GDP has grown six-fold since 1950. Reduced barriers to trade and foreign investment together with great advances in information technology have led to a much more integrated world economy over this period. At the same time, however, and at least in part as a consequence there has been worldwide environmental degradation ranging from climate change to deforestation, from desertification to over fishing, from threatened loss of the ozone layer to continuing loss of bio-diversity.

There is a tendency to infer from this observation that, to the extend that international trade is one of the major sources of this remarkable growth trend it is associated with environmental degradation

This assertion is not valid. Trade per se is not bad for the environment. Trade can be beneficial to society provided that the appropriate environmental policies are in place. Environmental policies are however complicated by a number of factors such as:

- The basic cause of environmental degradation can be ascribed to market failure.
- Ecological systems do not respect national borders.
- The global nature of most environmental problems necessitates international solutions.
- The interdependence of the world economy has reduced the regulatory power of individual nations.
- Vast differences exist in per capita income levels between countries and thus also differences in immediate priorities that can push back longer-term environmental issues.

Since the root cause of environmental degradation is market failure, environmental problems are best dealt with at the source by internalising externalities, such as for instance the production process or the sub-optimal use of resources because of its common property characteristics. In addition, due to the global nature of most of the environmental problems, unique global mechanisms should be established to deal with this aspect.

The first best solution is that of correcting for market failure, the second best solution, through trade measures is often proposed. The reason why trade measures are put forward as a way of dealing with environmental degradation is because it can provide a useful mechanism for encouraging participation and the enforcement of multi-national environmental agreements.

Given these underlying factors one cannot but agree with Nordstrom & Vaughan (1999) in their assessment of the present state of the trade/ecology debate, namely that,

> **"Trade is not the issue nor is economic growth. The issue is how to reinvent environmental policies in an ever more integrated world economy so as to ensure that we live within ecological limits.**

**The way forward seem to us is to strengthen the mechanisms and institutions for multilateral environmental cooperation, just like countries 50 years ago decided that it was to their benefit to cooperate on trade matters".**

## 2.2 Market failure

In this section a few of the major sources of pollution that threaten the environment will be discussed. To a large extend the sources of pollution are due to market failure in the sense that the full cost or benefit to society have not been considered in determining the optimum utilisation of inputs or the optimum levels of output. The first best solutions to rectify the externalities will be discussed briefly and it will be indicated to what extend international trade measures are proposed to deal with the problem. Five such sources identified by Nordstrom&Vaughan (1999) namely chemical intensive agriculture, deforestation, global warming, acid rain and over fishing are listed below

| | **Source** | **Origin of externality** | **First best solution** | **Trade measures** |
|---|---|---|---|---|
| 1. | Chemical Intensive agriculture | Over-use of chemicals, cost to the environment not included in indivi- duals decision making | Tax the specific inputs to reflect the damage to environment<br>No subsidy for agriculture | Import duty on specific inputs<br>Increased tariff on agr. products |
| 2. | Deforestation | Competition, agriculture more profitable: All benefits of forestry not reflected i.e. carbon sink, bio-diversity etc. | Create markets for carbon sequestration, bio-diversity etc. No subsidies for agric. | Increased tariff on agr. products |
| 3. | Global warming | Fossil fuel burning damage across borders, damage not costed | Multilateral co-operation. Setting emission standards and taxes | Transport of goods. Use WTO measure to enforce multilateral co-operation |
| 4. | Acid rain | Low quality fossil fuels, local and international damage not costed | Emission standards<br>Emission taxes<br>Prescribed abatement<br>Multilateral agreements | WTO measures to enforce multilateral environmental co-operation |
| 5. | Overfishing | Common property rights, open access<br>International co-operation<br>No subsidies | Managing common property resources | ? |

The examples listed are just a few of the local as well as international sources of pollution. The first best solutions are not always as simplistic as stated above (Kennedy, 1994), but at least the major instruments such as taxes, international standards and international cooperation being major first best solutions are mentioned. The issue and role of trade measures are discussed more fully in the following paragraphs.

## 2.3 The WTO and environmental issues

Notwithstanding arguments to the contrary the environmental issue as it relates to trade are now firmly linked to the multilateral trading system. The WTO specifically recognises the principle of sustainable development, which is defined as, development that meets the needs of the present without compromising the ability of future generations to meet their own demands. The international institutional machinery has been created to address this issue. The WTO created a Sub-Committee on Trade and Environment (CTE) in 1995 in order to identify the relationship between trade measures and environmental measures so that sustainable development can be promoted . The Committee can make appropriate recommendations on whether any modifications of the provisions of the multi-lateral trading system are required that is compatible with the open, equitable and non-discriminatory nature of the system. In subsequent reports of this sub-committee it states that the committee supports that multi-lateral environmental agreements (MEA's) as the best way for governments to address global and trans-boundary environmental problems. It pointed to the clear complementarity that exists between this approach and the work of the WTO in seeking multilateral solutions to trade concerns.

One such significant MEA initiative originated under the auspices of the United Nations on green house gasses (GHG). In 1992 in the Rio de Janeiro Conference, the United Nations Framework Convention on Climate Change (UNFCCC) established a goal for industrialised countries to return to the 1990 GHG emission levels by the year 2000. Realising that this agreement was non-binding a complementary agreement was decided on that would quantify the emission limitations and reduction obligations for developed countries. This negotiations lead to the establishment of the Kyoto protocol in 1997. The provisions of the Kyoto protocol were scheduled to be approved at the Marrakesh conference in 2001 but due to some opposition, notably from the USA, the protocol has not yet entered into force. (Rosenzweig,Varilek, Feldman, Kuppalli & Janssen, 2002 ).

Environmentalists, as represented by NGO's and the WTO do not always agree. At the fundamental level many environmentalists argue that the WTO should employ broader criteria to evaluate the multi-lateral trading system. Although sustainable development is a principle objective of the WTO it does not appear in the legally binding rights and obligations of the agreements. The challenge is to incorporate the environmental concerns and still preserve the well-functioning characteristics of the rules based trading system (Sampson). The origin of these challenges centre around three issues:

- The perceived link between trade liberalisation and environmental degradation;
- The sovereign status of members of the WTO; and
- The mission of the WTO.

The argument from the trade community is frequently that environmental damage coupled with trade liberalisation is bad environmental management and not bad trade policy. This statement cannot be generalised because the maintenance of trade distortions can be both bad trade and bad environmental policy. The removal of market restrictions and distortions can have beneficial effects in that damage to their own environment is curbed, developing countries can gain when their exports increase due to the lower restrictions and the additional

resources created by trade can be used to improve the environment. In this sense their can be no fundamental difference between NGO's and the WTO. A case in point could be the reduction of agricultural subsidies. These changes can be implemented without changing WTO rules

Environmental groups also criticise WTO rules which do not respect the rights of democratically elected governments such as denying nations the possibility of restricting the importation of goods that are produced in an environmentally unfriendly way. Furthermore they say that the institution is undemocratic and unresponsive to public concerns. The involvement of NGO's in WTO affairs have been negatively received by them and the allegations denied. A case in point is the non discrimination rule which states that their can be no discrimination against any country's products regardless of the way in which it is produced, even if environmentally unfriendly production processes are used. Should, for instance, this rule be scrapped it would change the foundation on which the rules based trading system is based. This provision serves to minimise the encroachment on national sovereignty by powerful countries on less powerful ones by forcing them to produce goods according to more stringent environmental or other standards. In this sense the WTO respects the sovereignty of its members.

Another case where there is a difference in approach between environmentalists and the WTO is in connection with the Precautionary Principle which states that in situations where there are threats of serious irreversible damage, lack of full scientific certainty should not be used as a reason for postponing cost effective measures to prevent environmental degradation. The WTO rules, as we have seen, permits any country to set its own standards to protect the environment and public health amongst others. The non-discrimination rule states the you cannot discriminate against producers on the basis of these national standards. The WTO agreements further want to ensure that standards are not used to create unnecessary barriers to trade. This is done by requiring scientific evidence to justify any import restrictions, which is contradictory to the precautionary principle.

The precautionary principle has led to disputes as is evidenced in the case where, faced with the same scientific evidence of the effects of consuming hormone treated beef, the United States and the European Union could not agree on how the possible health risks should be managed. When the EU restricted the imports of US hormone treated beef, the US brought a complaint to the dispute-settlement system of the WTO. Due to the absence of sufficient scientific evidence they ruled that it would be illegitimate discrimination against the US. This provoked negative reaction from EU consumer groups.

The future inclusion of an enforcing role with respect to environmental standards as part of the mission of the WTO is controversial. The status quo is important for developing countries that consider discrimination based on how they produce their goods as an infringement on their national sovereignty and in many cases disguised protectionism. The thought of importing and consuming goods that have degraded the environment is however unacceptable to public interest groups in developed countries. Developing countries and NGO's find themselves at opposite ends and a solution as to how the WTO should deal with production and other standards should be found

The problem is not the restricting measures as such. There are agreed on restrictions in place on stolen goods, trade in endangered species and ozone depleting substances because member governments have agreed on these cases. On a similar basis member countries should ideally

also agree on other environmental standards. In such cases universally agreed on standards will be in place that can be applied when problems arise. This would obviate the need for the WTO to act in the role of arbitrator on environmental issues on which it does not have the ability or expertise.

It would appear as if WTO members are fundamentally opposed to any reinterpretation of the non-discrimination rule that would give it a standard setting and enforcement role.

They argue that there is no limit on other international treaties to establish standards and compliance measures. Agencies under the auspices of the United Nations can fulfil this role. So far there are no treaties that have been created with similar dispute settlement mechanism to that of WTO agreements. Nations are as yet unwilling to forego their national sovereignty and accept strong compliance mechanisms in treaties negotiated under the auspices of the UN. If this could happen it would leave the WTO with its narrower tasks for which it was designed. Such a scenario would be one that would be preferred by the WTO. The reality might not be so simple and most probably the WTO will have to find ways to accommodate the environmental concerns with minimum damage to their rule based multi-lateral trade arrangements. A case in point is the existing trade distortion measures such as subsidies and other entry barriers the markets.

**2.4 The role of public sentiment in creating a clean environment**

For at least 30 years, economists have agued that market and policy failures have to be corrected for if economic activities are to be shaped in line with ecological barriers. It is necessary "to get prices right". This has seldom been done anywhere in the world for the obvious reason that it is very difficult to get international cooperation and even, in cases of local pollution, strong vested interests complicate matters.

In the context of international trade, it may be even more difficult to get prices right (Norstrom &Vaughn, 1999) since there are both legal and political economic constraints to be faced such as:

- It is often claimed that WTO rules circumscribe environmental policy-making and that the WTO rules provide legal cover for foreign countries to challenge domestic environmental policies that interfere with their trading rights as was the case of the USA/EU dispute on hormone treated beef.
- Competitive pressure from the world markets sometimes makes it impossible to forge the necessary political support at home to upgrade environmental standards.
- The perceived costs of acting alone in terms of lost investment and jobs often dampens regulatory initiatives.
- Environmental regulations may even be bid down in the relentless competition for market share, investments and jobs.

On the other side is the perception that trade liberalisation can undermine the sustainability of the natural environment which result in the international environmental community resisting further trade liberalisation until sound environmental policies are in place. Given that public concern over environmental degradation is mounting rapidly in especially the richest trading

countries, this may increasingly put pressure on the multi-lateral trading system to adapt to environmental constraints in order to preserve itself.

It is often suggested that public sentiment in developed countries will soon be strong enough to force governments into a number of such "prior commitments and agreements as to their obligations in the field of environmental policy" and that this development will have an increasingly pervasive influence on the shape of trade policy. This issue is discussed further as part of the so-called Environmental Kutznets Curve (EKC).

It would be prudent therefore, that any country that wishes to prosper from trade in future had better be aware of how such international public sentiment is changing and the threats and opportunities that will result. It is also argued that, as a generalisation, South Africa's awareness in this regard is inadequate.

So far international organisations and agendas rather than domestic political activity was responsible for adopting many of the environmental standards. This is illustrated in the case of the now standard use of environmental impact assessment that has been adopted worldwide not as a result of national policies but largely due to efforts of international agencies. Especially donor agencies required such analysis as a prerequisite for funding and provided the infrastructure such as to provide for the training of practitioners (Hironaka, 2000).

It is however clear that the extend of degradation, the effect and ways of dealing with the environment is not uniform across countries and the perceived and real threats of MEA's are that it might be acceptable some but might be extremely detrimental to others.

# 3. OVERVIEW OF LITERATURE

The debate on the environment can become very subjective and it is therefore necessary to assess the validity of many popularly held views. The economic effects of environmental degradation and measures to remedy this situation have been studied intensively. This review is not an exhaustive one and is included to give an indication of the different approaches proposed and the potential impact on the global economy when viewed from a theoretical as well as an empirical perspective.

## 3.1 Links between trade and the environment

Although the total effect of trade on the environment is relevant, this effect is sometimes divided into different components (Copeland & Taylor, 1994). The three components are the composition effect, the scale effect and the technique effect.

The composition effect is driven by the tendency of international trade to favour specialisation. There is a tendency for a country to specialise in a subset of products and import the rest of its needs. This tendency results in economic benefits through increased efficiency and economies of scale in production. The net effect on the local environment will be positive if the expanding sectors are less polluting than the contracting import competing sectors and negative in the reverse situation. Local pollution problems will become worse in

countries with a comparative advantage in polluting industries and improve in countries with a comparative advantage in clean industries.

Given the production structure in a country, the scale effect leads to an increase in economic activity and to an increase in pollution. The scale effect in turn is counteracted by the demand for a cleaner environment, the so-called technique effect, that is associated with higher per capita income, where consumers are demanding stricter environmental standards and are willing to pay more for such goods.

Such a classification is convenient for descriptive purposes; it is however the net effect that is relevant. A review of literature shows that there is no one to one relationship between trade and the environment. Empirical studies, on the other hand, confirm the theoretical assertion that trade liberalisation can harm the local environment as a result of the composition effect. Such studies (Lee& Roland-Holst, 1997) however, also indicate that the income gains from international trade can more than compensate for the additional abatement cost associated with the increase in production. In this sense there is no conflict between the two objectives. The conflict arises due to the failure of political institutions to resolve pollution issues whereby the net gain from trade can be realised.

The reason why political institutions are reluctant to introduce legislation and enforce environmental laws could be the compliance cost associated with stricter environmental standards. Critics of such standards allege that it will force the production of pollution intensive products to overseas countries with the associated loss of jobs.

Competition, on the other hand, to attract international business can then create pollution havens with no net gain to the environment. This argument is based on examples from the US experience where individual states initially addressed the pollution problem each one in accordance with the local conditions it faced. This decentralised way of dealing with the issue was not optimal because of inter-jurisdictional spillovers of pollution effects and the inability to regulate mobile industries from moving to states where standards were lower (Friedman,Gerlowski&Silberman, 1992).

The same kind of argument is carried over to the international level where economies have become much more open. The concern of environmentalists is that international competition will lead to governments willing to sell their environment rather than to consider the ecological effects of such action. Such competitive behaviour could slow down the environmental as well as the trade agenda leading to the so-called “regulatory chill” hypothesis with a reluctance by governments to institute or enforce regulations.

Whether there is a basis for this argument depends, amongst others, on the cost of environmental regulations. Studies indicate that such abatement cost as a percentage of production cost could range between 1% for the lower and 5 % for the high pollution intensive products (United States Census Bureau, 1996).

The estimates are based on engineering cost calculations and could be substantially lower due to innovative application of technology. This substitution effect, also known as the Porter hypothesis (Porter& van der Linde, 1995) states that environmental pressure encourages industrial innovation. For instance, a comparison of the profitability of firms with a superior

against those with a lower environmental profile did not indicate any detrimental effects. Many studies have investigated this hypothesis and there is empirical evidence to support this hypothesis although the results are not applicable to all situations. Palmer,Oates and Portney, (1995) point out that although some cost saving/quality improving innovations did take place, environmental protection and regulation, amounted to a net production cost addition. It can therefore not be inferred that environmental regulation will cost nothing but that the cost must be weighed up against the benefits to society (Cropper, 2000). Judged purely on a cost basis however it is suggested that competitiveness concerns could have been overstated. In US studies, environmental control measures account for a small percentage of production cost and are overwhelmed by other cost considerations.

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Most studies (Gray, 1997) also indicate that environmental regulations are not an important factor in international plant location decisions. Once a locality is decided on, the location within that country could be influenced by local environmental regulations, a result in line with the experience in the US. There are also other complementary factors that inhibit firms from relocating to exploit the presumed small percentage of higher abatement costs associated with stricter environmental regulations. International firms do not base their decisions only on present environmental regulations but also on what they expect to happen in future. In addition, firms increasingly demonstrate their readiness to assume environmental responsibility such as for instance demonstrated by the rapid adoption of voluntary environmental management standards as promulgated by the International Organisation for Standardisation (ISO). Although these standards are voluntary it is more and more seen as a commercial necessity. Certified firms in turn often require their suppliers to be certified as well. The drive to qualify for eco-labels suggest that a green profile is a valuable marketing asset that fits in with the market pressure applied by environmentally conscious consumers. Firms can therefore not escape their responsibility by moving polluting plants offshore. In another example, many prominent firms commit themselves voluntarily to reduce or compensate for their GHG-emissions resulting from burning oil, gas and coal so as to arrive

at a neutral impact on the climate (Fortune, 2002). Institutions such as the World Wildlife Fund perform an overseeing function by verifying an audited program of greenhouse gas emission reduction. Such "climate cool" firms can the use that characteristic to their advantage. Whether being climate neutral is profitable is not definite but firms are participating because mainstream groups are getting involved and also because, in this case, US firms are afraid of losing ground against more ecological friendly European firms.

Although there is little evidence that environmental regulations are of primary importance for competitiveness or location decisions there is still a concern among environmentalists that the further removal of trade and investment barriers will undermine efforts to stop degradation. The ability of investors to move their capital freely to where ever the highest returns are obtained can result in a "race to the bottom". This is the term used to describe the case where environmental regulations are driven down by competition between countries to attract international mobile investments. Based on theoretical models developed by Kanbur (1995) and Kim & Wilson (1997) some support for this hypothesis could be found. On the empirical level, evidence in support of this effect is however purely anecdotal (Esty & Geraldin, 1998). At present there is little support for the "race to the bottom" hypothesis.

The milder form of this phenomenon is "regulatory chill" namely where industries often appeal to competitiveness concerns to lobby against environmental regulations, sometimes with some degree of success. In this case, if competitiveness concerns are troublesome, it can be turned into a positive force by opening up the possibility for countries to look for international cooperative solutions. In this case the problem is shifted from the national to the multi-national level.

The opposite effect is one of a "race to the top" where regulatory regulations are raised for fear of activities not desirable as manifested by an attitude of not in my back yard (NIMBY)
The only empirical case to support this occurrence is that of hazardous waste products.

### 3.2. The link between trade, economic growth and the environment

The pessimistic predictions in the past of the disastrous consequences of growth on the environment have not realised. This is largely the result of the adoption of environmental regulations to combat the negative effects of growth. Actions have however not been equally rapid in all countries. The reason for slow progress in some countries can be ascribed to the prevalence of a low income per capita. Such countries find it difficult to afford the resources needed for pollution abatement. In addition they might question the wisdom of sacrificing their growth prospects to help solve global pollution problems, which has been caused in a large part by the lifestyle in richer countries.

The counter argument is that if poverty is the problem then economic growth is part of the solution. There is some empirical evidence that suggests that pollution increases at the earlier stages of development and decreases after a certain level has been reached. This phenomenon is called the Environmental Kutznets Curve (EKC). It might be valid for some types of environmental indicators of notably local pollutants (Barbier, 1997). With respect to the more global pollutants this does not seem to be the case.

If the EKC hypothesis can be verified then it would mean that previous warnings on the dire consequences of growth is without foundation. Then improved environmental quality would flow from gains in per capita income and not the other way around. Policies should then be geared to economic growth in especially the developing countries to speed up the convergence in environmental standards

There is no inherent reason that indicates that pollution will turn down with increasing income per capita. One must guard against a simplistic argument that income growth by itself will generate forces that will curb pollution. The best that can be said is that income growth by itself will generate forces to curb the effects of pollution. The best that can be said is that income growth might be a necessary condition for focussing on environmental issues but it is not a sufficient condition to reverse environmental degradation (Grossmann & Krueger, 1995) If the incentives facing producers and consumers do not change with higher incomes, pollution will continue unchecked with rising incomes. Democratic institutions with governments held responsible for implementing these measures (Torras & Boyce, 1998) are an important success factor.

This is especially applicable in the case of global pollution where it would appear as if countries are willing to accept the consequences of rather than carry the cost of curbing emissions.

Alternatively as borne out by the Kyoto stalemate there is a strong incentive for free-riding which in combination with weak institutions for collective decision making and enforcement at the international level is a recipe for non action. That is why the WTO is a focal point because of its built-in adjudication mechanism and eventually the imposition of trade sanctions.

Economic growth that requires ever more inputs are not as harmless as growth driven by technological progress that saves inputs and reduces pollutants per unit of output. This kind of growth will not result spontaneously but require economic incentives to steer development in a sustainable direction. Trade can play a role in this process in the sense that it can facilitate the diffusion of environmentally friendly technology.

# 4. SOUTH AFRICA AND THE TRADE AND ENVIRONMENT DEBATE

No country can ignore the impact of the present debate of sustainable development on its economy. Environmental issues as it relates to the South African economy are briefly outlined in the following paragraphs.

## 4.1. South Africa's economic growth potential

Trade is but one aspect that contributes to economic growth. The primary factors that drive economic growth are investments in physical capital, human capital and technology.

Savings are important in this regard because most investments are financed by domestic savings. International capital flows assist the process but is sensitive to the economic policies

that are followed in a country. Factors included in this context are; a financial sector capable of mobilising and allocating funds efficiently, the rule of law, macro-economic and monetary stability, adequate infrastructure, an educated work force and an open trade regime.

Where does South Africa stand with respect to these growth factors? Fiscal and monetary policy management are considered to be sound. The guidance of the IMF and World Bank are followed while the other prerequisites for a sound growth performance, mentioned above, are receiving attention. At present the reality is however that the growth performance is not satisfactory with a GDP growth that oscillates around 3 percent. This does not leave much room for per capita income improvement and will leave the country in its present state as a developing country for the foreseeable future. The trickle down effect of the growth that did occur is very low, leaving the poor in a dire state since they are marginalised by growth in the main industries.

It is not the purpose of this article to evaluate the country's growth potential and limiting factors, but it would appear as if at least one of the reasons for the low growth is that the country has lost its comparative advantage, which was mainly based on the production of strategic minerals. What should replace this growth sector? It is difficult to answer positively. Skills have emigrated, labour is largely unskilled and unschooled**,** we are far from world markets and governance at all levels needs improvement. This suggests that at present our main international trade advantage and perhaps also for the immediate future is the weak exchange rate, which is a temporary symptom of the problem and not a permanent solution.

This unsatisfactory picture suggests that a search must be launched for new, non-traditional comparative advantages from which to create trade opportunities. In this regard one could investigate the new opportunities created by the worldwide concern with conserving the natural environment of the planet. In this regard one does not refer to eco-tourism but to the new awareness of the necessity of the importance of sustainable resource use and the restructuring that will accompany this shift in emphasis.

The possibilities of this new growth source will be accompanied, at least in the short run, by potential negative impact on the pollution intensive industries in South Africa where the necessary policy actions are needed to protect these growth sources.

### 4.2. The ecology/economic revolution

Notwithstanding the current uncertainty on implementation it is believed that the world has entered a new era of growth based on sound environmental principles. It must be emphasised that reference is made of an economic revolution, not one based on a trade-off between economic growth and environmental conservation but growth that is shaped by corrections of market and policy failure.

Some of the provocative ideas on the shape of such a new economy in contained in Brown (2001).

A restructuring of the global economy into one that is sustainable can provide the greatest investment opportunities in history, comparable to the agricultural and industrial revolutions

that preceded it. This eco-economy revolution that will affect the world will however have to be compressed into a much shorter time period.

The elements of this eco-economy will consist of:

- An economy that is in sync with the earth's ecosystem which will be in contrast with the polluting, disruptive and ultimately self-destructing economy of today.
- All economic sectors will experience restructuring of which the more obvious ones are:
    - The energy sector will have to shift from oil, coal and natural gas to environmentally friendly form of energy such as, among others, wind, solar cells and geothermal energy.
    - The materials used, where the major shift will be away from the linear economic model where materials go from the mine or forest to the landfill, to a model based on re-use and or recycling. In this closed loop system, recycling industries will replace extraction industries.
    - The food sector where the emphasis will be on the change of the way in which the sector is managed. Natural capital will have to be managed more efficiently in order to stabilise aquifers by increasing water productivity, conserve topsoil and means to increase productivity on a sustainable basis that obviates the clearing of forests to produce more food.

The ideas expressed by Brown can be described as visionary. Apart from broad indications of policy matters that should receive attention to achieve the new eco-economy, the detail still needs a lot of public debate, analysis and research. It is nonetheless a clear indication of the direction in which the global economy will move in the future.

The challenge would therefore be for researchers to investigate the following two broad topics in the South African context namely:

a) Future economic structure:
    i) The extend to which the view put forward by Brown, amongst others, is a realistic one;

    ii) How it will affect the present structure of the South African economy; and

    iii) The measures to direct the economy in the required direction.

b) Opportunities - Growth opportunities, in the short as well as the long term, that flow from the new economy

### 4.3. Consequences

The two broad issues put forward requires the adjustments so that the existing growth sectors can continue to play a role as well as new sources of growth that will come from an early understanding of the pending economic revolution. In this section some of the resulting overlooked threats and opportunities that face the country in this regard are discussed. The analysis is not exhaustive and is more of an indication of possible trends. A more exhaustive analysis should follow in future.

In order to focus the discussion, is the issue of climate change mitigation is taken as an example. It seems as if the threats and opportunities that climate mitigation generates for South Africa illustrate the central theme of this paper. Among the reasons for this choice is:

- The issue is still debated as part of the ongoing refinement of the Kyoto Protocol and provides opportunities for new thinking.
- Until quite recently, South Africa was content to consider herself officially as a developing country in the Kyoto context and therefore not so directly involved in the debates, despite the fact that the rest of the world was well aware that the country's carbon footprint, as measured by the carbon efficiency of its economy, is amongst the heaviest in the world
- Recent research concerning the issue was first recognised by the researchers outside the government sector. Official involvement is however needed.

### *4.3.1 Structural issues*

The present structure of production and consumption come about as a result of economic incentives that did not take all the environmental costs and sometimes benefits into account. The required adjustment to sustainable production and consumption patterns as discussed previously Palmer *et al* (1999) may not involve Hugh outlays but it will definitely not be costless. In addition the more challenging issue is that it will not affect all countries to the same extend nor will the treatment of pollution emissions at the source be equally affordable, especially for some developing countries.

Pollution in the sense that it is an international phenomenon implies that every country must be involved. It is often argued by small countries that the unilateral introduction of, for instance, a carbon tax, and the potential loss of competitiveness they stand to incur can be substantial while their contribution to global warming is very small. This factor also explains why especially developing countries are sceptical about standards and the potential negative influence on their economies by having to carry the burden for pollution generated mainly in developed countries and explains to some extend why political action is sometimes slow.

Such concerns by developing countries are not without foundation as reflected in some empirical studies on this issue. In a recent study on the relationship between trade and the environment, (Wilson, Otsuki & Sewadeb, 2002) analysed data from 24 countries between 1994 and 1998 to determine whether environmental standards effect the exports of five different pollution intensive goods namely metal mining, nonferrous metals, pulp and paper, iron and steel, and chemicals in 6 OECD and 18 non- OECD countries, which included South Africa.

The study found that environmental regulations does effect export competition. A negative relationship between the stringency of environmental standards and exports for the majority of industries examined may imply a trade-off between trade expansion and encouraging improvements in environmental standards. If the political system in developing countries do not place an emphasis on environmental quality, they will be reluctant to tighten environmental standards. Such a situation supports the race- to- the bottom hypothesis because with a lack of international coordination, pollution may become concentrated in developing countries.

If countries do harmonise environmental standards globally then developing countries will suffer from a greater loss in exports of the pollution intensive products than a developed country. The results at best implies that environmental standards should be tightened gradually over a transition period to avoid the rapid decline of pollution intensive products. Public awareness should also be raised in developing countries so as to alert the public that the loss of competitiveness can be weighed up against the benefits of an improved environment.

The converse is also true namely the developed countries are motivated to set high global environments standards in multi-lateral agreements for they benefit more (and loose less exports) from a reduction in trans-boundary pollution.

International coordination to offset loss in export competitiveness for developing countries should in the light of these results be a part of international discussions.

The competitiveness issue has received a lot of attention in the literature as discussed in paragraph 3.1. This study is one of a few that approach the issue from the perspective of developing countries (also see Dasgupta, Mody, Roy & Wheeler, 2001). It must alert us to the slightly different slant that developing countries have on both local and international environmental standards.

An industry that could face possible restructuring as a result of environmental concerns is Eskom. Encouraged by the government, Eskom produces and sells electricity as cheaply as possible. This in turn encourages investment by industries that are heavily reliant on inputs of electricity. Electricity is especially cheap for these industries because they are able to negotiate special deals for bulk consumption. The coke that Eskom uses to generate electricity is very high in carbon content and hence South Africa's heavy carbon footprint. The negative externalities resulting from Eskom's activity are not internalised and government has in the past not been in favour of the introduction of a carbon tax on electricity generation to achieve this internalisation.

Given the possible direction in which the eco-economy will develop it is clear that Eskom's cheap electricity is a source of an artificial and temporary comparative advantage for South Africa that is built on historically outdated technology that is only sustained by artificial low prices. South Africa' exports dependent on cheap electricity are thus vulnerable in an eco-economy that is financially but not economically viable through implicit subsidies by not including the cost of the damage to the environment
The implications of environmental concerns on the energy sector in South Africa are the subject of a preliminary study by Scott & Veck (2001). About a third of total energy consumed are used by industries that export more than 90 percent of their output. Industries in this category are aluminium, gold and uranium, platinum, iron and steel, ferrochrome, titanium and paper and pulp. Should environmental standards be enforced it could influence these industries. It would therefore be prudent to monitor this potential threat.

In a different context they view environmental standards as related to the energy sector as an opportunity. This opportunity flows from the current restructuring process on the supply side of the energy market. The process of deregulation could open the way for new participants that use cleaner technology for generating electricity. Products produced with clean energy

might become more attractive in the international markets. The extent to which such possibilities are available, needs to be evaluated.

Given the fact that environmental concerns can impact significantly on the South African economy a further study (Nathan Associates Inc, 2001a) used the latest South African input-output model to identify the industries that will be more vulnerable to the imposition of some kind of emission standard. This study also attempted to determine the awareness amongst these industries of such a potential threat and the broad strategies pursued in this regard..The conclusion reached is that the level of awareness in respect of carbon emission and its climate change impact is high. The process of developing strategies and responses to deal with the issue is however not well advanced.

In one of the first studies in this area Goldblatt *et al* (1999) analysed the potential effect of environmental measures on the coal export sector, basic iron and steel production and citrus exports as case studies.

The review presented in this article indicates that the issues have been intensively researched internationally. The references stated above may have omitted some local studies but it would appear as if local research is still in its infancy. The South African economy and society faces unique challenges given the structure of its economy as well as the prevalence of widespread poverty that needs to be addressed in an environment friendly way.

### *4.3.2 Opportunities*

In discussions on the influence of consumer prefences for products that are produced in a clean environment and the possibility that a premium will be paid for such products opens up this market. Notwithstanding the fact that some firms are engaged in agreements that will allow them to produce in pollution neutral ways, the extent to which being environmentally friendly is profitable is still being debated.

The fact that the private sector and in some cases governments are at the stage voluntarily entering into such contracts is encouraging.

One opportunity that flows directly from measures to combat global warming is that of carbon sequestration by stimulating forestry activities and the restoration of degraded natural environments. The Kyoto protocol, when it comes into operation will require industrialised countries to reduce greenhouse gas emissions to agreed upon levels. In anticipation of the required reduction levels, once the Protocol is signed by everyone, a market is evolving on an informal and ad hoc basis in measures to reduce emissions. One way in which industrialised countries can meet their emission reduction commitments is to negotiate contracts on reduction levels jointly with other parties, such as for instance, developing countries. As a result a growing number of companies and governments have begun to purchase verified emission reductions (VER's). One such reduction possibility is the net addition to natural vegetation to absorb one of the major greenhouse gases namely carbon dioxide. The natural vegetation can thus act as a carbon sink.

Quantifiable reductions in carbon dioxide emissions, so-called carbon credits may be used to offset emissions from other sectors such as energy use and transport. The Plan Vivo System

(The Edinburgh Centre for Carbon Management, 2002) manages the supply of verifiable carbon credits from rural communities via forestry and other ways in developing countries. As a development initiative it not only helps to mitigate climate change but it also initiates local development. Plan Vivo allows for a partnership between companies that wish to reduce their impact on the environment and the communities in developing countries.

The feasibility of such a development initiative in South Africa has been investigated (Dockel, 2002). It is of particularly importance in areas that have been degraded by over utilisation of especially grassland and forests in the past Areas that show particular promise in this regard is former homelands such as the Transkei ( Nathan Associates, 2001b) where climatic conditions are such that significant amounts of carbon can be restored by rehabilitating the natural resources. The rehabilitation, in other words, allowing the natural resources to return to their natural state can be achieved by adapting land use practices that are favourable. The selling of carbon credits in the emission reduction markets provides a source of income that was not previously available and provides an incentive for resource conservation. Such resource rehabilitation projects have been subjected to a cost-benefit analysis and proved to be economically viable for both indigenous forests and grasslands in the Transkei (Nathan Associates, 2001, c). Given that carbon credit contracts can be obtained, such rural projects can be managed with the aid of the private sector assisted by government.

Carbon sequestration can thus provide the impetus for substantial rural development projects not only in the Transkei but also in other areas in South Africa.

### 4.4. Corrective measures

Based on the analysis so far it can be concluded that in the arena of trade and the environment as defined here, South Africa is missing the boat and will continue to do so as long as the status quo prevails. To change this situation, two kinds of interventions warrant further investigation namely management institutions and economic incentive structures. It has been encouraging to see that movement on both fronts have occurred since May 2002.

#### *4.4.1 Institutional fragmentation*

If we are indeed facing an ecology/economic revolution then the institutional structure to deal with this phenomenon must be established. The current institutional structure is perhaps not ideally suitable for this purpose. Government Departments and their functional responsibilities are not geared to lead the country into a world of eco-economics. The two departments that qualify to guide this process are Trade and Industry (DTI) and Environmental Affairs and Tourism (DEAT).

DTI are kept occupied by many restructuring issues but it would appear as if the kind of restructuring associated with ways in which concerns about the physical environment affects the business sectors have not received adequate attention. Similarly, DEAT has not yet fully appreciated the possible contribution that economists can make to environmental affairs

Understanding the climate change phenomenon has been developed up to now mainly by expert consultations at the global level. There is considerable uncertainty about the nature and intensity of potential impacts at the sub-regional national and local level and especially for

developing countries with weak technical capacity and infrastructure. So far the need to address these issues on a more local level is not apparent. In order to give the environmental issues the necessary prominence the gap between DTI & DEAT needs to be bridged. The possibility of creating a structure outside the government to fulfil such a dedicated function can also be considered.

One task could be to monitor world trends in this regard. We are already far behind.

This function could be supported by focussed research that can involve, amongst others, institutions such as TIPS and the Forum for the Environment and Economics (FEE). The initial research done in South Africa needs to be followed up.

### *4.4.2 Incentives*

South Africa needs to look at the possibility of introducing a variety of green taxes (perhaps even temporary incentives to establish green industries such as those involved in renewable forms of energy. The pros and cons of green taxes have been discussed thoroughly in the literature and introduced successfully in many countries Why they have not been introduced in South Africa can only be explained by the assumption that there are more urgent other fiscal matters that required attention. This could be a costly misjudgment of the importance of such fiscal actions. If it is, as we have argued, necessary for South Africa to prepare and indeed start moving towards an eco-economy then it might also be necessary to create an institution to lead the change and one of its first tasks should be to give green taxes the attention it deserves

## 5. SUMMARY AND CONCLUSIONS

Economic growth has been associated with increased degradation of the environment. If the experience of the recent past continues the world faces an environmental disaster. This fact has been recognised by the world community. The effects of the environment does not recognise national borders and therefore requires international cooperation. International cooperation on this issues faces enormous challenges. However, based on the severity of the problem, and the worldwide public concern about its effects on present and future generations, it is clear that the status quo will be maintained. Measures to stop environmental degradation will be implemented.

In the light of this scenario South Africa will have to begin to assess the potential impact of such measures on the economy and ways in which it can adjust in the best way to these rules and even benefit from the opportunities created by this new situation.

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