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Economic Diversification in the Context of Climate Change

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Introduction

This paper covers background material outlining the needs and options of non-Annex I Parties for economic diversification, resulting from the potential adverse effects of climate change and the impact of implementation of response measures.

It is in six parts. The first part briefly reviews Articles 4.8 and 4.9 of the United Nations Framework Convention for Climate Change (UNFCCC) and the progress so far on their implementation. Part two offers an overview of economic diversification as a development issue. It also attempts to assess past experiences in the promotion of economic diversification in developing countries (DCs) and draw lessons with regards to the respective roles of domestic economic policies and foreign direct investment (FDI). Part three examines the needs and options of the DCs for economic diversification in the context of the adverse effects of climate change, with emphasis on the least developed countries (LDCs) and Small Island Developing States (SIDS) because of their limited adaptive capacity. Part four discusses the potential effects that response measures to climate change may have on economic diversification in DCs, especially energy exporting countries and countries whose economies depend heavily on the consumption of fossil fuels, and their needs and options. Part five considers the funding issue, as well as other factors that have not been dealt with elsewhere in the paper for the promotion of economic diversification. Finally, part 6 concludes.

I. Background on the Implementation of Article 4.8 and 4.9 of the Convention

The UNFCCC adopted in 1992 states in its Article 2 that "(T)he ultimate objective of this Convention...is to achieve … stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." Moreover, "Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner."

An important principle that the Parties subscribe to is that cooperation by all countries and their participation in the international response to climate change should be conducted "in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions."

In this spirit, Article 3.2 states that " (T)he specific needs and special circumstances of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change, and of those Parties, especially developing country Parties, that would have to bear a disproportionate or abnormal burden under the Convention, should be given full consideration." This clause introduces two important criteria for any country to receive special attention: first, vulnerability; second, the weight of burden under the Convention.

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Thus, Article 4.8 commits the Parties to "give full consideration to what actions are necessary… to meet the specific needs and concerns of developing country Parties arising from the adverse effects of climate change and/or the impact of the implementation of response measures." Special reference is made to the following countries:

- Small island countries;
- Countries with low-lying coastal areas;
- Countries with arid and semi-arid areas, forested areas and areas liable to forest decay;
- Countries with areas prone to natural disasters;
- Countries with areas liable to drought and desertification;
- Countries with areas of high urban atmospheric pollution;
- Countries with areas with fragile ecosystems, including mountainous ecosystems;
- Countries whose economies are highly dependent on income generated from the production, processing and export, and/or on consumption of fossil fuels and associated energy-intensive products; and
- Land-locked and transit countries.

Finally, Article 4.9 singles out the LDCs and commits the Parties to "take full account of the specific needs and special situations of the least developed countries in their actions with regard to funding and transfer of technology."

Article 3.14 in the Kyoto Protocol, adopted at the third session of the Conference of Parties (COP-3) in 1997, requires developed countries to "strive to implement" their Kyoto commitments "in such a way so as to minimise adverse social, environmental and economic impacts on developing country Parties," particularly those identified in Article 4.8 and 4.9 of the UNFCCC.

Since 1997, important progress has been made in the implementation of Articles 4.8 and 4.9, In particular,

- In March 2000, two UNFCCC workshops on Article 4.8 and 4.9 - one on adverse effects of climate change and the other on the impact of response measures - were conducted. While the former highlighted the particular needs of vulnerable developing countries, the latter identified economic diversification as a potentially effective means to reduce the adverse effects of response measures, especially in energy exporting countries (FCCC/SB/2000/2).
- In 2001 at COP-6, the issue of adverse effects/impacts received much attention. The Bonn Agreement (Decision 5/CP.6) contains several adverse effects/impacts provisions, which were eventually adopted by COP-7 as part of the Marrakesh Accords. These include the establishment of a special climate change fund that will fund *inter alia* adaptation, technology transfer and activities to assist those DCs in Article 4.8 to diversify their economies; a provision that requests Annex I Parties to provide annual information on how they are striving to minimise adverse social, environmental and economic impacts on DCs as they seek to fulfil their Kyoto commitments; and the establishment of a LDC fund (under the Convention) and an Adaptation fund (under the Kyoto Protocol, to be financed by 2 percent of the share of proceeds on Clean Development Mechanism projects). These three new funds will be managed by the Global Environment Facility. The EU, Canada, New Zealand, Norway and Switzerland

pledged to contribute US$450 million annually by 2005 (with this level to be reviewed in 2008) for the three funds (Decision 7/CP.7).

- COP-6 at Bonn had endorsed the concept and guidelines for National Adaptation Programmes of Action (NAPAs). COP-7 established the LDC Expert Group, which is mandated to provide guidance and advice on NAPAs, and adopted the guidelines for the preparation of NAPAs. The preparation of NAPAs is being supported from the LDC Fund.

The publication of the Intergovernmental Panel on Climate Change (IPCC)'s Third Assessment Report (TAR), *Climate Change 2001,* represented another major step in the implementation of Article 4.8 and 4.9. In the first instance, it defines a number of important terms:

- Vulnerability: "the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including variability and extremes"
- Adaptive capacity: "the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences." (McCarthy *et al* 2001:6).

Second, a direct link is drawn between the strengthening of adaptive capacity and sustainable development. Third, the TAR assembles important information on possible effects on different geographical regions. Like its predecessors, however, the TAR focuses on the physical effects. It provided limited coverage on socioeconomic issues, particularly the impact of response measures which is addressed in part in Chapters 8 and 9 of the Contribution of Working Group III (Metz *et al*, 2001).

Three particular groups of DCs seem to have attracted so far the most attention under Article 4.8 and 4.9, namely the SIDS (31), LDCs (49) [2] and Oil Exporting Countries (OECs) (24)[3] as well as those who are heavily dependent on coal such as China and India.[4] While these groups are only part of the DC parties, they nevertheless represent those where there is most concern under Article 4.8 and 4.9 due to their high level of vulnerability and/or the burden to adapt.

This paper attempts to address the scope of economic diversification as a means to minimise adverse effects/impacts for the DCs, especially the country groups identified above.

[2] . Antigua and Barbuda, Bahamas, Bahrain, Barbados, Cape Verde, Comoros, Cyprus, Dominica, Fiji, Grenada, Jamaica, Kiribati, Maldives, Malta, Mauritius, Micronesia, Marshall Islands, Nauru, Palau, Papua New Guinea, Samoa, Sao Tom? and Principe, Seychelles, Soloman Islands, St.Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Tonga, Tuvalu, Trinidad and Tobago, Vanuatu.

[3] . Algeria*, Angola, Baharin, Brunei Karussalam, Cammeroon, Congo, Ecuador*, Egypt, Gabon*, Indonesia*, The Islamic Republic of Iran*, Iraq*, Kuwait*, the Libyan Arab Jamahiriya*, Malaysia, Mexico, Nigeria*, Oman, Qatar*, Saudi Arabia*, Trinidad and Tobago, Tunisia, the United Arab Emirates* and Venezuela*. Countries marked by * are members of the OPEC.

[4] . 9 SIDSs (Cape Verde, Comoros, Kiribati, Maldvies, Samoa, Sao Tom? and Principe, Soloman Islands, Tuvalu and Vanutu) are also LDCs. 15 of the original 27 LDCs were said to be land-locked (UNCTAD 1985).

II. General background on economic diversification

a. Economic diversification and its rationale

Economic diversification is generally taken as the process in which a growing range of economic outputs is produced. It can also refer to the diversification of markets for exports or the diversification of income sources away from domestic economic activities (i.e. income from overseas investment). The last is particularly relevant to capital-surplus oil exporting countries. Economic diversification in its standard usage, either in terms of the diversity of economic activities or markets, is a significant issue to many DCs, as their economies are generally characterised by the lack of it (see table 1, 2 and 3).

Economic diversification can be measured in various ways. The simplest is to use the share of manufacturing in aggregate economic indicators, such as share of manufacturing in GDP and share of manufactured goods in merchandise exports. This is because developing economies have traditionally relied heavily on the production of primary commodities. However, such shares fail to capture fully the range of exports within manufacturing and in the rest of the economy. Therefore UNCTAD has developed the measure of Export Concentration Index (ECI), which is the normalised value of Herfindahl-Hirschman Index, ranging from 1 (low level of economic diversification) to 0 (high level of diversification). The calculation takes into account 239 products. Another indicator that UNCTAD designed is the Economic Vulnerability Index (EVI), a composite index based on the share of manufacturing in GDP, the share of labour force in industry, annual per capita commercial energy consumption and the ECI (UNCTAD 2000a).

There is a logical link between low levels of economic diversification and high levels of vulnerability. For an exporter, its vulnerability results first from the world price fluctuations (reflected by the instability of its terms of trade), second from its exposure to shocks, as expressed by the ratio of exports to GDP, and third from the capacity of the country to efficiently manage such shocks (Guillaumont, 1999). Thus the Committee for Development Policy (CDP), which is in charge of the review of the status of LDCs, in its April 1999 session, recommended the substitution of a composite Economic Vulnerability Index (EVI) for the old, composite EDI. The EVI takes into account the instability of agricultural production and the instability of exports of goods and services.

What is the rationale for economic diversification? Five considerations may be highlighted:

- Trends in terms of trade
- Price instability in primary commodity markets
- Depletion of mineral resources
- Economies of scale and external economies especially associated with manufacturing
- Reduction of portfolio risk

Trends in terms of trade and price instability. At a basic level, economic diversification is considered necessary in order to combat poor market conditions, especially worsening terms of trade and price instability for primary commodities. The reasoning is straightforward: while worsening terms of trade diminish the economic value of exports, price instability causes large macroeconomic swings in output, employment, government revenue and investment in the home country. Moreover, it is thought that the resulting

instability is much more significant for an underdeveloped country than it would be for a developed country, partly because of the relative importance of the export sector in the former, and partly because governments in such countries are inadequately equipped to undertake the contra-cyclical policies necessary to offset the internal repercussions of export instability (Young 1973; Guillaumont 1999).

However, there has been a long-standing debate on the trends in terms of trade. In this regard, Thirlwall (2003: 663-666) and UNCTAD (2002, Chapter IV-B) provide helpful reviews of the numerous studies. Three important conclusions emerge:

- Since 1900 and with exception of the 1920s, there has been a long-term decline in the terms of trade for primary commodities relative to manufactured goods, with a central estimate of 0.5 per cent per annum;
- Within manufacturing, the terms of trade for developing countries relative to developed countries has worsened since the 1960s or 1970s. The extent of decline varies from less than 1 percent for East and South East Asia to 5 percent for the LDCs.
- Scientific and technological capacities have a major impact on the development of terms of trade.

The implication of these is that diversification into manufacturing *per se* does not guarantee improving terms of trade for a developing country. For instance, it has been found that China's terms of trade in telecommunication goods deteriorated significantly in the 1990s as a reflection of its limited ability to add value (UNCTAD 2002a).

Depletion of mineral resources The depletion of the mineral resources that underpin many developing economies raises the issue of economic sustainability. Basic economic logic requires the compensatory building-up of other types of capital in order to maintain a non-declining flow of income for future generations (Pezzey 1992). These include physical capital (embodied in manufacturing hardware and infrastructure), human capital (including health, skills and the ability to learn), as well as natural capital.

Economies of scale and external economies in manufacturing. Some researchers believe that there are other important reasons why economic diversification, especially expansion into manufacturing, is desirable. One of the most important is the fact that manufacturing offers greater scope for economies of scale and external economies (Romer1986). A key point in Romer's (1990) model is that the diversity of intermediate good inputs enhances productivity in the final goods sector.

Reduction of portfolio risk Diversification also has the benefit of expanding the possibilities to spread investment risks over a wider portfolio. Greater diversification will enhance average capital productivity in the long run by providing better investment opportunities at lower risk. Acemoglu and Zilibotti (1997, cited in Berthelemy and Soderling 2001) demonstrate that lack of diversification leads economic agents to invest in low return, safe traditional products, rather than in riskier projects with higher growth potential. The absence of such possibilities will hamper capital productivity in the short run and capital accumulation in the long run.

While there is a general emphasis on economic diversification, however, the question as to how it can be fostered has received limited attention in the literature. This appears to have resulted from a lack of clear understanding of the nature of economic diversification and its

relationship to economic development. In order to facilitate our discussion in the rest of the paper, we now turn our attention to this important issue.

b. The relationship between economic development and diversification

There is a fundamental link between economic development and diversification. The former is generally defined as the process where by the real per capita income of a country increases over a long period of time without increasing poverty or income disparity (Meier 1995:7). On the other hand, it is well established (e.g. Chenery and Syrquin 1975) that countries experience a similar set of structural transformations as their per capita income rises, which include, *inter alia*, an increasing share of manufacturing in GDP and in total exports. Therefore, economic diversification is an integral part of economic development and is, in fact, a consequence of economic development, rather than the other way around. This is because the structural transformation is to a large extent driven by two underlying forces, namely changes in demand with rising income and differences in trade patterns resulting from variations in market size, as well as changes in factor proportions. Both are in turn reinforced by development.

This has two immediate implications. First, economic diversification is not a separate process from economic development, and should not be pursued apart from it. Second, there is a question as to what extent it is possible to pursue economic diversification when the level of economic development is low, and at what costs.

In one of the earliest studies of economic diversification, Young (1973) expresses the fear that if industrialisation is initiated before the economy is ready, state action to expand industry may simply cause misallocation of resources. In another study, while acknowledging that South Korea did alter its economic structure dramatically, Leipziger and Thomas (1993) question whether technical efficiency was achieved profitably. They point to high long-term costs, reflected in the socialised nature of risk sharing and the tight controls that the financial system was subject to under the state-sponsored heavy industry expansion programme and the problems this entailed. This point seems to be particularly poignant in the light of the Asian Financial Crisis in 1997, which hit South Korea very hard.

The fundamental link between economic development and diversification also suggests that the question as to how economic diversification can be pursued is parallel to the question as to how economic development can be obtained. In the latter, answers are divided regarding the respective roles of the market versus the state on one hand, and the public sector versus the private sector on the other.

In what follows, we discuss the respective roles of FDI and domestic economic policy in promoting economic diversification.

c. Role of foreign direct investment in economic diversification

The flow of FDI to host countries, measured as percentage of GDP, varies a great deal (see table 5). The size of DFI is much greater for OECs and other DCs than for the LDCs. IFC (1997:19) shows that in 1996, some 57 countries received FDI flows greater or equal to 1 percent of GNP. For 6 countries, it was more than 5 per cent. Inward DFI flow as a percentage of gross fixed capital formation in host DCs rose from 4.6 percent for 1988-

1993 to 11.5 percent in 1998, whereas inward FDI stock as a percentage of GDP increased from 5.4 percent in 1980 to 20.0 percent in 1998 (UNCTAD 2000b). In 1996, half of the top 12 recipients of FDI measured this way are low income, and 3 of which are African countries (IFC1997: 17).

Net FDI to LDCs rose from $279m in 1988 to its peak at $1809m in 1996. However, a small number of LDCs countries attracted a lion's share of the total FDI flows to LDCs. During 1991-1995, for instance, five countries (Angola, Lesotho, Myanmar, Yemen and Zambia) received more than 100m of DFI each. Angola alone received $2471m in 1999 (UNCTAD 2002b).

Such differences have a combination of causes, one of which is the nature of the host economy in the strategic calculus of the transnational corporations (TNCs). TNCs invest in DCs for two principal purposes, either to penetrate the domestic market or to exploit local resources for exports, although a country may attract a combination of DFI in this regard. Depending on the availability of local resources, export-oriented FDI in turn falls into two categories: those aimed at the exploitation of locally available human resources, or that of mineral resources. While the size of domestic economy, tariff protection, history are important factors for import-substituting DFI, skills of local labour force, quality of infrastructure, incentives and lack of red-tape are important for labour-consuming DFI. In all cases, however, the existence of profit-making opportunities is key.

There is a general consensus that FDI represents both opportunities and potential risks for the host countries. The benefits are well recognised and include the inflow of capital, managerial know-how, transfer of technology and marketing expertise and market links (e.g. IFC 1997; UNCTAD 1997). However, there are also potential problems. Adverse impacts on the domestic market structure and competition in the industry, and on the local environment are perhaps the most important. This is because, given their ownership-specific advantages, their sizes and given the oligopolistic structure of industries that they operate in, TNCs may increase market concentration and hinder competition, thus reducing economic welfare, although they entry should initially enhance competition in the industry (UNCTAD 1997).

In order to maximise benefits from FDI, UNCTAD (1997:128) stresses the importance of maintaining coherence between trade policy, FDI policy and competition policy. What makes this task difficult is the fact that liberalisation could increase the market power of TNCs. On the other hand, when market imperfections (e.g. economies of scale) do exist, market concentration is good for efficiency. Therefore there is a need to balance efficiency objectives with competition objectives (ibid: 130). With regards to FDI's environmental impact, consistent regulation and control by the government is needed, as market mechanisms may not work effectively in underdeveloped market environments.

Given the purpose of this paper, the key question is whether FDI can effectively promote economic diversification. This will again depend on the investment strategies of the TNCs involved on one hand, and the conditions of the host economies on the other. Since TNCs are constantly looking out for profit-making opportunities, much will depend on the host countries' efforts to offer the right investment environment. If a country is stable and developing, and if the regulatory framework is sufficiently open and flexible, and if the labour force is adaptable and the infrastructure satisfactory, there is good chance that the country will attract FDI in a range of productive activities. The diverging experiences of

China and India (see table 5) demonstrate however that growth and large home markets are not enough. What China has succeeded and India has failed to provide is to liberalise the DFI policy regime as well as the domestic economy. In this regard, China's success in attracting DFI is to a large extent driven by local authorities that are keen to speed up local economic growth (Zhang1994).

However, it is interesting to note that the first-generation East Asia Newly Industrialised Countries (NICs) relied much more on foreign trade than FDI during their process of development. Nevertheless, utilising FDI is a cornerstone in the development strategy of Singapore, and to a lesser extent of those of the second-generation Asian NICs and China (see table 5).

The conclusions that emerge from the review of country experiences in the next section are:

- FDI can help to initiate new industries, as long as the right conditions are available.
- Foreign investors from export-oriented economies tend to be particularly helpful to the initiation of new exporting industries.
- Quality, rather than quantity, of FDI is what really matters. This relates to export orientation, sectoral distribution, level of technology and marketing knowledge.

d. Role of domestic economic policy in economic diversification

Although the development literature is filled by conflicting views on the specific role of domestic economic policy in promoting development, they agree that it cannot be over-emphasised. In this section, the experiences of promoting economic diversification in Mauritius and Fiji are reviewed, as an attempt to highlight the range of policies required to promote economic diversification.

Mauritius is considered as one of the most successful African countries in developing its economy through diversification. Its GDP grew by 5.5 percent a year between 1980 and 1996 (Berthelemy and Soderling 2001). In 1970, agriculture accounted for 16 percent of GDP and most exports (sugar), whereas Manufacturing accounted for only 14 percent of GDP and mainly for the domestic market. The service sector, which made up the bulk of GDP (62 percent), was largely non-tradable. By 1997, agriculture's share in GDP had fallen to 9 percent and less than a fourth of total exports. Manufacturing's share had doubled (25 percent). Services had become tradable to a significant extent thanks to a flourishing tourism industry (UNCTAD, 2001), which accounted for 15.7 percent of GNP and 26.8 percent of exports (table 3).
In 1999, manufactured goods accounted for 75 percent of its total merchandise exports (World Bank, 2001).

Mauritius launched a policy to diversify away from traditional exports (sugar, garments) in the late 1970s and early 1980s. The centrepiece of the government's strategy was the advent of export processing zones (EPZs) to attract labour-intensive manufacturing for exports. EPZs offers a range of incentives:

- Tax holiday on corporate profits and dividends (effective corporate tax rate is only 15 percent or even lower, compared with 57.75 percent for non-certificate companies)
- Free repatriation of capital and dividends
- Duty-free entry of capital goods and raw materials (World Bank, 1992)

The EPZ program had great success in the 1980s. Exports from EPZs accounted for more than half of Mauritian exports by late 1980s. In particular, wearing apparel accounted for between 50-60 percent of total number of enterprises and more than 80 percent of total exports in EPZs (World Bank, 1992). Apart from a large pool of relatively well-educated labour, a program of stabilisation policy and adjustment created a favourable economic environment. Preferential policy in the EEC through the Lome Convention helped. Its manufacturing exports' (mainly textile and garments) initial entry into the U.S. market was helped by Hong Kong investors looking to move capital out of Hong Kong in anticipation of 1997 and seeking to locate their subsidiaries in countries that had not yet come up against quota restrictions in the U.S. (World Bank, 1989).

Due to rising labour cost and a combination of other constraints (e.g. high transport cost, skill shortage, bureaucracy and the lack of local supplies), however, number of firms in EPZ has declined from 1988 (IMF, 1997). In the same year, the government re-launched its tourism strategy, putting emphasis on low-impact and high-spending tourism (World Bank, 1992).

FDI inflow to Mauritius has been modest in quantitative terms. It has rarely exceeded $30 million in any one year. FDI as a percentage of gross fixed capital formation during 1993-1998 is only 2.5 percent. But it has had great impact, particularly in the 1980s, when manufacturing attracted a major part of FDI, and much of it was concentrated in garments and textiles. FDI inflow in manufacturing declined in the 1990s, but increased in tourism and banking. During 1990-1999, the respective shares in total FDI inflow are 27 percent for manufacturing, 26 percent for banking and 15 percent for tourism, mirroring the diversity of the economy (UNCTAD 2001).

Fiji is a small island developing State in the Pacific. A host of outwork-looking and deregulatory policies were introduced in 1987, when two successive coups pushed the economy to the brink of collapse. These include (Elek *et al* 1991):

- Devaluation by some 33 percent, accompanied by extremely tight fiscal and monetary policies;
- Special measures to promote the tourism industry;
- Vigorous campaign to attract foreign investment (including tax holidays of up to 13 years);
- Reform to dismantle anti-export bias, including removal of import licensing requirement, exemption of import duty for exporters, import tariff reduction;
- Labour market reform to allow more flexibility in setting wage rates and employment conditions and to curb the power of the trade unions.

There was a positive result in both growth and diversification. Sugar and Molasses, the most important traditional exports, as percentage of total export declined from 58.9 percent in 1987 to 41.1 percent in 1990, while that of garments increased from 9.9 percent to 13.7 percent. On the other hand, its tax free factories (TFF) scheme attracted 113 projects by end of 1990, with 74 in garments. The last accounted for 83 percent of all employment and 65 percent of total investment in the TFF scheme (ibid.: 31). Effective exchange rate, foreign investment, privileged access to the EC (under the Lome Convention) and US markets and the neighbouring markets are cited as crucial factors to the success.

The experience of Fiji illustrates that crisis may give rise to a determined push for diversification. Indeed, Elek *et al* (1991) observe that, once stability returned, the government found it increasingly difficult to implement further reform policies.

Asia NICs. The 'success stories' of the Far East offer varying lessons to observers, often depending on one's perspective and the extent of detailed knowledge about the region. The World Bank (1993) emphasises the government's role in encouraging saving and investment (including in human capital), providing infrastructure and generally maintaining a stable and balanced macroeconomic environment. By contrast, Lall (1996) stresses the government's role in remedying the crucial failures in the capital market and helping to foster capital-intensive industries. For Leipziger and Thomas (1993), however, "[A]t the core of development success in East Asia has been pragmatic policymaking-making, most importantly, the relative lack of ideology and the willingness to repudiate failed policies." (p.4). As evidence, they cited the abandonment in the earlier 1980s of Malaysia's experiment with selective industrial policies, Korea's curtailment of the heavy and chemical industry drive in 1970-1980, and Singapore's abandonment of a high-wage policy in 1985. Observers do agree on one point though, namely, the crucial role of an export-orientation, which forces domestic producers to face up to competition and to learn much more quickly than otherwise.

In the next section, an attempt is made to identify barriers in promoting economic diversification. Due to data availability, this focuses on the experiences of two oil-exporting countries, Brunei and Saudi Arabia.

e. *Barriers to past attempts at economic diversification*

Deliberate efforts to promote economic diversification have been common among OECs, mainly because, in comparison with other DCs, they have been less constrained by a lack of financial resources. Existing studies (e.g. Looney 1994; Karl 1997) tend to conclude however that, with few exceptions (e.g., Kuwait, Qatar and the United Arab Emirates), many such efforts have had disappointing results. In Algeria, for example, excessive amounts of investment supported by high oil income did in fact result in an increase in diversification, but with inefficient outcome, largely because the direction of these investments was determined by government decree rather than economic rationale (Berthelemy and Soderling 2001). In what follows, we take a close look at two such cases.

Brunei is a small and rich oil-exporting island country with a population of about a quarter of a million. Economic data on it are hard to obtain, as the country is not listed in the various relevant publications by the World Bank. However, Ali (1996) has provided a comprehensive account of the country's effort to diversify its economy, highlighting a striking contrast between the frequency with which economic diversification has been emphasised in the five-yearly national development plans since 1962 and the continuing dominance of the oil sector.

In Brunei, nearly 30 years after the state prioritised economic diversification as a development objective, the oil sector's contribution to GDP (at constant prices) was still as high as 62.9 percent in 1990, although it had declined from 83.7 percent in 1980. This is directly related to the fact that, although the country is a capital-surplus country and had built up a large overseas investment portfolio of some $25 billion by 1991, the state's allocation of development expenditure to the manufacturing sector has been extremely

small. For instance, manufacturing did not even feature in the sectoral allocation of development expenditure for 1962-1974, while infrastructure received a whopping 53.22 percent (p. 69). Industry and commerce received respectively 0.9 percent and 0.3 percent of the development expenditure under the NDP III (1975-1979) and NDPIV (1980-1984), before the share rose to 10 percent under the DNP V (1986-1990) and NDP VI (1991-1995).

Like elsewhere in OECs, the government has continuously called for the expansion of the private sector as part of its economic diversification strategy. However, the government sector's contribution to the non-oil sector share in total GDP (which rose from 16.3 percent to 37.1 percent between 1980 and 1990) actually increased from 37.4 percent to 55.5 percent, while that of the private sector declined (ibid: 179). This is despite the fact that actual private investment far outstripped the planned private investment several-fold (ibid: 115). Rather, the problem is that a lion's share of private funds went into the oil sector, as the latter offers a more attractive profit-making opportunity (ibid: 115).

Brunei illustrates well the barriers facing a small but rich OEC in economic diversification. For example, the attempt to develop manufacturing is constrained by the smallness of the home market on the one hand, and the lack of cost advantage for the export market on the other. What emerges most strongly from the studies of Brunei is, however, the deficiency of the process of human capital formation in an economy like Brunei. A fundamental barrier here is the fact that the native population is accustomed to a standard of living that is provided for by the state through oil revenue. This has many ramifications, including a limited incentive to acquire new skills. Thus, while the government has identified the promotion of capital intensive high-tech industry and financial services as part of its more recent economic diversification strategy, both are constrained by the fact that the native population lacks the required skills and commercial inclination to man these activities. Moreover, the government's human capital development strategy, with an emphasis on developing vocational and technical training, is found ineffective simply because the native population is not interested in the relevant occupations (Minnis 2000). On the other hand, Ali (1996) shows that there is strong contradiction between the government's effort to maintain traditional values (e.g. hierarchical authority) and the requirement of a modern economy for a generation of workers and professionals who are competitive and innovative.

The case of Brunei provides an important lesson for other OECs, namely that, although it is difficult to diversify the economy, it might be feasible to diversify the sources of income if there is sufficient foresight in financial management of the oil revenue and the political will to keep current expenditure under control. In fact, investment income from overseas provided one-third of the total government revenue by earlier 1980s, compared with over 60 percent from the oil sector and 3-4 percent from other sources (p. 160).

Saudi Arabia is one of the largest oil-exporting economies in the world. It also has one of the largest programs of economic diversification. However, the impact has been limited. Looney (1994) shows that the share of manufacturing in GDP increased very slowly from 5.3 percent in 1975 to 8.1 percent in 1985, compared with an increase from 5.5 percent to 13.1 percent for construction, and 6.9 percent to 21.3 percent for services (pp.5-7). In 2000, manufacturing export accounts for only 7 percent of its total merchandise exports (World Bank 2003).

Looney's analysis shows that the effects of the "Dutch Disease" are widespread: The expansion of the manufacturing sector is not only constrained by an over-valued domestic currency, but also by the large government expenditure in infrastructure and services, which raises the prices of manufactured goods despite numerous government subsidies to the manufacturing industry. A relative scarcity of a skilled native labour force, especially for technical and professional jobs, regional integration, and protectionism in EU and USA markets are also constraining factors.

The experiences of Brunei and Saudi Arabia provide support for various statements in the literature on OECs. Together they argue that the peculiar economic-incentive structure created by large oil revenue impedes economic diversification. On one hand, the inflow of large oil revenue leads to an over-valued exchange rate, which then makes the non-oil production uncompetitive in the international market. On the other hand, the easy gain of oil revenue creates an economic and institutional dynamic that reduces the incentive to diversify, as the state engages in indiscriminate subsidies, over-spending and inefficient investment projects (Karl 1997). These imply that the barriers to economic diversification in OECs are particularly high and often structural.

III. Economic diversification and adverse effects

This part will examine the needs and options for economic diversification in developing countries as a means to counteract adverse effects resulted from climate change, with special emphasis on those of the LDCs and SIDSs.

a. Lack of economic diversification as a factor in vulnerability

While the IPCC (McCarthy *et al* 2001) adopts a broad definition of vulnerability, Guillaumont (1999:4) defines it as "the risk of being harmed, wounded (negatively affected) by unforeseen events", or shocks, putting emphasis on the word 'unforeseen'. Guillaumont stresses the distinction between economic vulnerability and economic handicaps. In his view, smallness and remoteness, landlockedness, low level of human resources may be serious handicaps to growth, but not as such elements of vulnerability.

Indeed, Elek *et al* (1991) argue that 'smallness' is not necessarily a handicap to development because SIDS:

- Are less likely to pursue costly inward-looking development strategies since the limits to import substitution are readily apparent;
- Are able to change policy directions more quickly, and
- Are perceived as non-threatening and therefore able to achieve market access and avoid discriminatory trade treatment more easily than larger countries.

They assert that these benefits go some way to outweigh the costs usually associated with smallness (e.g. less able to exploit economies of scale, no commercial and diplomatic clout) and, to the extent that small nations are often distant from major commercial centres, the costs associated with remoteness.

A necessary point to consider here is how DCs may be adversely affected by climate change. The IPCC TAR makes it clear that, on the balance, climate change will affect DCs

more than the developed countries. On the other hand, different sub-groups will be affected differently. While the SIDS and low-lying countries are threatened by rising sea levels, other countries will be subject to drought, reduction of crop yield, and increased health risk and cost.

Drawing upon McCarthy *et al* (2001), UNDP in its *Human Development Report 2003* highlights the following possible adverse effects on DCs:

- Reduced crop yields in most tropical and subtropical regions and increased variability in agricultural productivity due to extreme weather conditions (droughts and floods);
- Increased variability of precipitation during Asian summer monsoons, which could reduce food production and increase hunger;
- Reduced water availability in many water-scarce regions, particularly subtropical regions. Increased water availability in some water-scarce regions-such as parts of South-East Asia;
- Increased destruction of coral reefs and coastal ecosystems and changes in ocean-supported weather patterns;
- Rising sea levels. With a 1-metre rise in sea level, partly due to global warming, Egypt could see 12 percent of its territory - home to 7 million people - disappear. Rising sea threaten to make several small island nations-such as the Maldives and Tuvalu-uninhabitable, and to swamp vast areas of other countries;
- Increased exposure to vector-borne diseases (malaria, dengue fever) and water-borne diseases (cholera). (p.124).

In order to appreciate the conditions needed to deal with these threats, one may recall Guillaumont's (1999) analysis of the three determinants of vulnerability, referred to earlier (p.4). Economic diversification *per se* can deal with the first (price fluctuations) and the second (exposure to external shock) factors, but not the last (i.e. the capacity to deal with shocks), which is a reflection of the overall level of development. It is low in DCs, especially in LDCs. In this respect, UNCTAD (2000a) has characterised the situations of LDCs as follows:

- Very low levels of socio-economic infrastructure;
- High degree of vulnerability to external shocks;
- High rates of environmental depletion;
- High rates of human capital resource depletion arising from the prevalence of diseases such as AIDS.

So once again, the question we have to address is how to overcome the lack of development. The earlier discussion on the respective roles of DFI and domestic economic policies remains valid here. National governments need to formulate and implement long-term plans that balance the development needs of both the current and future generations. In particular, measures to tackle the adverse effects of climate change need to be incorporated into national development plans. They must also work hard to attract foreign investment in such a way so that the benefits are maximised. However, to kick-start the development process, donor assistance will be important for this group, not only in installing a minimum level of infrastructure, but also in building the institutional capacity to manage development. In this regard, the formulation of the NAPAs offers an important opportunity for the LDCs to prioritise their needs for assistance and for urgent actions.

In the following section, the role of adaptation to climate change in fostering economic diversification is examined.

b. Role of adaptation to climate changes in fostering economic diversification

To start with, adaptation is defined as "adjustment in natural or human systems in response to actual or expected climate stimuli or their effects, which moderates harm or exploits beneficial opportunities." (McCarthy *et al* 2001: 6).

Burton *et al* (2002) point out that adaptation to climate change is an integral part of the UNFCCC in two related but distinct ways. The first is the prevention of dangerous interference with the climate system by the stabilisation of greenhouse gas (GHG) concentrations in the atmosphere, often referred to as " mitigation." The second is reduction of vulnerability to climate change by the process of "adaptation." In the former, the key issue is the extent to which the gross impacts of climate change can be reduced by adaptation. Whereas in the latter, the issue of adaptation has arisen from the fact that the developed country parties to the UNFCCC have committed to "assist the developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting the costs of adaptation to those adverse effects." (UNFCCC, Article 4.4.). The key questions here are about vulnerability, and how and where to deploy adaptation responses.

Both aspects are relevant to the strategy of promoting economic diversification in the DCs, but in different ways. In the former, the question is how the need to reduce GHG emission may provide opportunities for DCs to diversify their economies. The World Bank (2003:177) points out that although non-OECD countries use only about 20 percent as much energy per capita as OECD countries, they use 3.8 times as much energy per dollar of GDP. This indicates enormous potential to increase energy efficiency and reduce fuel cost in non-OECD countries – with reduced GHG emissions as a welcome side-benefit. This may relate to improving energy efficiency, adopting renewable and cleaner energy, cleaner transport and more sustainable land use pattern, etc. They may also arise from the attempt to anticipate or deal with adverse effects. For SIDSs, the strategies here will encompass retreating to higher land, learning to manage coastal resources with rising sea level, migration and investing abroad. These can conceivably give rise to new economic activities.

There are also implications for existing industries. An illustration here is tourism. A recent publication by the World Tourist Organisation (2001) indicates that tourism is the most important service export for LDCs. The total tourism receipts in LDCs more than doubled from 1992 to1998, and that tourism is the primary source of foreign exchange earnings in all LDCs, outside of the petroleum industry (which is concentrated in only three LDCs, namely, Angola, Yemen and Equatorial Guinea). The combined tourism receipts in 1998 accounted for 16.2 percent of the total non-oil export receipts of the LDCs, thereby exceeding the second and third largest non-oil exports sectors (cotton and textile products) by 39 percent and 82 percent, respectively. However, the numerous studies included in the report show that to maximise the benefits of international tourism for the LDCs, local supplies and services need to be developed and improved to reduce both revenue leakage (i.e. expenditure on imported goods and services) and fluctuation. Thus economic diversification is crucial to maintain the growth of leading sectors such as tourism. Climate change will only make this even more so.

In the latter, the question is how the commitment of the Annex I countries to help non-Annex I countries under the UNFCCC can be mobilised to foster sustainable development generally, and economic diversification in particular. Following the earlier argument that the conditions for fostering economic development are the same as those for promoting economic diversification, it may be further argued that donors' efforts would be most effective if they concentrate on improving the DC parties' general development conditions, including the improvement of macroeconomic management, market access, infrastructure, and health and education. The same logic would argue for an integration of aid programs to address a set of development needs for specific DCs, rather than attempt to separate out the climate change issue from the rest. Integration rather than compartmentalisation is needed.

c. *Role of economic diversification as an adaptation strategy*

Can a more diversified economy help to achieve the UNFCCC goal and reduce adverse effects on DCs? Given the inherent relationship between economic development and diversification on one hand, and the relationship between development and the strengthening of adaptive capacity on the other, the answer can only be affirmative. However, some finer points are in order.

First, economic diversification refers to the growing range of outputs produced and a growing range of markets served. It says nothing about how such goods and services are produced and how such activities may affect GHG emissions. Therefore, it is important to take steps to ensure that any measures taken to foster economic diversification should not encourage activities that increase emissions. This would suggest two points. On the one hand, Annex I countries should discourage polluting producers in their territories to shift to DCs. On the other hand, DCs need to take their environmental regulation and control seriously and refuse the entry and expansion of such operations.

Second, economic diversification offers important potential as an adaptation strategy, as it reduces the exposure of the economy to variability and extreme conditions in any particular economic sector, and generally improves their growth prospects. It will also give rise to more stable cash flows, which would enable governments to invest more in long-term projects such as those dealing with the adverse effects. However, as the review of the country experiences has shown, economic diversification is a long-term, multifaceted challenge, which cannot be achieved in isolation. It is not a substitute for, but rather a component of, sustainable development.

d. Economic diversification to address other environmental amenities

Environment is a characteristic public good (i.e. non-rival, non-excludable). Moreover, it is not always possible to put a value on it. Therefore, its provision has to be undertaken by an entity that is large enough to be able to reap the benefits. In the case of climate change, that entity encompasses the entire humanity. Of course, this is exactly why the UNFCCC was adopted in the first place. However, more explicit acknowledgement of this fact has to be made and more concrete measures to support adaptation (in both senses) are needed to maximise the impact. The truth is that, without helping the DCs to reduce their emissions, efforts by Annex I Parties to reduce emissions will not be totally effective in achieving the overall objective of the UNFCCC. The World Bank (2003:175) shows that, regardless of the pace of technological changes, total emissions by DCs will exceed those by the OECD

countries in the near future (approximately 10-20 years). This means that Annex I countries have to contemplate the prospect that DCs, especially those in climate-sensitive areas, will have to be supported with financial and non-financial resources to act as custodians of their local environment for the benefits of future generations.

Such collaboration could conceivably give rise to new economic activities, thus diversifying the economy. For instance, logging/forestry workers may be encouraged to preserve bio-diversity, and fishermen taking up new roles in managing the aquatic environment. For such a collaborative relationship to work, however, not only financial and technical resources, but also mutual trust, clear rules and two-way accountability are needed.

IV. Economic diversification and Impacts of Response Measures (IRM)

This part will focus on the impact of efforts to reduce emissions by Annex I Parties on the economies of energy exporting countries and heavy fossil fuel user countries. It will also consider their needs and options in economic diversification.

a. Background on ways to reduce IRM

The adoption of the UNFCCC and its Kyoto Protocol marks the beginning of a world-wide collaborative effort to reduce emissions in order to stabilise the level of GHG concentrations in the atmosphere. Under the Protocol, Annex B countries are required to reduce their emission level by an average of around 5 percent from their 1990 levels for the commitment period 2008-2012.

In fulfilling their mitigation commitments, industrialized countries will have to take measures to reduce their energy use intensity, change their energy mix and improve their energy use efficiency, all of which will conceivably affect the world energy market and the export revenues of energy exporting countries. On the other hand, in order to reduce the cost of fulfilling their commitments, the Kyoto Protocol provides a number of flexible mechanisms, as will reviewed shortly, which may offer important opportunities for DCs, especially the heavy fossil fuel users such as China and India.

OPEC countries have, at various points in time, proposed the following measures to minimise the impact of response measures (Barnett and Dessai 2002):

- Monetary compensation for lost oil revenue;
- Removal of subsidies on coal production and of taxes on oil consumption in developed countries;
- Tax restructuring in developed countries to reflect the carbon content of fuels;
- Measures to discourage the production of fossil fuels within developed countries;
- Investment to help oil exporting economies to diversify sources of income;
- Increased use of carbon 'sinks' to offset the reductions required through less fossil fuel use;
- Finance and technology to support projects related to CO_2 storage and less wastage in energy extraction and delivery.

In what follows, some of these issues are examined.

b. Kyoto Protocol mechanisms and the impact on energy use

The Kyoto Protocol (KP) contains several mechanisms that Annex B countries can adopt to assist in meeting their assigned emission reduction amounts:

- Joint implementation (JI): Article 6 permits JI, where developed countries are able to invest in projects in other developed countries to acquire credits to assist in meeting their assigned amounts.
- The Clean Development Mechanism (CDM): Article 12 provides CDM whereby developed countries are able to invest in emission reducing projects in developing countries to obtain credits (or certified emission reductions, CERs) to assist in meeting their assigned amounts.
- Emission trading: Article 17 allows developed countries to participate in emissions trading for the purpose of meeting their assigned amounts. Although there were concerns (by the EU) that any such trading should be supplemental to domestic actions for the purpose of meeting commitments, the Marrakech Accords adopted at COP-7 have relaxed this supplementarity requirement.

The Marrakech Accords also accept forest management as carbon sinks with country-specific ceilings and other sink categories (agricultural soils, revegetation) without any ceiling, reducing the effective commitments by a potentially large amount (Jotzo and Michaelowa 2002).

It is clear that different sub-groups of DCs will be affected differently by these mechanisms. To start with, under various assumptions and based upon the comparative costs of achieving emissions domestically, through JI and the CDM, as well as the availability of surplus assigned amount units (AAUs) under emissions trading (hot air), it has been tentatively estimated (Radetzki 2002) that the CDM would account for a market share of 32 percent, compared with 29 percent for domestic abatement in Annex B OECD countries, 34 percent for sales of AAUs by EIT countries and 5 percent for JI. Under the standard scenario, this would translate into an international price of 3.78 \$/t CO_2 and a total CER sales of 372 million tons CO_2 /year, of which 235 million tons CO_2/year would from general energy sector projects, 70 from gas flaring projects, 67 from sinks projects. The total CDM revenue over the first commitment period would be \$7 billion, with \$141 million accruing to the Adaptation Fund (ibid.)

Further more, it has also been pointed out that countries that rely on coal for their energy needs and/or countries where the major energy users are relatively inefficient tend to have the greatest potential for large and cheap CDM projects. Accordingly, China (47 percent) and India (12 percent) are projected to account for almost 60 percent of the CDM other than forestry projects, leaving 11 percent respectively for Middle East and Africa and 9 percent for other Asia countries (ibid.). Jotzo and Michaelowa (2002) note however that institutional factors could influence the distribution of CDM significantly. This implies that countries that are better at attracting FDI will also be better at attracting CDM.

Given the potential size of the CDM market, the LDC Parties were right in noting that creating the appropriate enabling environment for them to participate in the CDM is a key issue (FCCC/SB/2000/12). However, it needs to be recognised that, in determining the share of any particular country in the CDM market, market mechanisms will probably play

a dominant role. Institutions in these countries need to prepare themselves to compete for these projects.

However, Grubb *et al* (2003) stress the uncertainty facing the Kyoto system, given the withdrawal of the USA, the acceptance of sink credits under the Marrakech Accords and the potentially large surplus in the supply of AAUs relative to the size of demand. They predict that developed countries parties will focus on their domestic measures and treat emission trading as supplementary. On the other hand, the market for emission credits is likely to be a low activity, low price market, as there is potential a large supply of credits, but few buyers. They also expect disparity in prices between projects and mechanisms, with CDM commanding the highest prices, up to £25/t CO_2

c. Removal of fossil fuel subsidies

Fossil fuel subsidies are widespread. Subsidies to fossil fuels and nuclear power in the OECD countries total $71 billion annually. However, the problem is not limited to developed countries. Some of the largest emitters from the developing countries are also the countries that subsidise energy consumption heavily. One estimate shows that energy subsidies in Iran, Venezuela, Russia, Indonesia, Kazakhstan, India, China and South Africa add up to 17.2 billion in 1997. Removal of such subsidies would increase, for instance, Iran's GDP by up to 2.2 percent and reduce carbon dioxide emissions by up to 49 percent (World Bank 2003:30).

d. Energy tax restructuring according to carbon content

The need for energy tax restructuring in Annex I countries is commonly acknowledged both on efficiency and equity grounds. UNDP (2003:126) notes for instance that the price of petrol, much of it determined by tax, can make a big difference to consumption. Currently, among OECD countries, Canada and the United States have the highest per capita consumption. The effect is illustrated by the fact that Austria and Japan, whose petrol prices are among the highest in the world, consume only one-third as much petrol per capita.

It is also well recognised that the carbon tax, which is an exercise tax imposed according to the carbon content of fossil fuel, has important advantages over energy taxes, which exist widely. The latter is an excise tax imposed on both fossil fuels and carbon-free energy sources according to their energy (or heat) contents, with renewables usually exempted. These include: first, it will target emission better, as heat contents for a given amount of CO_2 is higher for oil and gas, in comparison with the more polluting coal. Second, given the purpose of reducing CO_2 emission, a carbon tax is more effective, as it equalises the marginal cost of CO_2 abatement across fuels and therefore meet the condition of minimising the global cost of reducing CO_2 emission. In other words, carbon tax causes both price-induced energy conservation and fuel switching, while energy tax's effect on fuel switching is limited (Zhang and Baranzini 2003: 508).

However, Bruvoll and Larsen's (2003) study of Norway's experience in implementing a carbon tax shows that, due to widespread exemptions, especially for these industries that are most emission-intensive (e.g. metal, cement, etc.), a high carbon tax with a maximum rate of $51 per tonne CO_2 (and a weighted average rate of $21 per tonne CO_2) only managed to reduce emissions by 2.3 percent during 1990-1999. It is also noted that this

high carbon tax rate reduced total household consumption of gasoline and heating oil by 4.2 percent and 6 percent respectively, but increased their use of electricity by 0.5 percent.

It has been suggested that a carbon tax will only be effective if it is applied across all sectors and across major trading partners, as concerns about competitiveness often give rise to demand for exemptions (ibid.; Zhang and Baranzini 2003)

e. Impacts on world energy market and fossil fuel prices

It should come as no surprise that the implementation of mitigation commitments by Annex I Parties will have an impact on energy use, as illustrated earlier by the case of Norway. One estimate (Raketzki 2002) shows indeed that world fossil fuel consumption in 2010, measured in oil equivalents, will be 7 percent lower under the Kyoto regime than with business-as-usual (BAU), if climate policy relies entirely on reducing CO_2 emissions from fossil fuel burning. This translates into a consumption of coal that is 22 percent lower, that of oil 8 percent lower, but that of gas 9 percent higher with the Kyoto constraints than in a BAU world. However, the demand will nevertheless be 2 percent higher than in 1997 in the case of coal, 18 percent higher for oil and 65 percent higher for gas. The same author concludes that the Protocol need not have any significant impact on fossil fuel price levels, provided that the volume impact of climate policy on fossil fuel demand is established firmly and believably in the near future. The last qualification is important, as such belief will allow a gradual reduction in productive capacities in the energy industry.

f. Priorities for the implementation of economic diversification strategies in energy exporting countries and heavy fossil fuel users

From the above discussion, it would appear that there is still considerable uncertainty as to how the Annex I countries will actually try to meet their emission reduction commitments. If the Marrakech Accords are any indication, then it is likely that the implementation of Kyoto Protocol targets will be relaxed, allowing more credits to be gained from 'sinks' and from emission trading. If this happens, then the reduction in energy use and the pace of reducing energy intensity and shifting energy mix will be slowed down. The implication of this is that at least for the current commitment period (i.e. up to 2012), energy market conditions will not be altered substantially by the KP. There are a number of reasons for this. One of the most important is the existence of OPEC which, as a residual holder of the market share, is able to largely dictate oil prices through adjusting its output (Raketzki 2002).

This is certainly good news for the oil exporting countries. Nevertheless, both the depletion of oil reserve and the call for response measures do make economic diversification an absolute necessity in these countries. A particularly urgent issue is that most OECs seem to be under-investing and are therefore facing an uncertain future (Askari *et al* 1997). On the other hand, decisive measures (including exchange rate adjustment) need to be taken to make it more profitable to produce and export goods other than oil.

As for the heavy coal users, how much investment they will receive from the CDM will again depend heavily on how easily it is for the developed countries to meet their targets through emissions trading and JI, as well as domestic measures. But the opportunities clearly exist, not only in the reduction of coal use, in raising energy efficiency, and developing cleaner and renewable energy. For instance, China reduced CO_2 emissions by

7.3 percent over 1996-2000, largely through industrial restructuring and fuel improvements, while increasing its GDP by 36 percent (Street *et al* 2001, cited in World Bank 2003). It may also lie in the production of energy-consuming products, such as efficient motors, compact fluorescent lights, improved boilers and insulation, which are said to be able to pay for themselves in a year or two (World Bank 2003:178). Fortunately for these two countries, with their existing industrial capacity, which is substantial, the response measures to climate change may well offer important opportunity for export growth.

V. Current options for mobilising resources for economic diversification

a. Funding options

Mobilising financial resources will be an important task.[5] Net capital flows to DCs and transition economies have declined since 1997 as a result of the Asian Financial Crisis. It fell from $115 billion in 1997 to $60 billion in 2002. In 2000, the amount was only $8.9 billion (See Figure 2). A distinctive feature is that FDI has remained fairly stable and is often several times as large as the net capital flows, while the net portfolio is very small. However, there are substantial negative 'other net flows", which comprise other long-term net investment flows, including official and private borrowing (i.e. investment and principal payments).

In comparison, official development assistance (ODA) through the OECD's Development Assistance Committee in the 1990s is in the region of $50-60 billion a year, and declining (see table 6). ODA as percentage of GDP declined from 1.61 percent in 1990 to 0.81 percent in 2001 for DCs as a whole. In particular, aid to the 49 LDCs declined from 12.9 percent of their GNP in 1990 to 8.5 percent today according to UNDP(2003:146). There are two implications: first, the attraction of inward DFI is very important. Second, much of the resources that have to be mobilised for the promotion of economic diversification will have to come from within the countries.

However, OAD will continue to be crucial for the LDCs, where FDI inflow and access to commercial loans are limited. Long term (more than one year) net capital inflows into the LDCs increased in the 1980s, but declined in the 1990s, bringing the level in the late 1990s back to that of 1980. This contrasts with the situation for DCs, where inflows in the 1980s were for most years below the level in 1980, but registered a rapid increase in the 1990s (UNCTAD 2000b: 55). Although the share of net FDI in the LDCs increased to 11 percent of their net capital inflows for 1990-1998, compared with 3 percent for 1983-1989 and 4 percent for 1975-1982, this is largely a reflection of their declining ability to attract commercial loans. As a result, grants play an increasingly important role in long-term net capital inflow for LDCs. The share of grants was 38 percent during 1975-1982, 46 percent during 1983-1989 and 63 percent for 1990-1998 (UNCTAD 2000a: 57).

In the context of the drive to achieve the Millennium Development Goals, an estimated $40-100 billion additional aid is called for (UNDP 2003). There has been some progress on this front. Since the 2002 International Conference on Financing for Development in Monterrey, Mexico, an additional 16 billion a year by 2006 has been pledged by donors. There is also a proposal from the British Government to create an international finance

[5] . It is impossible to accurately describe the state of finance for DCs as different institutions use different definition in their data collection.

facility through bond issues to provide predictable, stable aid for the investments required to achieve the goals until 2015 (ibid: 147). However this will require donors to make long-term pledges for annual payments to the facility, which may be difficult to achieve.

b. Enabling environments and the role of stakeholders

The disappointing experience of the OECs in economic diversification has demonstrated that a supply of finance is by no means a sufficient condition. An appropriate macroeconomic environment is needed in order to enable investment to take place in the desired sectors and industries. These would include, *inter alia*, realistic exchange rates, market access and incentives for exports. In this respect, national governments and donors need to join forces to improve the DCs' environment for development. Priority areas include the financing and management of the physical infrastructure, access to the markets of developed countries, and the strengthening of macro-economic management capacity.

The private sector will need to be encouraged to invest in a wide range of economic activities. However, both domestic and foreign investors will do so only if there is a real chance of making a return. Therefore, governments have to make this possible through appropriate domestic economic policies.

Civil society in DCs needs to be given a larger role in the process of development. They need to be encouraged to monitor more closely the performace of their governments and officials in managing national sustainable development, including economic diversification, and exert their influence in the political process. On the other hand, in the context of climate change, the promotion of indigenous knowledge on adaptation is crucial.

c. Strengthening human and institutional capacities

A striking insight that new growth theories have offered is that human capital is as important as physical capital, if not more so, in promoting economic development. In particular, the desire and the ability to learn are critical for the attainment of a higher level of development. In this regard, it is important to appreciate that the needs of the LDCs and the OECs are fairly different, although both have to overcome inequity in the provision of education. While a lack of resources and political will are a key constraint in the former, in the latter the existence of a paternalistic state reduces the need to work and the incentive to innovate and acquire new skills. An extraordinarily high level of political leadership will be required to tackle either of these challenges.

On the other hand, new institutional economics advocates that institutions play a critical role in determining the pace and pattern of economic development. In this regard, assistance needs to be provided to DC governments to develop their technical and administrative skills in managing more effectively their economy and social relationships. However, there should be no illusion that such skills could substitute for responsive and accountable government. The donor community needs to advocate and encourage good governance, including proper monitoring of the performance of governments in achieving sustainable development.

VI. Conclusions

This paper has highlighted a number of issues regarding economic diversification as a means to deal with the adverse effects of climate change and impact of the implementation of response measures. It argues that economic diversification is a consequence of economic development. It cannot substitute the role of development in enhancing the adaptive capacity of DCs in dealing with the adverse effects of climate change. Rather, united efforts need to be made in promoting sustainable economic development in DCs.

This paper has also attempted to assess the potential effects of climate change and the impact of response measures in the context of climate change, and the UNFCCC and its Kyoto Protocol. Although the review is by no means exhaustive, a tentative conclusion is that, as far as the first KP commitment period (i.e. up to 2012) is concerned, the impact of response measures will be moderate on OECs. On the other hand, large fossil fuel users such as China may indeed benefit from it by claiming a potentially large share of the CDM market. Nevertheless, it is clear from the literature that much will depend on the preference of alternative measures by the Annex I countries on one hand, and the institutional capacities of the non-Annex I countries to market the investment opportunities on the other.

This leaves the numerous LDCs, some of which are also SIDSs. Clearly, helping them to cope with the adverse effects of climate change, especially through promoting economic diversification to enhance adaptive capacity, will be a great challenge for all stakeholders. We strongly believe, however, that in the context of UNFCCC, with integrated planning, creative resource mobilisation and determined political leadership much can be accomplished.

Table 1. Selected economic indicators for the LDCs and DCs

Economic indicators	**Year/period**	**LDCs**	**Other DCs**
Share of labour in agriculture (%)	1990	75	32
Share of agriculture in GDP (%)	1997	34	17
Share of primary commodities in total merchandise exports (%)	1980 1997	86.3 68.9	79.6 31.9
Export Concentration index	1997	0.553	0.378
Export instability index	1980-1997	20.3	13.4

Source: UNCTAD 2000a, p. 26.

Table 2

Top quartile of developing countries by export concentration

Country	Concentration Index	Country	Concentration Index
Kuwait	.94	Bahrain	.629
Angola	.913	UAE	.619
Nigeria	.897	Reunion	.612
Uganda	.816	Mauritania	.61
Iran	.798	Ethiopia	.601
Iraq	.796	St. Lucia	.595
Libya	.782	Belize	.572
Oman	.765	Congo	.557
Saudi Arabia	.743	Nepal	.555
Qatar	.731	Burkina Faso	.555
Gabon	.730	Algeria	.551
Malawi	.68	Tonga	.545
Solomon Islands	.679	Honduras	.535
Seychelles	.677	Syria	.533
Burundi	.676	Venezuela	.521
Rwanda	.664		

Source: Herbst (2001), originally from UNCTAD 1998. Data pertaining to 1997
Note: of the 11 members of the OPEC countries, only Indonesia is excluded from the above list.

Table 3. Tourist inflow and receipts, various years, for selected small island states

Source: McCarthy *et al* (2001:862). Originally from Waters (1998).

Country	Number of Tourists (000s)[a]	Tourists as % of Population[a]	Tourist Receipts[b] as % of GNP	as % of Exports
Antigua and Barbuda	232	364.2	63.4	73.5
Bahamas	1618	586.4	42.0	75.6
Barbados	472	182.4	39.2	56.2
Cape Verde	45	11.4	11.5	37.3
Comoros	26	4.9	10.6	47.8
Cuba	1153	10.5	8.8	n/a
Cyprus	2088	280.7	24.0	49.1
Dominica	65	97.6	15.9	32.5
Dominican Republic	2211	28.1	13.6	30.2
Fiji	359	45.3	19.2	29.1
Grenada	111	116.2	27.0	60.6
Haiti	149	2.2	3.9	50.5
Jamaica	1192	45.6	31.6	39.8
Maldives	366	130.7	95.0	68.4
Malta	1111	294.7	22.9	28.7
Mauritius	536	46.4	15.7	26.8
Papua New Guinea	66	1.5	2.1	3.0
St. Kitts and Nevis	88	210.5	30.6	63.6
St. Lucia	248	164.7	41.1	66.6
St. Vincent	65	54.6	23.8	45.9
Samoa	68	31.1	19.6	48.8
Seychelles	130	166.7	34.6	52.2
Singapore	7198	209.2	6.2	4.1
Solomon Islands	16	3.7	2.8	4.2
Trinidad and Tobago	324	28.7	4.2	8.3
Vanuatu	49	27.1	19.3	40.9

[a]Data on tourist inflows and ratio to population pertain to 1997.

[b]Data for tourist receipts pertain to 1997 for the Bahamas, Cape Verde, Jamaica, the Maldives, Malta, Mauritius, Samoa, Seychelles, Singapore, and Solomon Islands; to 1996 for Antigua and Barbuda, Cuba, Dominica, Dominican Republic, Fiji, Grenada, Haiti, Papua New Guinea, St. Lucia, and St. Vincent; to 1995 for Barbados, Comoros, Cyprus, Trinidad and Tobago, and Vanuatu; and to 1994 for St. Kitts and Nevis.

Note: tourist receipts accounted for more than 30% of GNP in eight SISs, and more than 30% of export earning in 18 SISs.

Table 4.FDI inward stock by host region and economy
(millions of dollars)

	world	DCs	DCs/world	LDCs	LDCs/DCs	OECs	OECs/DCs
1980	495200	121240	0.245	2189	0.018	31556	0.260
1985	763357	218114	0.286	3851	0.018	86969	0.399
1990	1761198	377380	0.214	7092	0.019	156810	0.416
1995	2743391	739499	0.270	16054	0.022	246429	0.333
1999	4771981	1240976	0.260	28602	0.023	377905	0.305

FDI inflow by host region and economy

	World	DCs	DCs/world	LDCs	LDCs/DCs	OECs	OECs/DCs
1988-93	190629	46919	0.246	1361	0.029	12482	0.266
1994	255988	104920	0.410	1168	0.011	24277	0.231
1995	331844	111884	0.337	2001	0.018	23268	0.208
1996	377516	145030	0.384	2394	0.017	30662	0.211
1997	473052	178789	0.378	2524	0.014	39116	0.219
1998	680082	179481	0.264	3715	0.021	28401	0.158
1999	865487	207619	0.240	4527	0.022	27162	0.131

Source: World Investment report 2000.

Table 5. Inward FDI stocks as a percentage of GDP

	1980	1985	1990	1995	1998
DCs minus China	5.6	10.0	10.9	12.5	18.6
Asia and the Pacific DCs	5.0	9.4	10.3	13.6	20.3
China	3.1	3.4	7.0	19.6	27.6
India	0.7	0.5	0.5	1.7	3.4
LDCs	1.8	3.4	4.4	6.9	7.4
OECs	3.4	10.4	14.0	17.8	22.2

Source: World Investment Report 2000, annex B.6

Figure 1: Real Foreign Direct Investment and Foreign Portfolio Investment to Developing Countries, 1970-1996 (1996 $ billion)

Source: IFC (1997: 10).

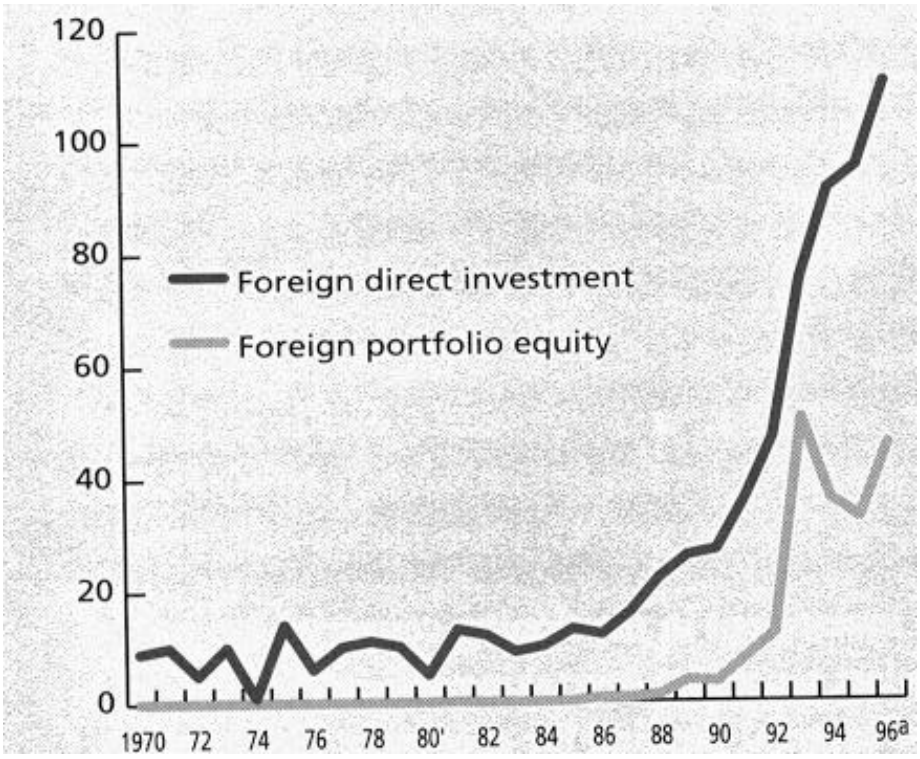
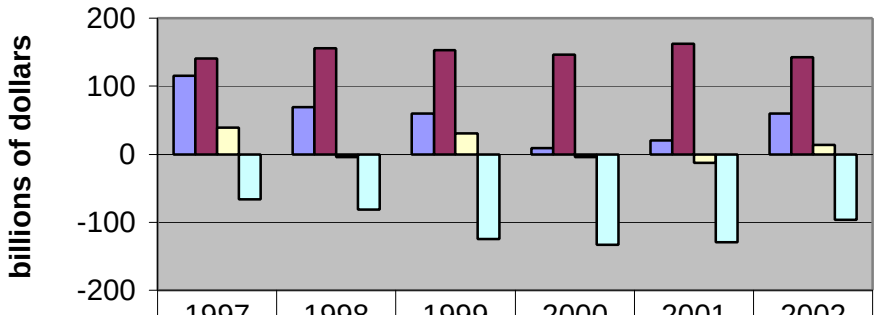


Figure 2. Net Capital Flows to Developing Countries and Transition Economies, 1997-2002



	1997	1998	1999	2000	2001	2002
Total	115	69.6	59.6	8.9	20.1	59.8
Net direct investment	141	155.4	153.4	146.2	162.4	142.6
Net fortfolio investment	39	-4.2	31	-4.3	-13	13.7
Other net flows	-66	-81.6	-124.8	-133	-129.4	-96.6

Source: UNCTAD (2001, 2002a)

Table 6. Total Net Resource Flows from DAC Member Countries and Multilateral Agencies to Aid Recipients								
	Current $ billion							
	1994	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
I. OFFICIAL DEVELOPMENT FINANCE (ODF)	**84.5**	**87.6**	**73.5**	**75.4**	**89.0**	**85.9**	**65.5**	**68.3**
1. Official development assistance (ODA)	59.6	59.1	55.8	47.9	50.3	52.1	49.5	50.6
of which: Bilateral	41.3	40.6	39.1	32.4	35.2	37.9	36.0	35.0
Multilateral	18.3	18.4	16.7	15.4	15.1	14.2	13.4	15.6
2. Official Aid (OA)	6.9	8.4	5.6	5.6	7.0	7.8	7.8	6.4
of which: Bilateral	5.5	7.1	4.0	4.0	4.5	4.9	4.9	3.6
Multilateral	1.3	1.3	1.5	1.6	2.5	2.9	2.9	2.8
3. Other ODF	18.1	20.1	12.2	22.0	31.7	26.1	8.2	11.3
of which: Bilateral	12.2	14.0	5.7	5.9	12.8	10.4	-1.4	1.6
Multilateral	5.8	6.1	6.5	16.0	18.9	15.6	9.6	9.7
II. TOTAL EXPORT CREDITS	**6.3**	**5.6**	**4.0**	**4.8**	**8.3**	**4.0**	**7.7**	**2.8**
III. PRIVATE FLOWS	**135.1**	**171.1**	**273.1**	**241.4**	**133.3**	**222.0**	**139.8**	**119.5**
1. Direct investment (DAC)	52.1	59.6	68.9	102.3	119.8	145.6	121.8	115.3
of which: to offshore centres	10.8	6.3	16.7	19.1	20.3	37.9	25.7	26.9
2. International bank lending (a)	32.1	76.9	86.0	12.0	-76.3	-21.2	-18.6	-10.6
3. Total bond lending	32.0	24.7	78.5	83.7	34.2	29.1	19.9	9.7
4. Other (including equities) (b)	12.5	3.5	33.8	37.0	48.4	59.5	7.2	-5.4
5. Grants by non-governmental organisations	6.5	6.4	5.9	6.4	7.2	8.9	9.5	10.4
TOTAL NET RESOURCE FLOWS (I+II+III)	**225.9**	**264.2**	**350.7**	**321.6**	**230.7**	**312.0**	**212.9**	**190.7**
Memorandum items (not included):								
Net Use of IMF Credit (c)	0.6	15.6	0.3	14.4	18.8	-12.8	-10.6	13.3
Non-DAC donors (ODA/OA)	1.0	0.8	0.9	1.0	0.9	0.8	1.0	1.0
For cross reference								
Total DAC net ODA (d)	59.2	58.9	55.6	48.5	52.1	56.4	53.7	52.3
of which: Bilateral grants	35.2	36.2	36.5	31.3	32.5	33.9	33.0	33.4
a) Excluding bond lending by banks (item III.3.), and guaranteed financial credits (included in II).								
b) Incomplete reporting from several DAC countries (including France, the United Kingdom and the United States). Includes Japan from 1996.								
c) Non-concessional flows from the IMF General Resources Account.								
d) Comprises bilateral ODA as above plus **contributions to** multilateral organisations in place of ODA **disbursements from** multilateral organisations shown above.								
p) Provisional.								

Source: www.oecd.org.

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