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PRELIMINARY STUDY ON THE CONSTRUCTION OF AN INDEX FOR RANKING COUNTRIES ACCORDING TO THEIR ECONOMIC VULNERABILITY[¶]

by

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¶ *This study has been commissioned by the UNCTAD Secretariat. The views expressed in this study are those of the author and do not necessarily reflect the views of the UNCTAD Secretariat.*

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1. INTRODUCTION

Many countries, face special disadvantages associated with small size, insularity, remoteness and proneness to natural disasters. These factors render the economies of these countries as very vulnerable to forces outside their control - a condition which sometimes threatens their very economic viability. As is well known, many Island Developing Countries (IDCs) experience disadvantages of this type, but their GDP per capital statistics tend to conceal this reality.

In this paper an attempt will be made to construct an index for ranking countries according to their economic vulnerability. The index is not intended as a yardstick of poverty as such, but as a measurement of the lack of economic resilience arising from the relative inability of a country to shelter itself from forces outside its control.

It should be stated at the outset that the exercise is to be considered as a preliminary attempt. It will be argued that much work remains to be done to improve the data and the refine the procedures for computing the index. However, the results presented in this paper are promising, and it appears that constructing a Vulnerability Index on an ongoing basis is feasible.

A note on the general thrust of the paper is in order here. The focus of attention will be on Island Developing Countries. The first reason for this is that the terms of reference for this study stipulated that emphasis is to be laid on these countries. Another reason is that the idea for constructing the Vulnerability Index emerged to a large extent from international fora on the problems of Island Developing Countries (IDCs), because of the special vulnerabilities faced by these countries.

The paper is divided into seven sections. Section 2, which follows this introduction, gives an outline account of how the idea of constructing a Vulnerability Index evolved, and describes the support that the idea has already obtained in international fora.

Section 3 deals with the special disadvantages of IDCs, since, as just stated, the paper assigns particular importance to the vulnerabilities of the economies of countries.

Section 4 describes the methodology that is utilised for constructing the Vulnerability Index. An attempt is made to compute this index, using a sample of 113 countries, 26 of which are IDCs.

Section 5 concludes the study, with some comments on the feasibility and desirability of constructing, managing and maintaining the Vulnerability Index on an ongoing basis. This section also puts forward a number of recommendations.

2. CALLS FOR THE CONSTRUCTION OF A VULNERABILITY INDEX

The idea of constructing a Vulnerability Index developed in international fora during discussions dealing with the disadvantages faced by Island Developing Countries.

Within the United Nations, the issue of the special problems faced by IDCs was first raised during UNCTAD III in 1972, where the focus of attention was the disadvantages associated with insularity and remoteness. Subsequently, other fora within UNCTAD identified additional disadvantages peculiar to IDCs.[1] By 1988 a wide array of such disadvantages were recognised, as evidenced by a comprehensive document prepared by UNCTAD in preparation for a meeting of a group of experts on Island Developing Countries, held in Malta in May 1988.[2]

The deliberations of the Malta meeting led to a United Nations Resolution which recognised that in addition to the general problems faced by developing countries, IDCs suffer additional handicaps arising from the interplay of such factors as smallness, remoteness, geographical dispersion, vulnerability to natural disasters, fragility of the ecosystems, constraint on transport and communications, great distance from market centres, a highly limited internal market, lack of natural resources, weak indigenous technological capacity, problems of fresh water supplies, heavy dependence on imports, depletion of natural resources, migration of highly skilled personnel, shortage of administrative personnel and heavy financial burdens.[3]

Up to 1990, however, there was no attempt to present the disadvantages faced by IDCs into a composite index to serve as a yardstick that could measure the degree of overall vulnerability of these countries.

The need to construct such an index was first formally proposed by the Maltese Ambassador to the UN in June 26, 1990, during the meeting of Government Experts of Island Developing Countries and Donor Countries and Organisations, held under the auspices of UNCTAD. In his speech, the Maltese Ambassador suggested that a vulnerability index be constructed, stating, *inter alia*, that such an index "is important because it reiterates that the per capita GDP of IDCs is not by itself an adequate measurement of the level of development of island developing countries as it does not reflect the structural and institutional weaknesses and the several

handicaps facing IDCs."

In the final report by the chairperson of the same meeting, there was reference to the possible inappropriateness of GDP per capita as a yardstick of development in IDCs. The chairperson proposed that among the studies which UNCTAD could be requested to undertake, "particular consideration should be given to topics such as a review of appropriate indicators of social and economic progress which take into account, not only the level of GDP but also other factors that relate to the high vulnerability of IDCs".

The issue was again raised and discussed at some length during the International Conference of Islands and Small States, held in Malta on 23-25 May 1991, under the auspices of the Foundation for International Studies at the University of Malta. During this conference, UNCTAD was represented by Mr. Gerard Fischer.

In its final statement, the conference resolved "to construct a Vulnerability Index which could be used to supplement GDP per capita index for the purpose of accounting for the special problems associated with small size" and " to explore ways and means to have the United Nations and other international institutions consider such an index for assessing the need for aid to small countries".

3. THE SPECIAL DISADVANTAGES OF IDCS

As stated in the introduction, this paper is principally concerned with the special vulnerabilities of Island Developing Countries, and a description of the special disadvantages of these countries is therefore in order.

In this section a brief account of the most important disadvantages are given. These disadvantages are classified under four headings, namely (a) small size (b) remoteness and insularity (c) disaster proneness and (c) other factors. These factors are dealt with in more detail in the literature listed at the end of this study.

3.1 Small Size

The size of a country can be measured in terms of its population, its land area or its gross national product. Some studies prefer to use population as an index of size, while others take a composite index of the three variables. Appendix 1 gives data on the ranking of countries according to different indices of size, and it can be seen that IDCs are among the smallest, no matter what index is used.[4]

Some reasons why small size is disadvantageous include:

- Small size often implies poor natural resource endowment and low inter-industry linkages, which result in a relatively high import content in relation to their GDP (see Appendix 4). This makes the economy highly dependent on foreign exchange earnings.
- A small domestic market and the need for a relatively large amount of foreign exchange to pay for the large import bill, gives rise to a relatively high dependence on exports (see Appendix 5) and therefore on economic conditions in the rest of the world.
- Small size renders the economy as a price-taker of a very high order, since in a small economy importers and exporters are unable to influence international prices.
- In many cases, small size restricts the country's ability to diversify its exports, and this renders the country asdependent on a very narrow range of goods and services. (See Appendix 6). This carries with it the disadvantage associated with having too many eggs in one basket, and intensifies the problems associated with dependence on international trade.
- Small size renders it difficult for IDCs to exploit the advantages of economies of scale due mostly to indivisibilities.

  In turn this gives rise to (*inter alia*):

  1. high per unit costs of production;
  2. high costs of infrastructural development per capita;
  3. high per unit costs of training specialised man power;
  4. high dependence on imported technologies, since small size inhibits the development of endogenous technology.
- Domestic competition is often limited in small economies, and generates a tendency towards monopolistic organisation.
- Small size creates problems associated with public administration, including:

  1. small manpower resource base from which to draw experienced and efficient administrators;
  2. diseconomies of scale in public administration, due to the fact that certain functions are not divisible in proportion to size;
  3. certain specialized services cannot be provide economically for a small population;
  4. a top heavy public service, which was affordable under colonial rule, but which is very costly (though difficult to dismantle) for the small state;
  5. in small states people know each other well, and are often related to each other. This tends to work against impartiality and efficiency in the civil service and against a merit-based recruitment and promotions policy.

3.2 Insularity and Remoteness

All islands are by definition insular, although some islands have build land connections with the continental mass. Not all islands are however situated in remote areas.

Both insularity and remoteness give rise to problems associated with transport, and these two factors are considered together here. An index of transport and freight costs is given in Appendix 2, where it can be seen that such costs tend to be relatively higher for islands when compared to other developing countries.

Problems associated with insularity and remoteness include:

- Separation by sea give rise to communications difficulties. Islands are constrained to use air and sea transport only for their imports and exports. Land transport is of course out of the question, and this reduces the options available for the movement of goods and of people.
- Remoteness from the main commercial centres give rise to additional problems due to time delays and unreliability in transport services. These disadvantages are more intense for islands that are archipelagic and dispersed over a wide area.
- When transport is not frequent and/or regular, enterprises in islands find it difficult to meet sudden changes in demand. The alternative is to keep large stocks, which means excessive costs associated with tied up capital.
- Due to the relatively small and fragmented cargoes required by IDCs, these countries tend to be excluded from the major sea and air transport routes, and find it difficult therefore to exploit modern and technologically advanced means of transport.

3.3 Proneness to Natural Disasters

Many islands experience natural disasters caused by cyclones (hurricanes or typhoons), earthquakes, landslides and volcanic eruptions. Although natural disasters also occur in non-island countries, as shown in Appendix 3, the impact on an island economies where disasters occur, tends to be relatively larger.

In some instances they threaten the very survival of some small islands. Some of the effects of natural disasters include:

- The devastation of the agricultural sector.
- The wiping out entire village settlements.
- The disruption of communication services.
- Injury and death of persons.

3.4 Other Disadvantages of Being an Island:

Other problems often associated with IDCs include:

Environmental Factors

Environmental fragility: This results from a low level of resistance to outside influences, endangering bird and other endemic species, soil erosion, large land losses as a result of global warming and rising sea level.

Economic Development: The requirements of economic development in islands, such as building coastal regions for the promotion of tourism, and using pesticides and fertilizers to improve agricultural yields, tend to have a stronger negative effect on small island economies, where the ecosystem tends to be very fragile.

Land Erosion: This results from a large coast-line in relation to the land-mass.

Dumping Sites: Small remote islands are being utilised as dumping ground for toxic and non-biodegradable wastes, a requirement because of the location.

Depletion of non-renewable Resources: Some IDCs have experienced depletion of non-renewable natural resources. This happened for example in the case of Kiribati (phosphate), Vanuatu (manganese), Haiti (bauxite), Nauru (phosphate) and Trinidad and Tobago (oil).

Demographic Factors

Islands tend to face demographic factors associated with out- migration from the country, or in the case of multi-island states, from one island to another. These movements sometimes give rise to brain and skill drains and to social upheavals. This happens also in islands which are economically successful, due to limited opportunities for specialisation in such islands.

Dependence of Foreign Sources of Finance

Some islands tend to have an excessive degree of dependence on remittances from abroad. Available statistics would seem to suggest that. It does not appear however, that IDCs tend to have a larger dependence on International Debt than other countries.[7]

3.5 Vulnerability and non-IDCs.

The disadvantages just listed above are not all exclusively peculiar to IDCs. Disaster proneness is not for

example a condition found in IDCs only. since there are non-island states, such as Afghanistan, Argentina, Banghaledesh, El Salvador, Bolivia, Mexico and the (ex) USSR, where natural disasters have been frequent and large.

Similarly, there are non-islands states that have a small economy. These include Luxembourg, Belize, Botswana, Guinea Bissau, Panama, Suriname, Swaziland and others.

The only major type of vulnerability peculiar to some islands is insularity and remoteness, because of the geographical features of a number of islands.

On the other hand, not all islands face the type of setbacks just listed. Some IDCs are not small. These include the Philippines and Indonesia. Others are not disaster prone. These include Grenada, the Maldives, Malta, the Philippines, the Seychelles, and Trinidad and Tobago. Still other islands, such as Malta and Cyprus are not remote from main commercial metropolitan centres.

It can be said, however, that IDCs as a group, tend to face a large degree of these disadvantages, as will be shown below.

4. CONSTRUCTING A VULNERABILITY INDEX

In constructing the Vulnerability Index, the following procedure was followed:
1. setting the basic criteria for constructing the index;
2. identifying and measuring the variables for inclusion in the index;
3. constructing the indices of the separate variables;
4. establishing a weighting procedure for the composite index;
5. calculating the weighted scores for each country.

4.1 Basic Criteria

The basic criteria that were adopted to construct the index were the following:
- the index should be easy to construct;
- the results should be easily comprehended;
- the index should lend itself to international comparisons.

Simplicity in the construction of the index necessitates that the data must be relatively easy to obtain and to process. Preferably it should be collected as a matter of routine in line with the information required for the management of a country.

Ease of comprehension requires that the overall composite index must have an intuitive meaning, that it produces plausible results and that it summarise the many facets of the individual variables that it purports to represent.

The index of the type we are presenting in this paper, would of course be useless if it cannot lend itself to *international comparison*. Hence it must be based on variables which are measured in a homogenous manner internationally.
As we shall show, the Vulnerability Index that is presented in this paper meets, albeit somewhat imperfectly, these three criteria.

4.2 The Variables

A number of variables qualify, on *a priori* grounds, for inclusion in the Vulnerability Index. It should be kept in mind at this stage, however, that the index is intended to be of particular interest to islands. The focus is therefore on the type of vulnerabilities listed in Section 3 of this paper, but, referring to what was said above, these vulnerabilities do not pertain exclusively to islands and not all islands are subject to them.

Another point to be emphasised at this juncture is that the variables to be chosen should not have an effect which is captured by the GDP or GNP per capita statistics. The question we are trying to answer here is not what makes a country poor, but what makes it vulnerable and fragile to forces outside its control.

By way of example, let us take the case of two hypothetical countries, A and B. These countries have the same level of GNP per capita in a given year. We want to investigate whether one country has a more fragile economy than the other. What variables shall we consider for this purpose? Surely not those which are directly correlated to GDP or GNP per capita, and have a causal effect on it, since this would be a fruitless exercise given that we already have information on this index. For this reason, variables which are causally correlated to GDP or GNP per capita, either by assumption or through empirical investigation, were excluded from the Index.

Three variables, which appear to be obvious candidates for inclusion in the Vulnerability Index are Exposure to Foreign Economic Conditions, Insularity and Remoteness and Proneness to Natural Disasters.

4.2.1. Exposure to Foreign Economic Conditions

A high degree of exposure to foreign economic conditions renders a country vulnerable because this implies

a reduced capacity to control its own destiny. Various variables may capture this exposure, including:

1. the degree to which an economy depends on foreign trade (exports and imports)
2. the degree to which an economy depends on a narrow range of exports.
3. the degree to which an economy depends on imported technologies and imported expertise.
4. the degree to which an economy is a price-taker.

We shall refer to these variables as indices of international economic exposure. It was not possible to measure the third and fourth variables, but we present data on the first two in Appendices 4, 5 and 6. The data shown in these appendices is summarised in Table 1.

Table 1
Indices of Trade Dependence

Averages for different categories of Countries#	Exports/ GDP	Imports/ GDP	Diversity*
All countries	35.37	41.67	.758
Island Developing Countries	57.31	67.83	.845
Small Island Developing Countries	57.92	71.22	.872
Non-Island Developing Countries	28.65	33.66	.767
Developing Countries	36.09	43.57	.841
Developed Countries	31.34	31.02	.424

* The diversity index measures export concentration by means of a formula explained in UNCTAD (1991). It takes a value of between 0 and 1, where 1 is maximum concentration of exports.
\# For a description of the classification of countries see Appendix 10.

It can be seen from Table 1 that IDCs, especially the small ones, have much higher trade and concentration ratios than non-IDCs. The lowest ratios pertain to developed countries, which would have been lower had the small developed countries been excluded.

It is being hypothesised that these variables are independent of the stage of development in which a country finds itself, but are dependent on size. This assumption is plausible, since the degree of exposure that they measure is generally not statistically correlated with GDP per capita, but tends to be correlated with population and GDP size.[7] This makes these indices suitable candidates for inclusion in the Vulnerability Index for the reasons given earlier.

Since the indices of exposure just mentioned are probably associated with size, it was considered appropriate to take size as proxy variable for the "vulnerability" associated with international exposure.

Measuring size presents a number of choices. The most commonly used index is population size, but the size of GDP and the land area are also sometimes used. Some studies use a composite index of the three variables. The arguments for preferring one as against another index of size have been made elsewhere.[8] In this paper we use a composite index of the three measures of size. However in Appendix 1 we present the individual components of this composite index. These are summarised in Table 2.

Table 2 shows that on average, IDCs tend to be small, whatever index is taken. It should be pointed out that Table 2 gives simple averages which hide a considerable degree of variation within each category. For example, although non-IDCs are generally large, there are a few of them which are also relatively small. On the other hand, although IDCs are generally small, there are two of them, namely Indonesia and the Philippines, which are amongst the biggest in the World in terms of population.

4.2.2 Remoteness

The disadvantages associated with remoteness and insularity have been discussed in sub-section 3.2. Again here, these are not all associated with vulnerability, but remoteness and insularity do render a country as vulnerable because, amongst other things, they introduce

Table 2
Indices of Size

Averages for different categories of Countries#	Population	Land area	GDP
All Countries	30.6	699.4	114.4
Island Developing Countries	7.9	93.1	6.6
Small Island Developing Countries	0.3	4.6	0.9
Non-Island Developing Countries	38.2	903.3	150.6
Developing Countries	29.9	576.3	26.1
Developed Countries	35.0	1421.5	632.1

* Population is measured in thousands, land area in Sq. Km and GDP in millions of US$.
\# For a description of the classification of countries see Appendix 10.

uncertainties and costs in foreign trade.

The problem with remoteness is that it cannot be measured directly in a meaningful way. For example, it may be suggested that remoteness can be measured by taking the number of kilometres from a main commercial centre. Such an index has been compiled by UNEP (see UNEP 1991).

This index might however be misleading for measuring remoteness because the nearest main commercial centre may not be the one with which the country in question has its most important trade relations. Let us take the case of Malta by way of example. It is not distant from the continent, since Sicily is less than 100 kilometres north. Yet, air transport to London, which is thousands of kilometres away is more frequent and more consistent than it is to Sicily. Also, Malta exports more to Germany than to nearby Italy.

Table 3
Transport and Freight Cost as a Percentage of Exports

Average for country categories#	Ratio
Average for 139 Countries	19.89
Average for 33 IDCs	33.73
Average for 25 small IDCs	39.73
Average for 106 non-IDCs	15.58
Average for 117 Developing Countries	22.80
Average for 22 Developed Countries	4.42

For a description of the classification of countries see Appendix 10.

In the case of certain islands, a relatively large proportion of international trade is directed to and from their ex-colonizing powers, even though other centres of commercial activity are more proximate. In other words measuring remoteness by taking distance in kilometres may convey the wrong sort of information regarding insularity and remoteness.
We have identified two variables which may reflect the effects of remoteness. These are the ratios of FOB/CIF and the other are the ratio of transport and freight costs to exports proceeds. We consider the second as being more meaningful and perhaps more

reliable, and we shall utilise it in our vulnerability index. Transport and freight ratios are given in Appendix 2.[9]

As was the case with the size variables, the correlation coefficient between relative transport costs and GDP per capita was not different from zero, suggesting that GDP per capita does not capture the effect of remoteness.[10]

Appendix 2 shows that IDCs tend to have a higher ratio of expenditure on transport than non-island countries, although there is considerable variation in this regard. Table 3 gives a summary of the data shown in the appendix.

Table 3 confirms that IDCs tend to have higher transport cost ratios than non-IDCs.

It should be stated, however, that this index needs to be refined considerably to improve its direct relationship with insularity and remoteness, since as it stands, it may reflect factors not necessarily connected with this variable. This point will be briefly discussed again in the concluding chapter.

4.2.3 Disaster Proneness

Disaster proneness is another obvious candidate for an Index of Vulnerability.

The data for constructing the index of disaster proneness was derived from a 1990 report published by UNDRO which contains a wealth of information in this regard. Disaster damage is calculated in terms of money damage in relation to the GDP of the country concerned. Non-significant disasters were excluded, a significant disaster being defined as one which has an impact of at least 1% of GDP. The period covered by the report is 1970 to 1989 and the disasters covered included droughts, floods, earthquakes, hurricanes, cyclones, storms, typhoons, fire, volcanic eruptions, famine, landslide, accident, power shortage, epidemic and civil strife.

The report presents a total index, which gives the estimated damage
over a period of twenty years and an average index, which presents data on the damage per disaster. We have taken the total index, since this covers a sufficiently long period to merit the term proneness.

It is admitted that the choice of a twenty year period is subjective, but so would other choices. We thought it desirable to take a long-run view of disaster proneness. An alternative procedure is to assign declining weights to disaster damage of previous years according to the distance from the current year. This is possible, but we did not have enough time our disposal to experiment with this alternative. Needless to say, there is much more work to be done regarding the disaster proneness index.

We have refined the index somewhat, making it

directly related to natural disaster proneness, by excluding disasters of a political nature. For this reason we have excluded damage caused by civil strife.

We have tested the correlation of this index with GDP per capita, and again found no statistically significant correlation between the two variables.[11]

The results are shown in Appendix 3, which shows that, according to this index, IDCs tend to be more disaster prone than other countries. A summary of the results is given in Table 4.

Again here, IDCs register higher readings for disaster proneness, and this is especially so far small islands.

Table 4

Index of Disaster Damage as a Percentage of GNP (1970-1989)
(Countries with zero incidence are excluded)

Averages for country categories#	Ratio
65 countries with disaster incidence	30.66
19 Island Developing Countries	46.65
13 Small Island Developing Countries	60.58
61 Developing Countries	32.31
4 Developed Countries	5.35

The categories of countries are described in Appendix 10.

4.2.4. Other Variables

There are variables other than size, remoteness and disaster proneness that may be associated with vulnerability. Two such variables are dependence on foreign sources of finance and environmental fragility.

However we decided to stick to the three variables described previously, on one or more of the following grounds:

1. they are not-measurable. This applies to environmental fragility. Although some environment indices exist (see for example UNEP 1990), the data they convey is not suitable for the purpose of our index. Moreover, environmental fragility may be the consequence of small size, which has already been taken into consideration in the index.
2. they are directly related to economic performance, and as stated above, this is not the object of the vulnerability index. This applies to indices related to dependence on international debt and on remittances.

4.3 Constructing Indices for the Individual Variables

The variables that have been selected to form part of the composite index have to be measured in a manner that lends itself to an averaging procedure. For this purpose, the variables need to be standardised. For the purpose of the exercise we also considered whether or not to allow for diminishing marginal effects of the variables.

4.3.1 Standardising the Variables

The standardisation procedure is required to render the index insensitive to the scale of measurement used, since the variables which compose the index are measured in different units.

The standardisation method which is used in this study is based on the following formula:

$$V_{ij} = \frac{(\text{Max } X_i - X_{ij})}{(\text{Max } X_i - \text{Min } X_i)}$$

where:

- V_{ij} stands for the degree of vulnerability arising from the ith variable for country j.
- X_i stands for the ith variable included in the Vulnerability Index.
- Max X_i and Min X_i stand for the maximum and minimum reading of the ith variable for all countries in the index.
- X_{ij} stands for the reading of the ith variable for country j.

If a country has a reading of X_i corresponding to the Maximum, the value for V_{ij} would be zero, and this would correspond to maximum vulnerability arising from variable X_i.

On the other hand, the greater the gap between the reading of a particular country and the maximum, the higher will be the value of V_{ij}, so that the country with the minimum value would have a vulnerability value of 1. In this manner, the index would take a value of between 0 and 1.

In the case of the remoteness and disaster proneness index, the maximum would represent maximum vulnerability, and a high value of V_{ij} would suggest a low degree of vulnerability.

On the other hand, in the case of the size index, a high value of V_{ij} would suggest a high degree of vulnerability.

For this reason, in the case of size, vulnerability was measured as $1 - V_{ij}$ so as to make it compatible with the other two indices.

4.3.2 Diminishing Marginal Effect

When measuring the individual variables in absolute terms, one is implicity assuming that these variables have a constant marginal effect with regard to vulnerability. An alternative assumption is that the variables have a diminishing marginal impact.

In the case of our size index, for example, the assumption of diminishing marginal effect would imply that a country half the size of another is less then twice as vulnerable, with respect to international exposure. Similarly, allowing for a diminishing marginal impact with respect to the remoteness and disaster proneness indices, would imply that a country twice as distant as another or twice as much prone to natural disasters as another, is less than twice as vulnerable, with respect to these variables.

This question cannot be resolved on the basis of objective criteria, but it appears plausible to assume that as size decreases and remoteness and disaster-proneness increase, the vulnerabilities arising from these variables tend to increase at a diminishing rate.

One way of allowing for diminishing marginal effect of a variable is to measure it in logs. An alternative is to measure it in terms of a formula assigning declining weights to increments of the variable. We have decided to use logs for this purpose, on the grounds that it is relatively easy to transform raw data in logs.

4.3.3 Weighting the Variables for the Composite Index

A composite index, is, as its name implies, some sort of average of a number of sub-indices. In our case, we have three sub-indices which represent different dimensions of vulnerability and which are to be combined together to yield a single valued indicator. The simplest method of combining the effect of the sub-indices is by taking a simple average. This would be an equally weighted index. Such an approach has been used in constructing the Morris Physical Quality of Life Index and the UNDP Human Development Index.

An alternative is to use different weights for each variable, on the assumption that the different variables have a different impact on vulnerability. Unfortunately, in the case of our index, there is no way in which such weights can be established on *a priori* grounds or on statistical grounds.[12] The best one can do in this case is to assume different weights and compare the results.

In our case, the sub-indices are uncorrelated, and therefore significantly different weights are likely to produce significantly uncorrelated indices. However, experiments with different weight schemes where the minimum weight of any sub-index was not allowed to fall below 25%, produced roughly similar rankings. This range of weights possibly encompasses all the plausible weight values, including the equal weight scheme. We have therefore decided to adopt the equal weighted index on the grounds that it is the simplest one to compute, and that alternative weighting schemes do not solve the problem of subjective choice.

4.3.4 The Vulnerability Index

The ranking of countries according to the equally weighted Vulnerability Index are given in Appendix 9a, which lists the countries in alphabetical order and in vulnerability rank order.
The results shown are interesting, and confirm the assumption that IDCs tend to be more vulnerable than other countries. In general Island Developing Countries, especially the small ones, registered low scores, indicating a high degree of vulnerability, whereas large developing countries tend to register high scores, indicating a low degree of vulnerability.

There are however, a few unexpected rankings. Appendix 9a, for example ranks Suriname, which is a very small country, rather low in terms of vulnerability. This is possibly due to the fact that this country has a relatively large land area. The size variable used in this study includes land area, and unexpected rankings tend to occur wherever there is a very large discrepancy between population, GDP and area. Clearly, this aspect of the size variable needs to be investigated at some more depth.

Table 5 summarises the results. It should be recalled that when the index takes a value of 1, it signifies minimum vulnerability and when it takes a value of 0 it signifies maximum vulnerability. It can be seen that Island Developing Countries tend to have low scores, indicating a high degree of vulnerability. On average, the lowest scores pertain to small IDCs.

As stated elsewhere in this study, the composite index is a form of average, which hides the effect of the individual sub-indices. Although separate sub-indices do not have the appeal of a single composite index giving a single-valued ranking, there is something to be said in favour of presenting the sub-indices separately. One reason is that they individually convey useful information. Another reason is that a composite index, as Hicks and Streeten (1979) argue, implies some form

Table 5
Vulnerability Index for Different Groups of Countries.

Averages for Country Categories#	Number	Index*
All Countries	113	.624
Island Developing Countries	28	.461
Small Island Developing Countries	20	.410
Non-Island Developing Countries	85	.678
Developing Countries	91	.583
Developed Countries	22	.792

* in this index 1 signifies minimum vulnerability and zero maximum Vulnerability.
# see Appendix 10.

of trade-off between the variables composing the index, which have to be met together. Averaging would conceal, for example, situations where the effect of one variable cancels out the effect of another. For these reasons we are also presenting the sub-indices in Appendix 9b.

This Appendix shows that IDCs, especially the small ones, tend to be vulnerable as a result of the three variables, although there are many exceptions, in particular, with respect to the disaster-proneness index.

4.3.5 Vulnerability and Development

As stated above, the types of vulnerabilities represented in the Index presented in Appendix 9a are not related to the degree of economic development. This is confirmed in Table 6 which gives averages of GDP per capita and of the Human Development Index (see Appendices 8 and 9) of different country groups and compares them to the Vulnerability Index. It can be seen that IDCs do not fare badly in terms of GDP per capita, and in terms of the Human Development Index. As a matter of fact, their scores are much on average than those of developing countries in general. However, as stated, these countries are characterised by a high vulnerability scores.

An interesting consideration in this regard is the comparison of the vulnerability ranking and the GDP per capita ranking. For this purpose we have constructed a simple index which we for ease of reference we call the "Vulnerability Adjusted Development Index" (VADI). This is given in Appendix 9c, and consists of a simple average of the GDP per capita and the Vulnerability Index. It can be seen that in the case of most IDCs the Vulnerability Index "weights down" the GDP per capita Index.

For example, Antigua and Barbuda, has vulnerability score which indicates a very high degree of vulnerability (rank 3, where rank 1 is the highest vulnerability ranking). At the same time, this country has a GDP per capita score which is relatively high (rank 78, where rank 1 indicates the poorest country in the world). As a result the VADI score of Antigua and Barbuda has a lower rank (rank 28) than that of GDP per capita index. Countries like Antigua and Barbuda, which have a higher GDP per capita rank than their vulnerability rank are termed "countries with an overrated GDP per capita" for ease of reference.

A list of such countries appears in Appendix 9d. This appendix gives the magnitude of disparity between the GDP per capita rank and the VWDI rank.

Again here, the results appear to be interesting, since they indicate that many IDCs have an economy which appears stronger in terms of GDP per capita, than in terms of a Vulnerability Adjusted index. There are however a few "surprises". For example, Bangladesh, which is a very poor country, is listed with the "countries with an overrated GDP per capita". The reason for this is of course that its vulnerability index is very high, rendering its degree of weakness higher than that indicated by its GDP per capita. The same argument applies to Kuwait, a rich but very small country, whose GNP per capita suggests economic strength and its size gives it a high vulnerability score.

Table 6
Vulnerability Index for Different Groups of Countries.

Averages for country categories#	Vulnerability Index	GDP P.C. US $	H.D.I
All Countries	.624	4468	.588
IDCs	.461	3165	.670
Small IDCs	.410	3384	.698
Non-IDCs	.678	4890	.565
Developing Countries	.583	2191	.535
Developed Countries	.792	16740	.962

See appendix 10.

5. WEAKNESSES, FEASIBILITY AND CONCLUDING REMAKES

The Vulnerability Index presented in this study has a

number of weaknesses, which have been highlighted in previous sections. These include two basic ones, namely the subjective criteria on which it is constructed and the errors in measurement. This section comments briefly on these weaknesses and puts forward some recommendations for improvement. The feasibility and desirability of the index will also be discussed.

5.1 Suggestions for Improvement

Composite indices are notorious for the amount of discussion they provoke, principally because of the subjectivity in their computation. Normally, they are based on criteria chosen by the compiler as to which variables are to be included and weighted. In general one finds that there are no hard and fast rules for rejecting or accepting the results.

The Vulnerability Index proposed in the paper can, no doubt, be criticised on various grounds. The criteria for the choice of variables and the way they are measured and weighted are by and large chosen on the basis of plausible assumptions as to what renders an economy vulnerable to forces outside its control, guided by the simplicity and comprehensibility criteria outlined at the beginning of Section 4.

It is therefore contended that the construction of the index is feasible. The other major weakness relates to the measurement of the variables. The most difficult task in this regard would seem to be that of procuring regular updated data on disaster proneness. The index produced by UNDRO is an important step in this direction. It is suggested in this regard that UNCTAD collaborates with UNDRO to collect and process such data on a regular basis.

There is also the need for further study to improve the remoteness index by procuring data which measures this variable, keeping other things constant. The index chosen in the present study has the merits that it can be very easily obtained from balance of payments statistics. But it may capture factors which are not directly related to remoteness, such as monopolistic practices in the domestic carrier-companies and other market distortions.

The size index also needs to be refined. The land-area component is important, because land area has a bearing on size. However, in some cases it has given rise to questionable results, as in the case of Suriname, discussed above. Again here, further study is called for to derive a size index which reduces such distortions.

It is therefore recommended that UNCTAD allocates funds to renumerate a team of three expert consultants to carry out the required refinements, and to compute the Vulnerability Index on a regular (annual) basis.

5.3 Feasibility and Desirability

One objective of this study was to discuss the feasibility of constructing the Vulnerability Index. The fact that the index has actually been constructed and that it has produced meaningful results with readily available data, is, to an extent, an indication that it is a feasible exercise. Moreover, the improvements just suggested with respect to the measurement of the variables do not seem to be insurmountable.

Feasibility is of course a relative term, in that the costs involved have to be assessed against the benefits. It is contended that the construction of the Vulnerability Index as outlined in the present study is desirable and warrants the allocation of modest funds for expert advise for its computation on a regular basis.

The benefits that will be derived from the index include:

a. it will attract attention towards the issue of vulnerability of certain economies, in particular those of IDCs and
b. it will present a single-value measure of vulnerability based on meaningful variables which can be considered by donor countries and organisations when taking decisions regarding the allocation of financial aid and technical assistance.

5.4 Concluding Remarks

This study has attempted to produce a simple indexing system to measure economic vulnerability. It has been shown that vulnerability takes many forms and the variables used to compute the index were chosen to represent this reality.

The scores reported in the index have shown that Island Developing Countries, especially the small ones, are characterised by a high degree of vulnerability with regard to forces outside their control. It has been shown that in many instances, IDCs have a relativey high GDP per capita, conveying the impression of a strong economy, even when, in reality, their economies are fragile in terms of economic exposure, remoteness or proneness to natural disasters. In other instances, IDCs are very poor and very vulnerable at the same time, a state of affairs which deserves immediate attention from the international community.

The computations carried out in this study is not intended as just another academic exercise. It is hoped that it will help to draw the attention of donor countries and organisation to the plight of vulnerable countries, in particular IDCs.

NOTES

1. The first comprehensive report dealing specifically with IDCs under the auspices of UNCTAD, was issued in 1974, following a resolution at UNCTAD III.

2. See UNCTAD (1988).

3. See "Resolutions adopted on the Reports of the Second Committee" Meeting 83, Report A/43/915/Add.2 dated 20 December 1988.

4. There are however a few IDCs which are relatively large. These include two very large countries, namely the Philippines and Indonesia and three "medium-sized" ones, namely Sri Lanka and Cuba and Madagascar.

5. These arguments are derived from on Jacobs (1989).

6. Figures pertaining to these variables are published in UNCTAD (1991) Table 5.1 and 5.14. These are summarised in the following table:

Average for country categories#	Remittances¶	Debt*
All Countries	6.17	66.70
Island Developing Countries	9.36	55.55
Small Island Developing Countries	10.98	49.89
Non-Island Developing Countries	5.12	70.57
Developing Countries	7.40	66.70
Developed Countries	0.68	-

* As % of GNP. Developed countries are excluded from the average.
¶ As % of GNP. These cover private and government net transfers
# See appendix 14.

The table shows that there is some evidence that IDCs tend to be relatively more dependent on remittances from abroad than non-IDCs, On the other hand, the figures do not indicate that IDCs tend to have a relatively higher debt burden than non-IDCs.

7. A negative correlation between country size and dependence on international trade is very often reported in studies on small economies. The rank correlation coefficients obtained from the data used in this study is -0.7 for Export Ratio against the size variable and -0.8 for Import Ratio against the Size Variable. On the other hand, there is no evidence to suggest that the GDP per capita is related to size, remoteness or disaster proneness. On testing these relationships we have found the following non-statistically significant correlation coefficients.

GDP per capita against size:	.028
GDP per capita against disaster proneness:	.015
GDP per capita against transport ratio:	.350

8. See Downes (1988) and Jalan (1982)

9. Transport and freight as a ratio of export proceeds pertain to the years 1987-1989. They therefore represent a medium term average. This was done to avoid attaching to much importance to a single year. Source: (UNCTAD 1991).

10. See note 7.

11. See note 8.

12. If the variables of the vulnerability Index were correlated the method of principal components could have been used to determine the weighting pattern. See Downes (1988). However, as already noted, the three variables that we are using are not correlated

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APPENDIX 1a. COUNTRIES RANKED IN DECENDING ORDER BY SIZE

COUNTRY	AVERAGE(*) RANK	POPUL. RANK	AREA RANK	GDP RANK
Tuvalu	151	151	150	151
Kiribati	150	149	137	150
St. Kitts and Nevis	149	150	144	145
Bermuda	148	148	151	111
St. Vincent and the	147	144	145	143
Maldives	146	135	148	148
Seychelles	145	147	149	129
Grenada	144	141	146	139
Sao Tome and Princi	143	142	135	149
Tonga	142	143	138	146
Dominica	141	115	136	142
Antigua and Barbuda	140	146	142	132
St. Lucia	139	140	140	134
Western Samoa	138	136	130	144
Barbados	137	132	143	110
Malta	136	127	147	107
Vanuatu	135	139	122	147
Netherlands Antille	134	131	134	118
Comoros	133	122	131	137
Cape Verde	132	126	129	133
Bahrain	131	123	139	91
Belize	130	137	114	131
Equatorial Guinea	129	129	110	140
Solomon Islands	128	130	109	138
Djibouti	127	125	115	135
New Caledonia	126	138	118	124
Gambia	125	117	124	136
Mauritius	124	115	132	103
Bahamas	123	133	123	101
Guinea-Bissau	122	116	105	141
Swaziland	121	120	121	125
Fiji	120	119	119	121
Qatar	119	128	125	74
Cyprus	118	121	127	87
Trinidad and Tobago	117	112	128	85
Lesotho	116	108	108	127
Bhutan	115	110	101	130
Singapore	114	101	141	50
Guyana	113	118	72	128
Suriname	112	124	78	117
Jamaica	111	103	126	90
Iceland	110	134	87	73
Burundi	109	81	111	120
Hong Kong	108	78	133	35
Togo	107	97	98	112
Liberia	106	102	85	116

APPPENDIX 1a. COUNTRIES RANKED IN DECENDING ORDER BY SIZE (Continued)

COUNTRY	AVERAGE RANK	POP. RANK	AREA RANK	GDP RANK
Sierra Leone	105	91	95	115
Rwanda	104	75	113	99
Haiti	103	77	112	96
Kuwait	102	107	120	55
El Salvador	101	83	116	76
Costa Rica	100	100	99	80
Lao People's Rep.	99	92	70	126
Panama	98	104	94	81
Gabon	97	114	64	92
Benin	96	87	83	108
Malawi	95	66	82	114
Botswana	94	113	40	102
Dominican Republic	93	74	100	79
Jordan	92	93	89	82
Congo	91	105	53	100
Oman	90	111	73	67
United Arab Em.	89	109	93	51
Mauritania	88	106	24	122
Central African Rep	87	99	37	119
Honduras	86	85	84	83
Israel	85	86	117	38
Guinea	84	79	67	97
Uruguay	83	98	76	65
Burkina Faso	82	64	62	106
Ireland	81	95	96	47
Papua New Guinea	80	94	46	89
Senegal	79	72	74	78
Guatemala	78	62	86	66
Sri Lanka	77	43	97	68
Chad	76	80	17	123
Nepal	75	39	80	94
Somalia	74	71	36	109
Paraguay	73	90	50	72
Tunisia	72	68	77	62
Madagascar	71	52	38	105
Denmark	70	82	102	22
Zambia	69	67	33	95
Ghana	68	48	69	77
Uganda	67	41	71	86
Mozambique	66	46	29	113
Hungary	65	56	90	49
Zimbabue	64	61	51	71
Mali	63	63	19	104
Niger	62	70	18	98
New Zealand	61	96	63	39
Ecuador	60	58	61	61
Belgium	59	60	107	19

APPPENDIX 1a. COUNTRIES RANKED IN DECENDING ORDER BY SIZE (Continued)

COUNTRY	AVERAGE RANK	POP. RANK	AREA RANK	GDP RANK
Syrian Arab Rep.	58	51	75	57
Switzerland	57	76	103	15
Portugal	56	57	91	40
Cote d'Ivoire	55	53	57	63
Bolivia	54	73	23	84
Yemen	53	55	42	69
Afghanistan	52	45	35	88
Greece	51	59	81	37
Austria	50	69	92	20
Taiwan, Province of	49	37	106	21
Cameroon	48	54	45	58
Netherlands	47	47	104	14
Norway	46	89	56	25
Tanzania	45	30	26	93
Kenya	44	35	39	64
Finland	43	84	54	23
Libya	42	88	14	52
Malaysia	41	42	55	45
Chile	40	50	32	53
Morocco	39	32	48	54
Bangladesh	38	8	79	56
Yugoslavia	37	34	65	31
Myanmar	36	22	34	59
Iraq	35	40	49	34
Ethiopia	34	20	20	75
Sweden	33	65	47	16
Korea, Rep. of	32	21	88	18
Zaire	31	26	10	70
Philippines	30	12	60	41
Poland	29	24	58	30
Sudan	28	31	8	60
Venezuela	27	38	28	32
Peru	26	36	16	43
Colombia	25	27	22	42
Thailand	24	16	43	33
Egypt	23	19	25	46
Saudi Arabia	22	49	11	28
Turkey	21	17	31	29
Algeria	20	33	9	36
Nigeria	19	9	27	48
South Africa	18	25	21	26
Pakistan	17	7	30	44
Spain	16	23	44	10
Argentina	15	28	7	24
United Kingdom	14	14	68	5
Italy	13	13	59	6
Germany	12	11	66	3

APPPENDIX 1a. COUNTRIES RANKED IN DECENDING ORDER BY SIZE
(Continued)

COUNTRY	AVERAGE RANK	POP. RANK	AREA RANK	GDP RANK
France	11	15	41	4
Iran Is. Rep.	10	18	15	11
Australia	9	44	5	13
Mexico	8	10	12	17
Indonesia	7	4	13	27
Japan	6	6	52	2
Canada	5	29	1	7
Brazil	4	5	4	9
India	3	2	6	12
China	2	1	2	8
United States	1	3	3	1

(*) Average rank is obtained by first averaging the Population, Area and GDP standarised scores, and than re-ranking the result.

Source: Handbook of International Trade and Development Statistics UNCTAD (1991), Table 6.1.

APPENDIX 1b. GDP IN MILLION US$ AND ITS RANK

COUNTRY	GDP	RANK	COUNTRY	GDP	RANK
Afghanistan	3772	88	Gambia	221	136
Algeria	54102	36	Germany	1201823	3
Antigua and Barbuda	274	132	Ghana	5229	77
Argentina	89660	24	Greece	52883	37
Australia	247029	13	Grenada	166	139
Austria	126718	20	Guatemala	7818	66
Bahamas	2153	101	Guinea	2430	97
Bahrain	3359	91	Guinea-Bi	147	140
Bangladesh	19321	56	Guyana	360	128
Barbados	1540	110	Haiti	2497	96
Belgium	150904	19	Honduras	4457	83
Belize	277	131	Hong Kong	54567	35
Benin	1792	108	Hungary	27945	49
Bermuda	1389	111	Iceland	5920	73
Bhutan	285	130	India	281063	12
Bolivia	4437	84	Indonesia	84250	27
Botswana	2011	102	Iran Is.	297649	11
Brazil	350964	9	Iraq	55826	34
Burkina Faso	1860	106	Ireland	32725	47
Burundi	1094	120	Israel	41878	38
Cameroon	12634	58	Italy	831983	6
Canada	486043	7	Jamaica	3416	90
Cape Verde	263	133	Japan	2848895	2
Central African Rep.	1119	119	Jordan	4549	82
Chad	917	123	Kenya	8418	64
Chile	22082	53	Kiribati	22	150
China	374532	6	Korea. Re	171311	18
Colombia	38881	42	Kuwait	19966	55
Comoros	207	137	Lao Peopl	533	126
Congo	2153	100	Lesotho	390	127
Costa Rica	4611	80	Liberia	1174	116
Cote d'Ivoire	9745	63	Libya	22976	52
Cyprus	4236	87	Madagasca	1883	105
Denmark	107561	22	Malawi	1194	114
Djibouti	228	135	Malaysia	34692	45
Dominica	140	142	Maldives	80	148
Dominican Republic	4638	79	Mali	1941	104
Ecuador	10292	61	Malta	1833	107
Egypt	34096	46	Mauritani	1002	122
El Salvqador	5473	76	Mauritius	1948	103
Equatorial Guinea	147	141	Mexico	174904	17
Ethiopia	5574	75	Morocco	21987	54
Fiji	1075	121	Mozambiqu	1256	113
Finland	105560	23	Myanmar	11051	59
France	955652	4	Nepal	3076	94
Gabon	3324	92	Netherlan	227372	14

APPENDIX 1b. GDP IN MILLION US$ AND ITS RANK
(Continued)

COUNTRY	GDP	RANK	COUNTRY	GDP	RANK
Netherlands Antilles	1126	118	St. Lucia	242	134
New Caledonia	855	124	St. Vince	136	143
New Zealand	41802	39	Sudan	10990	60
Niger	2398	98	Suriname	1173	117
Nigeria	30187	48	Swaziland	609	125
Norway	89447	25	Sweden	181808	16
Oman	7610	67	Switzerla	183428	15
Pakistan	37207	44	Syrian Ar	14981	57
Panama	4551	81	Taiwan, P	122314	21
Papua New Guinea	3566	89	Tanzania	3137	93
Paraguay	6242	72	Thailand	59579	33
Peru	37286	43	Togo	1359	112
Philippines	39150	41	Tonga	94	146
Poland	68816	30	Trinidad	4280	85
Portugal	41699	40	Tunisia	10052	62
Qatar	5717	74	Turkey	70887	29
Rwanda	2305	99	Tuvalu	3	151
Sao Tome and Princip	63	149	Uganda	4260	86
Saudi Arabia	75292	28	United Ar	23672	51
Senegal	4980	78	United Ki	833833	5
Seychelles	295	129	United St	4809080	1
Sierra Leone	1174	115	Uruguay	7944	65
Singapore	24530	50	Vanuatu	91	147
Solomon Islands	176	138	Venezuela	60379	32
Somalia	1681	109	Western S	114	144
South Africa	88225	26	Yemen	6924	69
Spain	344499	10	Yugoslavi	62764	31
Sri Lanka	6979	68	Zaire	6467	70
St. Kitts and Nevis	113	145	Zambia	2721	95
			Zimbabue	6304	71

Source: Handbook of International Trade and Development Statistics
UNCTAD (1991), Table 6.1.

APPENDIX 1c. POPULATION SIZE AND ITS RANK

COUNTRY	POP.	RANK	COUNTRY	POP.	RANK
Afghanistan	15742	45	Gambia	815	117
Algeria	23691	33	Germany	61204	11
Antigua and Barbuda	84	147	Ghana	14152	48
Argentina	31526	28	Greece	10002	59
Australia	16427	44	Grenada	117	141
Austria	7573	69	Guatemala	8703	62
Bahamas	249	133	Guinea	5448	79
Bahrain	481	123	Guinea-Bissau	928	116
Bangladesh	104530	8	Guyana	794	118
Barbados	254	132	Haiti	6263	77
Belgium	9850	60	Honduras	4836	85
Belize	166	137	Hong Kong	5693	78
Benin	4372	87	Hungary	10591	56
Bermuda	73	148	Iceland	248	134
Bhutan	1454	110	India	819530	2
Bolivia	6937	73	Indonesia	177503	4
Botswana	1216	113	Iran Is. Rep.	51813	18
Brazil	144446	5	Iraq	17711	40
Burkina Faso	8548	64	Ireland	3653	95
Burundi	5176	81	Israel	4453	86
Cameroon	11120	54	Italy	57093	13
Canada	26064	29	Jamaica	2398	103
Cape Verde	352	126	Japan	122411	6
Central African Rep.	2882	99	Jordan	3768	93
Chad	5414	80	Kenya	22457	35
Chile	12753	50	Kiribati	69	149
China	1081400	1	Korea, Rep. of	41998	21
Colombia	31738	27	Kuwait	1911	107
Comoros	515	122	Lao People's Rep.	3921	92
Congo	2138	105	Lesotho	1680	108
Costa Rica	2866	100	Liberia	2425	102
Cote d'Ivoire	11171	53	Libya	4241	88
Cyprus	687	121	Madagascar	11297	52
Denmark	5135	82	Malawi	8188	66
Djibouti	387	125	Malaysia	17005	42
Dominica	86	145	Maldives	199	135
Dominican Republic	6868	74	Mali	8694	63
Ecuador	10079	58	Malta	349	127
Egypt	50060	19	Mauritania	1921	106
El Salvqador	5058	83	Mauritius	1057	115
Equatorial Guinea	336	129	Mexico	84909	10
Ethiopia	46144	20	Morocco	23847	32
Fiji	738	120	Mozambique	14878	46
Finland	4946	84	Myanmar	41123	22
France	55751	15	Nepal	17994	39
Gabon	1097	114	Netherlands	14764	47

APPENDIX 1c. POPULATION SIZE AND ITS RANK
(Continued)

COUNTRY	POP.	RANK	COUNTRY	POP.	RANK
Netherlands Antilles	273	131	St. Lucia	132	140
New Caledonia	162	138	St. Vincent and the	109	144
New Zealand	3334	96	Sudan	23851	31
Niger	7282	70	Suriname	406	124
Nigeria	101932	9	Swaziland	738	119
Norway	4188	89	Sweden	8406	65
Oman	1398	111	Switzerland	6553	76
Pakistan	114869	7	Syrian Arab Rep.	11701	51
Panama	2323	104	Taiwan, Province of	19855	37
Papua New Guinea	3708	94	Tanzania	25490	30
Paraguay	4043	90	Thailand	54063	16
Peru	21260	36	Togo	3330	97
Philippines	59496	12	Tonga	114	143
Poland	37935	24	Trinidad and Tobago	1240	112
Portugal	10234	57	Tunisia	7812	68
Qatar	340	128	Turkey	53659	17
Rwanda	6783	75	Tuvalu	9	151
Sao Tome and Princip	115	142	Uganda	17535	41
Saudi Arabia	13118	49	United Arab Em.	1493	109
Senegal	6946	72	United Kingdom	56989	14
Seychelles	84	146	United States	245248	3
Sierra Leone	3957	91	Uruguay	3060	98
Singapore	2657	101	Vanuatu	151	139
Solomon Islands	301	130	Venezuela	18768	38
Somalia	7046	71	Western Samoa	167	136
South Africa	33797	25	Yemen	11091	55
Spain	38953	23	Yugoslavia	23534	34
Sri Lanka	16774	43	Zaire	33500	26
St. Kitts and Nevis	49	150	Zambia	7874	67
			Zimbabue	9142	61

Source: Handbook of International Trade and Development Statistics
UNCTAD (1991), Table 6.1.

APPENDIX 1d. LAND AREA AND ITS RANK

COUNTRY	AREA	RANK	COUNTRY	AREA	RANK
Afghanistan	647500	35	Gambia	11300	124
Algeria	2381740	9	Germany	248580	66
Antigua and Barbuda	440	142	Ghana	238540	69
Argentina	2766888	7	Greece	131940	81
Australia	7686846	5	Grenada	340	146
Austria	83850	92	Guatemala	108890	86
Bahamas	13940	123	Guinea	245860	67
Bahrain	620	140	Guinea-Bissau	36120	105
Bangladesh	144000	79	Guyana	214970	72
Barbados	430	143	Haiti	27750	112
Belgium	30514	107	Honduras	112090	84
Belize	22960	114	Hong Kong	1040	133
Benin	112620	83	Hungary	93030	90
Bermuda	50	151	Iceland	103000	87
Bhutan	47000	101	India	3287587	6
Bolivia	1098580	23	Indonesia	1904570	13
Botswana	581730	40	Iran Is. Rep.	1648000	15
Brazil	8511968	4	Iraq	434920	49
Burkina Faso	274200	62	Ireland	70280	96
Burundi	27830	111	Israel	20770	117
Cameroon	475440	45	Italy	301230	59
Canada	9976136	1	Jamaica	10990	126
Cape Verde	4030	129	Japan	377710	52
Central African Rep.	622980	37	Jordan	97740	89
Chad	1284000	17	Kenya	582650	39
Chile	756950	32	Kiribati	710	137
China	9560966	2	Korea, Rep. of	98480	88
Colombia	1138910	22	Kuwait	17820	120
Comoros	2170	131	Lao People's Rep.	236800	70
Congo	342000	53	Lesotho	30350	108
Costa Rica	50700	99	Liberia	111370	85
Cote d'Ivoire	322460	57	Libya	1759540	14
Cyprus	9250	127	Madagascar	587040	38
Denmark	43070	102	Malawi	118480	82
Djibouti	22000	115	Malaysia	329750	55
Dominica	750	136	Maldives	300	148
Dominican Republic	48730	100	Mali	1240000	19
Ecuador	283560	61	Malta	320	147
Egypt	1001450	25	Mauritania	1030700	24
El Salvqador	21040	116	Mauritius	1860	132
Equatorial Guinea	28050	110	Mexico	1972550	12
Ethiopia	1221900	20	Morocco	446550	48
Fiji	18270	119	Mozambique	801590	29
Finland	337030	54	Myanmar	676550	34
France	547030	41	Nepal	140800	80
Gabon	267670	64	Netherlands	37330	104

APPENDIX 1d. LAND AREA AND ITS RANK
(Continued)

COUNTRY	AREA	RANK	COUNTRY	AREA	RANK
Netherlands Antilles	960	135	St. Lucia	620	139
New Caledonia	19060	118	St. Vincent and the	340	145
New Zealand	268680	63	Sudan	2505809	8
Niger	1267000	18	Suriname	163270	78
Nigeria	923770	27	Swaziland	17360	121
Norway	324220	56	Sweden	449960	47
Oman	212460	73	Switzerland	41290	103
Pakistan	796100	30	Syrian Arab Rep.	185180	75
Panama	77080	94	Taiwan, Province of	35990	106
Papua New Guinea	461690	46	Tanzania	945090	26
Paraguay	406750	50	Thailand	514000	43
Peru	1285220	16	Togo	56790	98
Philippines	300000	60	Tonga	700	138
Poland	312680	58	Trinidad and Tobago	5130	128
Portugal	92080	91	Tunisia	163610	77
Qatar	11000	125	Turkey	780580	31
Rwanda	26340	113	Tuvalu	160	150
Sao Tome and Princip	960	134	Uganda	236040	71
Saudi Arabia	2149689	11	United Arab Em.	83600	93
Senegal	196190	74	United Kingdom	244820	68
Seychelles	280	149	United States	9372606	3
Sierra Leone	71740	95	Uruguay	176220	76
Singapore	580	141	Vanuatu	14760	122
Solomon Islands	28450	109	Venezuela	912050	28
Somalia	637660	36	Western Samoa	2860	130
South Africa	1221040	21	Yemen	527970	42
Spain	504780	44	Yugoslavia	255800	65
Sri Lanka	65610	97	Zaire	2345409	10
St. Kitts and Nevis	360	144	Zambia	752610	33
			Zimbabue	390580	51

Source: Handbook of International Trade and Development Statistics
UNCTAD (1991), Table 6.1.

APPENDIX 2. TRANSPORT & FREIGHT AS % OF MERCHANDISE EXPORTS (1987-1989) AND ITS RANK.

COUNTRY	RATIO(%)	RANK	COUNTRY	RATIO(%)	RANK
Afghanistan	27.0	33	Grenada	34.8	24
Algeria	7.5	97	Guatemala	13.2	64
Antigua & Barbuda	83.2	4	Guinea	13.0	66
Argentina	2.0	135	Guinea Bissau	51.2	11
Australia	7.2	98	Guyana	10.3	79
Austria	3.7	123	Haiti	29.1	30
Bahamas	32.2	27	Honduras	8.7	88
Bahrain	10.9	77	Hungary	4.4	117
Bangaladesh	25.5	34	Iceland	1.7	138
Barbados	46.0	16	India	18.2	47
Belgium	2.7	128	Indonesia	7.8	93
Belize	17.3	50	Iran, Is.Rep.	12.8	68
Benin	23.8	36	Ireland	3.6	124
Bolivia	20.8	41	Israel	4.7	112
Botswana	5.0	110	Italy	6.1	104
Brazil	2.3	131	Jamaica	23.5	37
Burundi	33.0	25	Japan	3.2	126
Cameroon	16.9	53	Jordan	27.2	32
Canada	1.0	139	Kenya	30.4	28
Cape Verde	17.9	48	Kiribati	62.8	7
Cent. Af. Rep.	46.6	15	Korea	1.8	137
Chad	65.3	5	Kuwait	9.4	84
Chile	3.9	119	Lesotho	39.9	21
China, Rep.	4.6	115	Liberia	9.2	85
Colombia	4.7	113	Libya	7.8	92
Comoros	65.2	6	Madagascar	19.0	44
Congo	11.2	75	Malawi	47.1	13
Costa Rica	11.9	71	Malaysia	6.7	101
Cote d'Ivoire	11.2	74	Maldives	9.0	86
Cyprus	28.3	31	Mali	57.3	10
Denmark	4.8	111	Malta	17.6	49
Dominica	12.9	67	Mauritania	9.8	82
Dominican Rep.	21.2	40	Mauritius	12.2	70
Ecuador	5.8	105	Mexico	3.8	120
Egypt	34.9	23	Morocco	11.5	72
El Salvador	10.0	80	Mozambique	59.5	9
Equat. Guinea	17.3	51	Nepal	22.0	38
Ethiopia	41.4	19	Netherlands	6.1	103
Fiji	17.3	52	Neth. Antilles	15.1	57
Finland	4.1	118	New Zealand	13.1	65
France	5.5	106	Nicaragua	30.3	29
Gabon	11.3	73	Niger	11.1	76
Gambia	25.0	35	Nigeria	4.6	114
Germany	2.3	130	Norway	2.2	132
Ghana	10.7	78	Oman	6.8	99
Greece	9.8	81	Pakistan	13.6	62

APPENDIX 2. TRANSPORT & FREIGHT AS % OF MERCHANDISE EXPORTS (1987-1989) (Continued)

COUNTRY	RATIO(%)	RANK	COUNTRY	RATIO(%)	RANK
Panama	4.6	116	Surinam	5.3	108
Papua New Guinea	12.3	69	Swaziland	2.1	134
Paraguay	14.1	58	Sweden	1.8	136
Peru	6.5	102	Switzerland	2.2	133
Philippines	8.6	89	Syrian Arab Rep.	13.9	60
Poland	3.1	127	Tanzania	40.4	20
Portugal	9.7	83	Thailand	14.0	59
Rwanda	43.9	17	Togo	18.5	45
Sao Tome & Princip	42.1	18	Tonga	124.7	2
Saudi Arabia	8.7	87	Trinidad and Tobag	8.1	91
Senegal	18.2	46	Tunisia	7.7	95
Seychells	168.2	1	Turkey	3.7	121
Sierra Leone	13.6	61	Uganda	32.4	26
Singapore	6.8	100	United Kingdom	2.5	129
Solomon Islands	21.9	39	United States	3.7	122
Somalia	62.5	8	Uruguay	3.4	125
South Africa	5.2	109	Vanuatu	84.2	3
Spain	5.4	107	Venezuela	7.5	96
Sri Lanka	15.2	55	Western Samoa	48.0	12
St. Kitts and Nevi	35.7	22	Yemen Arab Rep.	46.9	14
St. Lucia	20.3	42	Yugoslavia	8.3	90
St. Vincent	16.5	54	Zaire	15.1	56
Sudan	19.7	43	Zambia	13.5	63
			Zimbabue	7.7	94

Source: Handbook of International Trade and Development Statistics. UNCTAD (1991), Table 5.1.

APPENDIX 3. INDEX OF DISASTER PRONENESS: DAMAGE AS % OF GNP (1970-1989) AND ITS RANK

COUNTRY	INDEX	RANK	COUNTRY	INDEX	RANK
Afghanistan	27.10	23	Guatemala	12.80	35
Algeria	14.90	32	Guinea Bissau	0.00	68
Antigua & Barbuda	38.00	18	Haiti	9.21	39
Argentina	3.20	55	Honduras	34.82	20
Australia	4.08	53	Hong Kong	0.00	68
Austria	0.00	68	Hungary	0.00	68
Bahamas	0.00	68	Iceland	0.00	68
Bahrain	0.00	68	India	0.00	68
Bangaladesh	50.32	13	Ireland	0.00	68
Barbados	0.00	68	Israel	0.00	68
Belgium	0.00	68	Italy	7.08	44
Belize	7.15	43	Jamaica	64.40	9
Bhutan	0.00	68	Japan	7.80	42
Bolivia	84.16	6	Jordan	1.21	66
Botswana	10.13	37	Kenya	0.00	68
Brazil	3.21	54	Kiribati	0.00	68
Brunei	0.00	68	Korea (South)	0.00	68
Burkino Fasu	191.23	3	Kuwait	0.00	68
Burma	1.71	63	Liberia	21.28	29
Cameroon	0.00	68	Libya	0.00	68
Canada	0.00	68	Madagascar	16.60	31
Cape Verde	0.00	68	Malawi	2.36	60
Chad	92.04	5	Malaysia	0.00	68
Chile	5.90	45	Maldives	0.00	68
China, Rep.	21.91	27	Mali	22.52	25
Colombia	5.56	47	Malta	0.00	68
Comoros	61.18	10	Mauritania	41.15	16
Congo	0.00	68	Mauritius	40.68	17
Cote d'Ivoire	0.00	68	Mexico	2.91	56
Cuba	2.86	57	Morocco	0.00	68
Denmark	0.00	68	Mozambique	2.65	58
Djibouti	9.80	38	Nepal	16.84	30
Dominica	141.30	4	Netherlands	0.00	68
Dominican Rep.	2.31	61	New Caledonia	0.00	68
Ecuador	2.52	59	New Zealand	0.00	68
El Salvador	52.32	12	Nicaragua	206.95	2
Ethiopia	60.82	11	Niger	21.53	28
Fiji	14.68	34	Nigeria	0.00	68
Finland	0.00	68	Norway	0.00	68
France	0.00	68	Oman	0.00	68
Gabon	0.00	68	Pakisatan	5.54	49
Gambia	14.79	33	Panama	4.25	52
Germany	0.00	68	Papua New Guinea	0.00	68
Greece	4.54	51	Paraguay	5.08	50
Grenada	0.00	68	Peru	8.45	41
Guadalupe	5.85	46	Philippines	0.00	68

APPENDIX 3. INDEX OF DISASTER PRONENESS: DAMAGE AS % OF GNP (1970-1989) (Continued)

COUNTRY	INDEX	RANK	COUNTRY	INDEX	
Romania	9.03	40	Syrian Arab Rep.	0.00	6
Saudi Arabia	0.00	68	Tanzania	0.00	68
Senegal	21.98	26	Thailand	1.27	65
Seychells	0.00	68	Tokelu	50.00	15
Sierra Leone	0.00	68	Tonga	50.20	14
Singapore	0.00	68	Trinidad and Tobago	0.00	68
Spain	1.99	62	Tunisia	1.37	64
Sri Lanka	25.50	24	Tuvalu	0.00	68
St. Kitts and Nevis	28.00	22	United Arab Em.	0.00	68
St. Lucia	81.17	7	United Kingdom	0.00	68
St. Vincent	35.99	19	United States	0.00	68
Sudan	5.56	48	Uruguay	1.01	67
Surinam	0.00	68	Vanuatu	228.41	1
Swaziland	12.60	36	Yemen Arab Rep.	66.67	8
Sweden	0.00	68	Yemen P.D. Rep.	29.05	21
Switzerland	0.00	68	Yugoslavia	0.00	68
			Zimbabue	0.00	68

Source: Preminary Study on the Identification of Disaster Prone Countries Based on Economic Impact, (UNDRO (1990)

APPENDIX 4. IMPORTS AS A PERCENTAGE OF GDP (1987-1989) AND ITS RANK

COUNTRY	%	RANK	COUNTRY	%	RANK
Afghanistan	12.9	135	Ghana	24.2	105
Algeria	13.7	134	Greece	27.9	88
Antigua & Barbuda	135.4	3	Grenada	86.6	10
Argentina	9.2	139	Guatemala	22.3	113
Australia	17.8	126	Guinea Bissau	43.6	50
Austria	37.3	63	Guyana	67.8	23
Bahrain	89.4	8	Haiti	23.7	106
Bangaladesh	18.2	123	Honduras	25.2	97
Barbados	47.3	47	Hong Kong	128.0	4
Belgium	67.0	25	Hungary	35.6	67
Belize	73.5	18	Iceland	34.5	70
Benin	37.4	61	India	8.8	141
Bhutan	53.2	37	Indonesia	22.5	111
Bolivia	17.7	128	Iran, Is.Rep.	4.5	145
Botswana	61.4	31	Ireland	54.1	36
Brazil	6.0	144	Israel	41.9	55
Burkino Fasu	40.3	56	Italy	19.0	121
Burundi	24.4	104	Jamaica	53.1	38
Cameroon	18.7	122	Japan	8.2	143
Canada	25.3	96	Jordan	63.5	28
Cape Verde	42.6	52	Kenya	28.5	86
Cent. Af. Rep.	32.7	74	Kiribati	76.0	17
Chad	58.2	33	Korea	32.0	75
Chile	29.6	83	Kuwait	46.3	48
China, Rep.	15.4	131	Lesotho	144.4	2
Colombia	15.5	130	Liberia	32.8	73
Congo	63.2	29	Libya	26.7	90
Costa Rica	37.1	64	Madagascar	20.1	118
Cote d'Ivoire	31.5	78	Malawi	30.3	80
Cyprus	51.9	39	Malaysia	58.7	32
Czechoslovakia	37.4	62	Maldives	98.1	7
Denmark	31.9	77	Mali	34.3	71
Djibouti	70.0	20	Malta	89.0	9
Dominica	55.7	35	Mauritania	57.6	34
Dominican Rep.	39.3	57	Mauritius	70.0	21
Ecuador	22.9	109	Mexico	14.0	133
Egypt	17.8	127	Morocco	26.2	93
El Salvador	25.1	99	Mozambique	15.1	132
Equatorial Guinea	51.0	41	Myamnar	8.4	142
Ethiopia	21.2	116	Nepal	25.5	95
Fiji	48.2	44	Netherlands	49.6	42
Finland	24.9	100	Netherlands Anthill	84.0	12
France	22.4	112	New Caledonia	29.0	85
Gabon	47.6	46	New Zealand	26.4	91
Gambia	69.7	22	Nicaragua	62.4	30
Germany	24.5	102	Niger	24.4	103

APPENDIX 4. IMPORTS AS A PERCENTAGE OF GDP (1987-1989)
(Continued)

COUNTRY	%	RANK	COUNTRY	%	RANK
Nigeria	19.2	120	St. Lucia	98.4	6
Norway	37.5	60	St. Vincent	77.3	15
Oman	29.1	84	Sudan	8.9	140
Pakisatan	23.2	108	Surinam	28.4	87
Panama	67.5	24	Swaziland	82.9	13
Papua New Guinea	49.2	43	Sweden	31.3	79
Paraguay	30.1	82	Switzerland	42.1	53
Peru	9.8	138	Syrian Arab Rep.	12.6	136
Philippines	25.2	98	Tanzania	36.4	56
Poland	20.7	117	Thailand	34.9	68
Portugal	42.8	51	Togo	51.2	40
Qatar	32.0	76	Tonga	72.7	19
Romania	21.8	115	Trinidad and Tobago	33.2	72
Rwanda	18.0	125	Tunisia	42.0	54
Sao Tome & Principe	44.6	49	Turkey	22.3	114
Saudi Arabia	48.2	45	Uganda	16.9	129
Senegal	36.2	66	United Kingdom	26.9	89
Seychells	76.7	16	United States	11.0	137
Sierra Leone	24.7	101	Uruguay	18.1	124
Singapore	181.5	1	Vanuatu	65.9	2
Solomon Islands	86.4	11	Venezuela	23.2	17
Somalia	30.2	81	Western Samoa	67.0	26
South Africa	22.5	110	Yemen Arab Rep.	34.7	69
Spain	20.0	119	Yugoslavia	25.6	94
Sri Lanka	36.3	65	Zaire	79.0	14
St. Kitts and Nevis	101.9	5	Zambia	37.6	59
			Zimbabue	26.3	92

Source: International Financial Statistics, IMF (1991), pp. 150-151

APPENDIX 5. EXPORTS AS A PERCENTAGE OF GDP (1987-1989) AND ITS RANK

COUNTRY	%	RANK	COUNTRY	%	RANK
Afghanistan	5.1	140	Germany	29.9	70
Algeria	15.0	116	Ghana	18.4	108
Antigua & Barbuda	96.5	5	Greece	20.9	102
Argentina	13.9	121	Grenada	56.4	25
Australia	16.1	114	Guatemala	16.4	113
Austria	38.0	51	Guinea Bissau	10.5	129
Bahrain	101.3	3	Guyana	56.7	24
Bangaladesh	8.0	135	Haiti	13.8	123
Barbados	47.7	31	Honduras	23.0	93
Belgium	70.1	14	Hong Kong	133.0	2
Belize	64.4	18	Hungary	37.2	53
Benin	27.0	76	Iceland	35.2	56
Bhutan	24.8	87	India	6.0	138
Bolivia	13.9	122	Indonesia	25.1	85
Botswana	90.5	6	Iran, Is.Rep.	3.7	144
Brazil	9.7	131	Ireland	63.1	20
Burkino Fasu	13.0	125	Israel	34.5	59
Burundi	10.6	128	Italy	19.3	104
Cameroon	15.8	115	Jamaica	49.6	29
Canada	25.9	79	Japan	10.5	130
Cape Verde	20.9	103	Jordan	43.5	39
Cent. Af. Rep.	18.1	110	Kenya	22.2	98
Chad	24.7	89	Kiribati	25.0	86
Chile	35.4	55	Korea	38.4	49
China, Rep.	14.6	119	Kuwait	47.1	34
Colombia	18.1	109	Lesotho	21.5	101
Congo	42.0	42	Liberia	44.9	37
Costa Rica	34.0	63	Libya	28.7	71
Cote d'Ivoire	39.1	48	Madagascar	14.9	117
Cyprus	50.4	27	Malawi	25.7	81
Czechoslovakia	39.9	47	Malaysia	68.5	15
Denmark	34.4	61	Maldives	100.9	4
Djibouti	45.0	35	Mali	17.1	112
Dominica	47.5	32	Malta	77.9	10
Dominican Rep.	34.6	58	Mauritania	47.5	33
Ecuador	25.6	83	Mauritius	66.4	17
Egypt	10.7	127	Mexico	17.6	111
El Salvador	18.5	107	Morocco	22.9	95
Equat. Guinea	45.0	36	Mozambique	3.6	145
Ethiopia	11.8	126	Myamnar	4.9	141
Fiji	50.1	28	Nepal	13.6	124
Finland	24.4	90	Netherlands	53.2	26
France	23.0	94	Neth. Antilles	67.0	16
Gabon	41.3	44	New Caledonia	33.0	65
Gambia	61.5	21	New Zealand	27.0	77

APPENDIX 5. EXPORTS AS A PERCENTAGE OF GDP (1987 - 1989)
(Continued)

COUNTRY	%	RANK	COUNTRY	%	
Nicaragua	22.3	96	St. Lucia	89.7	7
Niger	18.9	105	St. Vincent	71.7	12
Nigeria	27.6	74	Sudan	4.3	142
Norway	38.0	50	Surinam	36.0	54
Oman	48.9	30	Swaziland	85.2	8
Pakisatan	14.9	118	Sweden	32.6	66
Panama	76.0	11	Switzerland	42.4	41
Papua New Guinea	42.9	40	Syrian Arab Rep.	9.2	133
Paraguay	27.5	75	Tanzania	14.6	120
Peru	9.3	132	Thailand	33.7	64
Philippines	24.8	88	Togo	41.8	43
Poland	21.8	100	Tonga	30.9	68
Portugal	34.5	60	Trinidad and Tobago	38.0	52
Qatar	41.0	45	Tunisia	40.5	46
Romania	25.7	82	Turkey	22.3	97
Rwanda	7.2	136	Uganda	7.1	137
Sao Tome & Principe	58.0	23	United Kingdom	24.1	91
Saudi Arabia	35.1	57	United States	8.3	134
Senegal	28.2	72	Uruguay	22.0	99
Seychells	63.9	19	Vanuatu	34.4	62
Sierra Leone	25.9	80	Venezuela	25.2	84
Singapore	185.4	1	Western Samoa	32.0	67
Solomon Islands	60.1	22	Yemen Arab Rep.	4.2	143
Somalia	5.8	139	Yugoslavia	23.7	92
South Africa	27.8	73	Zaire	71.7	13
Spain	18.6	106	Zambia	44.5	38
Sri Lanka	26.3	78	Zimbabue	30.1	69

Source: International Financial Statistics, IMF (1991), pp. 148-149.

APPENDIX 6: DIVERSIFICATION INDEX (1988) AND ITS RANK

COUNTRY	INDEX	RANK	COUNTRY	INDEX	RANK
Algeria	0.879	85	Grenada	0.897	97
Angola	0.901	103	Guatemala	0.826	55
Argentina	0.666	32	Guinea	0.955	137
Australia	0.697	33	Guinea Bissau	0.900	101
Austria	0.395	10	Guyana	0.889	91
Bahamas	0.874	79	Haiti	0.812	49
Bahrain	0.841	61	Honduras	0.871	76
Bangaladesh	0.883	86	Hong Kong	0.659	30
Barbados	0.740	41	Iceland	0.897	96
Belgium	0.386	8	India	0.654	29
Belize	0.878	84	Indonesia	0.716	36
Benin	0.859	69	Iran, Is.Rep.	0.917	112
Bermuda	0.915	111	Iraq	0.908	109
Bolivia	0.894	94	Ireland	0.554	21
Brazil	0.546	20	Israel	0.579	23
Brunei	0.918	113	Italy	0.366	7
Burkino Fasu	0.901	102	Jamaica	0.836	59
Burundi	0.934	128	Japan	0.434	13
Cameroon	0.866	72	Jordan	0.800	45
Canada	0.431	12	Kenya	0.875	80
Cape Verde	0.885	89	Kirabti	0.803	46
Cent. Af. Rep.	0.920	117	Korea	0.520	16
Chad	0.954	136	Kuwait	0.878	83
Chile	0.821	51	Liberia	0.931	124
Colombia	0.732	39	Libya	0.906	106
Comoros	0.918	114	Madagascar	0.912	110
Congo	0.890	92	Malawi	0.944	133
Costa Rica	0.791	44	Malaysia	0.640	28
Cote d'Ivoire	0.893	93	Maldives	0.933	127
Cuba	0.928	121	Mali	0.884	88
Cyprus	0.736	40	Malta	0.871	75
Denmark	0.467	14	Mauritania	0.929	123
Dominica	0.941	131	Mauritius	0.873	77
Ecuador	0.864	71	Mexico	0.607	25
Egypt	0.769	43	Morocco	0.805	47
El Salvador	0.862	70	Myamnar	0.854	65
Equat. Guinea	0.950	135	Nauru	0.976	141
Ethiopia	0.924	118	Nepal	0.896	95
Fiji	0.901	104	Netherlands	0.356	6
Finland	0.556	22	Neth. Antilles	0.823	52
France	0.252	1	New Caledonia	0.963	138
Gabon	0.906	108	New Zealand	0.704	34
Gambia	0.873	78	Nicaragua	0.918	115
Germany	0.275	3	Niger	0.924	119
Ghana	0.906	107	Nigeria	0.919	116
Greece	0.659	31	Norway	0.584	24

APPENDIX 7: HUMAN DEVELOPMENT AND ITS RANK

COUNTRY	HDI	RANK	COUNTRY	HDI	RANK
Afghanistan	0.069	157	Egypt	0.394	114
Albania	0.821	49	El Salvador	0.524	95
Algeria	0.490	101	Equat. Guinea	0.186	137
Angola	0.150	147	Ethiopia	0.166	141
Argentina	0.854	43	Fiji	0.689	71
Atigua/Barbuda	0.832	46	Finland	0.963	13
Australia	0.973	9	France	0.971	10
Austria	0.957	17	Gabon	0.510	97
Bahamas	0.920	27	Gambia	0.064	159
Bahrain	0.810	51	Germany	0.959	15
Bangladesh	0.186	136	Ghana	0.311	122
Barbados	0.945	22	Greece	0.934	24
Belgium	0.958	16	Grenada	0.751	64
Belize	0.700	67	Guatemala	0.488	103
Benin	0.114	150	Guinea	0.066	158
Bhutan	0.159	144	Guinea Bissau	0.088	151
Bolivia	0.416	110	Guyana	0.589	89
Botswana	0.524	94	Haiti	0.296	125
Brazil	0.759	60	Honduras	0.492	100
Brunei	0.861	42	Hong Kong	0.934	25
Bulgaria	0.899	33	Hungary	0.911	30
Burkino Faso	0.081	154	Iceland	0.983	3
Burundi	0.177	139	India	0.308	123
Cambodia	0.175	140	Indonesia	0.499	98
Cameroon	0.328	119	Iran, Is.Rep.	0.577	92
Canada	0.983	2	Iraq	0.582	91
Cape Verde	0.428	109	Ireland	0.945	23
Cent. Af. Rep.	0.166	142	Israel	0.950	21
Chad	0.087	152	Italy	0.955	18
Chile	0.878	38	Jamaica	0.761	59
China	0.614	82	Japan	0.983	1
Colombia	0.757	61	Jordan	0.614	83
Comoros	0.274	126	Kenya	0.399	112
Congo	0.374	115	Korea, Rep. of	0.665	75
Costa Rica	0.876	40	Korea Dem. Rep.	0.884	35
Cote d'Ivoire	0.311	120	Kuwait	0.827	48
Cuba	0.754	62	Lao	0.253	128
Cyprus	0.923	26	Lebanon	0.592	88
Czeckoslovakia	0.920	28	Lesotho	0.432	107
Denmark	0.967	12	Liberia	0.220	132
Djibouti	0.083	153	Libya	0.665	77
Domenican Rep.	0.622	80	Luxemburg	0.954	19
Dominica	0.800	53	Madagascar	0.371	116
Ecuador	0.665	74	Malawi	0.179	138

APPENDIX 7. HUMAN DEVELOPMENT INDEX AND ITS RANK
(Continued)

COUNTRY	HDI	RANK	COUNTRY	HDI	RANK
Malaysia	0.802	52	Sierra Leone	0.048	160
Maldives	0.534	93	Singapore	0.879	36
Mali	0.072	156	Solomon Islands	0.521	96
Malta	0.917	29	Somalia	0.118	149
Mauritania	0.140	148	South Africa	0.766	57
Mauritius	0.831	47	Spain	0.951	20
Mexico	0.838	45	Sri Lanka	0.665	76
Mongolia	0.596	87	St. Kitts/Nevis	0.719	65
Morocco	0.431	108	St. Lucia	0.699	68
Mozambique	0.155	146	St. Vincent	0.636	79
Myamnar	0.437	106	Sudan	0.164	143
Namibia	0.440	105	Surinam	0.792	55
Nepal	0.158	145	Swaziland	0.462	104
Netherlands	0.976	8	Sweden	0.982	4
New Zealand	0.959	14	Switzerland	0.981	5
Nicaragua	0.612	85	Syrian Arab Rep.	0.681	72
Niger	0.079	155	Tanzania	0.266	127
Nigeria	0.242	129	Thailand	0.713	66
Norway	0.978	6	Togo	0.225	131
Oman	0.604	86	Trinidad and Toba	0.876	39
Pakisatan	0.311	121	Tunisia	0.588	90
Panama	0.796	54	Turkey	0.694	70
Papua New Guinea	0.353	117	Uganda	0.204	134
Paraguay	0.667	73	United Arab Em.	0.767	56
Peru	0.644	78	United Kingdom	0.967	11
Philippines	0.613	84	United States	0.976	7
Poland	0.863	41	Uruguay	0.905	32
Portugal	0.879	37	U.S.S.R.	0.908	31
Qatar	0.812	50	Vanuatu	0.490	102
Romania	0.762	58	Venezuela	0.848	44
Rwanda	0.213	133	Vietnam	0.498	99
Samoa	0.618	81	Yemen Arab Rep.	0.242	130
Sao Tome & Princi	0.399	113	Yugoslavia	0.893	34
Saudi Arabia	0.697	69	Zaire	0.299	124
Senegal	0.189	135	Zambia	0.351	118
Seychells	0.752	63	Zimbabue	0.413	111

Source: Human Development Report. UNDP (1991)

APPENDIX 8: GDP PER CAPITA AND ITS RANK

COUNTRY	PER CAPITA GDP	RANK	COUNTRY	PER CAPITA GDP	RANK
Afghanistan	240	131	Gabon	3030	48
Algeria	2284	57	Gambia	271	129
Antigua & Barbu	3279	45	Germany	19636	8
Argentina	2844	50	Ghana	369	118
Australia	15038	19	Greece	5287	38
Austria	16733	15	Grenada	1423	73
Bahamas	8649	29	Guatemala	898	88
Bahrain	6980	30	Guinea Bissau	159	143
Bangaladesh	185	139	Guyana	454	109
Barbados	6057	32	Haiti	399	115
Belgium	15320	18	Honduras	922	86
Belize	1673	66	Hong Kong	9585	24
Benin	410	112	Hungary	2639	52
Bermuda	18931	10	Iceland	23851	2
Bhutan	196	137	India	343	121
Bolivia	640	99	Indonesia	475	107
Botswana	1654	67	Iran, Is.Rep.	5745	34
Brazil	2430	55	Iraq	3152	47
Burkino Fasu	218	135	Ireland	8959	27
Burundi	211	136	Israel	9404	25
Cameroon	1136	80	Italy	14572	21
Canada	18648	11	Jamaica	1425	72
Cape Verde	748	92	Japan	23273	3
Cent. Af. Rep.	388	116	Jordan	1207	79
Chad	169	141	Kenya	375	117
Chile	1732	65	Kiribati	317	125
China, Rep.	346	119	Korea (South)	4079	41
Colombia	1225	78	Kuwait	10446	23
Comoros	402	114	Lesotho	232	133
Congo	1007	84	Liberia	484	106
Costa Rica	1609	69	Libya	5417	37
Cote d'Ivoire	872	89	Luxemburg	18203	12
Cyprus	6170	31	Madagascar	167	142
Denmark	20948	7	Malawi	146	144
Djibouti	589	102	Malaysia	2040	59
Dominica	1629	68	Mali	223	134
Dominican Rep.	675	97	Malta	5246	40
Ecuador	1021	83	Mauritania	522	105
Egypt	681	95	Mauritius	1843	61
El Salvador	1082	82	Mexico	2060	58
Equat. Guinea	438	110	Morocco	922	87
Ethiopia	121	146	Mozambique	84	147
Fiji	1457	71	Myanmar	276	128
Finland	21343	6	Nepal	171	140
France	17141	13	Netherlands	15400	17

APPENDIX 8: GDP PER CAPITA AND ITS RANK
(Continued)

COUNTRY	PER CAPITA GDP	RANK	COUNTRY	PER CAPITA GDP	RANK
Netherlands Ant	5924	33	St. Lucia	1835	62
New Caledonia	5280	39	St. Vincent	1246	77
Niger	329	123	Sudan	461	108
Nigeria	296	127	Surinam	2886	49
Norway	21356	5	Swaziland	825	90
Oman	5443	36	Sweden	21627	4
Pakisatan	324	124	Switzerland	27990	1
Panama	1959	60	Syrian Arab Rep	1280	76
Papua New Guine	962	85	Tanzania	123	145
Paraguay	1544	70	Thailand	1102	81
Peru	1754	64	Togo	408	113
Philippines	658	98	Tonga	823	91
Poland	1814	63	Trinidad and To	3452	44
Portugal	4075	42	Tunisia	1287	75
Qatar	16795	14	Turkey	1321	74
Rwanda	340	122	Uganda	243	130
Sao Tome & Prin	548	104	United Arab Em.	15855	16
Saudi Arabia	5739	35	United Kingdom	14631	20
Senegal	717	93	United States	19609	9
Seychells	3511	43	Uruguay	2596	54
Sierra Leone	297	126	Vanuatu	603	101
Singapore	9232	26	Venezuela	3217	46
Solomon Islands	585	103	Western Samoa	680	96
Somalia	239	132	Yemen	624	100
South Africa	2610	53.00	Yugoslavia	2667	51
Spain	8844	28	Zaire	193	138
Sri Lanka	416	111	Zambia	346	120
St. Kitts and N	2315	56	Zimbabue	690	94

Source: Handbook of International Trade and Development Statistics. UNCTAD (1991), Table 6.1.

APPENDIX 9a. VULNERABILITY INDEX

COUNTRY ALPHABETICAL ORDER	VULNER INDEX	RANK	COUNTRY RANK ORDER	VULNER INDEX	RANK
Afghanistan	0.462	21	Vanuatu	0.150	1
Algeria	0.619	48	Tonga	0.187	2
Antigua and Barbuda	0.232	3	Antigua and Barbuda	0.232	3
Argentina	0.809	101	Comoros	0.248	4
Australia	0.720	77	Dominica	0.273	5
Austria	0.796	100	St. Lucia	0.284	6
Bahamas	0.574	37	St. Kitts and Nevis	0.292	7
Bangladesh	0.462	22	Chad	0.315	8
Barbados	0.517	31	St. Vincent/Grenadin	0.335	9
Belgium	0.811	102	Jamaica	0.363	10
Belize	0.479	24	Yemen	0.371	11
Benin	0.639	50	Ethiopia	0.404	12
Bolivia	0.408	15	Mauritius	0.405	13
Botswana	0.603	45	Seychelles	0.406	14
Brazil	0.834	107	Bolivia	0.408	15
Cameroon	0.698	66	Mali	0.420	16
Canada	0.946	113	Cape Verde	0.436	17
Cape Verde	0.436	17	El Salvador	0.447	18
Chad	0.315	8	Kiribati	0.456	19
Chile	0.695	67	Fiji	0.458	20
China	0.691	63	Afghanistan	0.462	21
Colombia	0.704	70	Bangladesh	0.462	22
Comoros	0.248	4	Mauritania	0.477	23
Congo	0.693	65	Belize	0.479	24
Cote d'Ivoire	0.720	76	Haiti	0.483	25
Cyprus	0.594	41	Senegal	0.484	26
Denmark	0.768	90	Nepal	0.491	27
Dominica	0.273	5	Honduras	0.495	28
Dominican Republic	0.599	44	Madagascar	0.506	29
Ecuador	0.704	71	Grenada	0.509	30
El Salvador	0.447	18	Barbados	0.517	31
Ethiopia	0.404	12	Niger	0.529	32
Fiji	0.458	20	Guatemala	0.539	33
Finland	0.796	99	Guinea-Bissau	0.545	34
France	0.821	104	Malawi	0.545	35
Gabon	0.687	60	Mozambique	0.546	36
Gambia	0.583	39	Bahamas	0.574	37
Germany	0.875	111	Malta	0.582	38
Greece	0.639	51	Gambia	0.583	39
Grenada	0.509	30	Paraguay	0.594	40
Guatemala	0.539	33	Cyprus	0.594	41
Guinea-Bissau	0.545	34	Maldives	0.595	42
Guyana	0.671	58	Swaziland	0.598	43
Haiti	0.483	25	Dominican Republic	0.599	44
Honduras	0.495	28	Botswana	0.603	45

APPENDIX 9a. VULNERABILITY INDEX
(Continued)

COUNTRY ALPHABETICAL ORDER	VULNER INDEX	RANK	COUNTRY RANK ORDER	VULNER INDEX	RANK
Hungary	0.776	94	Sudan	0.604	46
Iceland	0.791	98	Sri Lanka	0.612	47
India	0.776	93	Algeria	0.619	48
Ireland	0.779	96	Jordan	0.635	49
Israel	0.754	84	Benin	0.639	50
Italy	0.689	62	Greece	0.639	51
Jamaica	0.363	10	Pakistan	0.643	52
Japan	0.745	83	Tanzania	0.645	53
Jordan	0.635	49	Peru	0.653	54
Kenya	0.665	56	Panama	0.656	55
Kiribati	0.456	19	Kenya	0.665	56
Korea, Rep. of	0.865	109	Sierra Leone	0.667	57
Kuwait	0.694	66	Guyana	0.671	58
Liberia	0.692	64	Trinidad and Tobago	0.676	59
Libya	0.756	85	Gabon	0.687	60
Madagascar	0.506	29	Singapore	0.688	61
Malawi	0.545	35	Italy	0.689	62
Malaysia	0.768	89	China	0.691	63
Maldives	0.595	42	Liberia	0.692	64
Mali	0.420	16	Congo	0.693	65
Malta	0.582	38	Kuwait	0.694	66
Mauritania	0.477	23	Chile	0.695	67
Mauritius	0.405	13	Cameroon	0.698	68
Mexico	0.783	97	Papua New Guinea	0.699	69
Morocco	0.735	81	Colombia	0.704	70
Mozambique	0.546	36	Ecuador	0.704	71
Nepal	0.491	27	Syrian Arab Rep.	0.705	72
Netherlands	0.767	88	New Zealand	0.708	73
New Zealand	0.708	73	Suriname	0.714	74
Niger	0.529	32	Tunisia	0.716	75
Nigeria	0.817	103	Cote d'Ivoire	0.720	76
Norway	0.833	106	Australia	0.720	77
Oman	0.727	79	Thailand	0.724	78
Pakistan	0.643	52	Oman	0.727	79
Panama	0.656	55	Portugal	0.728	80
Papua New Guinea	0.699	69	Morocco	0.735	81
Paraguay	0.594	40	Zimbabue	0.740	82
Peru	0.653	54	Japan	0.745	83
Philippines	0.763	87	Israel	0.754	84
Portugal	0.728	80	Libya	0.756	85
Saudi Arabia	0.771	92	Yugoslavia	0.758	86
Senegal	0.484	26	Philippines	0.763	87
Seychelles	0.406	14	Netherlands	0.767	88
Sierra Leone	0.667	57	Malaysia	0.768	89
Singapore	0.688	61	Denmark	0.768	90
Spain	0.769	91	Spain	0.769	91

APPENDIX 9a. VULNERABILITY INDEX
(Continued)

COUNTRY ALPHABETICAL ORDER	VULNER INDEX	RANK	COUNTRY RANK ORDER	VULNER INDEX	RANK
Sri Lanka	0.612	47	Saudi Arabia	0.771	92
St. Kitts and Nevis	0.292	7	India	0.776	93
St. Lucia	0.284	6	Hungary	0.776	94
St. Vincent/Grenadin	0.335	9	Uruguay	0.778	95
Sudan	0.604	46	Ireland	0.779	96
Suriname	0.714	74	Mexico	0.783	97
Swaziland	0.598	43	Iceland	0.791	98
Sweden	0.862	108	Finland	0.796	99
Switzerland	0.825	105	Austria	0.796	100
Syrian Arab Rep.	0.705	72	Argentina	0.809	101
Tanzania	0.645	53	Belgium	0.811	102
Thailand	0.724	78	Nigeria	0.817	103
Tonga	0.187	2	France	0.821	104
Trinidad and Tobago	0.676	59	Switzerland	0.825	105
Tunisia	0.716	75	Norway	0.833	106
United Kingdom	0.865	110	Brazil	0.834	107
United States	0.900	112	Sweden	0.862	108
Uruguay	0.778	95	Korea. Rep. of	0.865	109
Vanuatu	0.150	1	United Kingdom	0.865	110
Yemen	0.371	11	Germany	0.875	111
Yugoslavia	0.758	86	United States	0.900	112
Zimbabue	0.740	82	Canada	0.946	113

TABLE 9b. THE THREE SUB-INDICES OF VULNERABIBILITY

COUNTRY	SIZE INDEX	SIZE RANK	DISASTER INDEX	DISASTER RANK	REMOTENESS INDEX	REMOTENESS RANK
Afghanistan	0.638	73	0.392	19	0.358	23
Algeria	0.747	97	0.503	26	0.608	74
Antigua and Barbuda	0.228	9	0.330	14	0.138	4
Argentina	0.771	101	0.786	47	0.871	109
Australia	0.804	106	0.741	44	0.616	75
Austria	0.643	75	1.000	57	0.748	98
Bahamas	0.402	19	1.000	57	0.323	18
Bangladesh	0.689	86	0.330	15	0.369	24
Barbados	0.300	11	1.000	57	0.254	13
Belgium	0.627	66	1.000	57	0.808	102
Belize	0.356	16	0.638	35	0.444	38
Benin	0.536	37	1.000	57	0.382	26
Bolivia	0.633	71	0.184	4	0.409	30
Botswana	0.547	39	0.574	31	0.689	86
Brazil	0.877	110	0.785	46	0.842	105
Cameroon	0.648	76	1.000	57	0.450	40
Canada	0.840	109	1.000	57	1.000	113
Cape Verde	0.329	15	0.542	30	0.439	36
Chad	0.593	53	0.167	3	0.185	5
Chile	0.677	84	0.673	37	0.738	95
China	0.939	112	0.432	22	0.703	91
Colombia	0.728	94	0.684	38	0.701	89
Comoros	0.317	14	0.243	8	0.185	6
Congo	0.551	42	1.000	57	0.530	56
Cote d'Ivoire	0.631	70	1.000	57	0.530	55
Cyprus	0.435	23	1.000	57	0.349	21
Denmark	0.610	58	1.000	57	0.696	87
Dominica	0.228	8	0.088	2	0.502	50
Dominican Republic	0.548	40	0.846	52	0.405	29
Ecuador	0.626	65	0.830	50	0.658	82
El Salvador	0.521	34	0.271	10	0.551	59
Ethiopia	0.695	88	0.244	9	0.274	14
Fiji	0.424	22	0.505	27	0.446	39
Finland	0.665	81	1.000	57	0.725	94
France	0.798	105	1.000	57	0.668	83
Gabon	0.535	36	1.000	57	0.528	54
Gambia	0.377	17	1.000	57	0.373	25
Germany	0.785	104	1.000	57	0.842	104
Greece	0.643	74	0.721	42	0.556	60
Grenada	0.219	6	1.000	57	0.308	17
Guatemala	0.589	51	0.531	28	0.498	48
Guinea-Bissau	0.403	20	1.000	57	0.233	10
Guyana	0.468	26	1.000	57	0.547	58
Haiti	0.516	32	0.591	32	0.343	20
Honduras	0.560	45	0.346	17	0.581	67
Hungary	0.620	60	1.000	57	0.711	93

TABLE 9b. THE THREE SUB-INDICES OF VULNERABIBILITY
(Continued)

COUNTRY	SIZE INDEX	SIZE RANK	DISASTER INDEX	DISASTER RANK	REMOTENESS INDEX	REMOTENESS RANK
Iceland	0.480	29	1.000	57	0.895	112
India	0.896	111	1.000	57	0.435	35
Ireland	0.586	48	1.000	57	0.752	99
Israel	0.564	46	1.000	57	0.699	88
Italy	0.780	103	0.640	36	0.649	81
Jamaica	0.471	26	0.233	7	0.385	27
Japan	0.836	108	0.622	34	0.778	101
Jordan	0.550	41	1.000	57	0.357	22
Kenya	0.664	80	1.000	57	0.334	19
Kiribati	0.177	1	1.000	57	0.193	7
Korea, Rep. of	0.703	90	1.000	57	0.893	111
Kuwait	0.519	33	1.000	57	0.565	63
Liberia	0.509	30	1.000	57	0.568	64
Libya	0.670	82	1.000	57	0.600	71
Madagascar	0.610	57	0.483	25	0.427	33
Malawi	0.546	38	0.842	51	0.249	11
Malaysia	0.673	83	1.000	57	0.631	78
Maldives	0.214	4	1.000	57	0.573	65
Mali	0.623	62	0.427	20	0.211	9
Malta	0.305	12	1.000	57	0.442	37
Mauritania	0.560	44	0.316	12	0.557	61
Mauritius	0.386	18	0.318	13	0.513	52
Mexico	0.806	107	0.803	48	0.742	96
Morocco	0.681	85	1.000	57	0.525	53
Mozambique	0.616	59	0.821	49	0.203	8
Nepal	0.595	54	0.480	24	0.398	28
Netherlands	0.654	77	1.000	57	0.649	80
New Zealand	0.626	64	1.000	57	0.500	49
Niger	0.624	63	0.435	23	0.531	57
Nigeria	0.749	98	1.000	57	0.703	90
Norway	0.655	78	1.000	57	0.846	106
Oman	0.553	43	1.000	57	0.628	76
Pakistan	0.754	99	0.685	40	0.493	47
Panama	0.530	35	0.734	43	0.706	92
Papua New Guinea	0.586	49	1.000	57	0.512	51
Paraguay	0.598	55	0.701	41	0.485	43
Peru	0.719	93	0.607	33	0.636	79
Philippines	0.709	91	1.000	57	0.581	68
Portugal	0.628	69	1.000	57	0.558	62
Saudi Arabia	0.735	96	1.000	57	0.580	66
Senegal	0.588	50	0.431	21	0.435	34
Seychelles	0.218	5	1.000	57	0.000	1
Sierra Leone	0.511	31	1.000	57	0.492	46
Singapore	0.439	25	1.000	57	0.628	77
Spain	0.762	100	0.873	53	0.673	84
Sri Lanka	0.592	52	0.775	45	0.471	42

TABLE 9b. THE THREE SUB-INDICES OF VULNERABIBILITY
(Continued)

COUNTRY	SIZE INDEX	SIZE RANK	DISASTER INDEX	DISASTER RANK	REMOTENESS INDEX	REMOTENESS RANK
St. Kitts and Nevis	0.187	2	0.386	18	0.303	16
St. Lucia	0.248	10	0.190	5	0.414	31
St. Vincent and the	0.212	3	0.340	16	0.455	41
Sudan	0.712	92	0.684	39	0.419	32
Suriname	0.469	27	1.000	57	0.675	85
Swaziland	0.409	21	0.533	29	0.854	108
Sweden	0.701	89	1.000	57	0.888	110
Switzerland	0.628	68	1.000	57	0.850	107
Syrian Arab Rep.	0.627	67	1.000	57	0.488	45
Tanzania	0.658	79	1.000	57	0.279	15
Thailand	0.731	95	0.956	55	0.486	44
Tonga	0.225	7	0.279	11	0.058	2
Trinidad and Tobago	0.436	24	1.000	57	0.593	70
Tunisia	0.603	56	0.942	54	0.604	73
United Kingdom	0.774	102	1.000	57	0.824	103
United States	0.956	113	1.000	57	0.746	97
Uruguay	0.573	47	0.998	56	0.764	100
Vanuatu	0.315	13	0.000	1	0.135	3
Yemen	0.637	72	0.227	6	0.250	12
Yugoslavia	0.690	87	1.000	57	0.588	69
Zimbabue	0.621	61	1.000	57	0.603	72

APPENDIX 9c. VULNERABILITY ADJUSTED DEVELOPMENT INDEX

COUNTRY	VUL.NDX	RANK	GDP.NDX	RANK	VADI*	RANK
Afghanistan	0.462	21	0.181	11	0.321	12
Algeria	0.619	48	0.569	69	0.594	68
Antigua and Barbuda	0.232	3	0.631	78	0.431	28
Argentina	0.809	90	0.606	75	0.708	84
Bahamas	0.574	37	0.798	88	0.686	82
Bangladesh	0.462	22	0.136	9	0.299	8
Barbados	0.517	31	0.736	86	0.627	71
Belize	0.479	24	0.515	61	0.497	47
Benin	0.639	50	0.273	23	0.456	37
Bolivia	0.408	15	0.350	32	0.379	18
Botswana	0.603	45	0.513	60	0.558	55
Brazil	0.834	92	0.579	71	0.707	83
Cameroon	0.698	66	0.448	49	0.573	61
Cape Verde	0.436	17	0.376	37	0.406	24
Chad	0.315	8	0.120	7	0.218	1
Chile	0.695	65	0.521	62	0.608	70
China	0.691	61	0.244	19	0.467	39
Colombia	0.704	68	0.461	51	0.583	63
Comoros	0.248	4	0.270	22	0.259	4
Congo	0.693	63	0.428	45	0.560	58
Cote d'Ivoire	0.720	73	0.403	40	0.561	59
Cyprus	0.594	41	0.740	87	0.667	78
Dominica	0.273	5	0.510	59	0.391	20
Dominican Republic	0.599	44	0.359	34	0.479	43
Ecuador	0.704	69	0.430	46	0.567	60
El Salvador	0.447	18	0.440	47	0.444	34
Ethiopia	0.404	12	0.063	2	0.233	2
Fiji	0.458	20	0.491	57	0.475	42
Gabon	0.687	59	0.617	77	0.652	73
Gambia	0.583	39	0.202	12	0.392	21
Grenada	0.509	30	0.487	55	0.498	48
Guatemala	0.539	33	0.408	41	0.473	41
Guinea-Bissau	0.545	34	0.110	5	0.327	13
Guyana	0.671	57	0.290	26	0.481	44
Haiti	0.483	25	0.268	21	0.376	17
Honduras	0.495	28	0.412	42	0.454	36
Hungary	0.776	85	0.593	73	0.685	81
Iceland	0.791	89	0.972	93	0.882	93
India	0.776	84	0.242	18	0.509	49
Ireland	0.779	87	0.804	89	0.791	92
Israel	0.754	78	0.812	91	0.783	91
Jamaica	0.363	10	0.487	56	0.425	26
Jordan	0.635	49	0.459	50	0.547	52
Kenya	0.665	55	0.258	20	0.462	38
Kiribati	0.456	19	0.229	15	0.342	14
Korea, Rep. of	0.865	93	0.668	81	0.766	90
Kuwait	0.694	64	0.830	92	0.762	89

APPENDIX 9c. VULNERABILITY ADJUSTED DEVELOPMENT INDEX
(Continued)

COUNTRY	VUL.NDX	RANK	GDP.NDX	RANK	VADI*	RANK
Liberia	0.692	62	0.301	28	0.497	46
Libya	0.756	79	0.717	83	0.737	86
Madagascar	0.506	29	0.118	6	0.312	10
Malawi	0.545	35	0.095	4	0.320	11
Malaysia	0.768	82	0.549	67	0.658	75
Maldives	0.595	42	0.273	24	0.434	30
Mali	0.420	16	0.168	10	0.294	7
Malta	0.582	38	0.712	82	0.647	72
Mauritania	0.477	23	0.314	29	0.396	22
Mauritius	0.405	13	0.532	65	0.468	40
Mexico	0.783	88	0.551	68	0.667	77
Morocco	0.735	76	0.412	43	0.574	62
Mozambique	0.546	36	0.000	1	0.273	5
Nepal	0.491	27	0.122	8	0.307	9
Niger	0.529	32	0.235	17	0.382	19
Nigeria	0.817	91	0.217	13	0.517	50
Oman	0.727	75	0.718	84	0.722	85
Pakistan	0.643	51	0.232	16	0.436	31
Panama	0.656	54	0.542	66	0.599	69
Papua New Guinea	0.699	67	0.420	44	0.559	57
Paraguay	0.594	40	0.501	58	0.548	53
Peru	0.653	53	0.523	63	0.588	66
Philippines	0.763	81	0.354	33	0.559	56
Saudi Arabia	0.771	83	0.727	85	0.749	88
Senegal	0.484	26	0.369	36	0.427	27
Seychelles	0.406	14	0.643	80	0.524	51
Sierra Leone	0.667	56	0.217	14	0.442	32
Singapore	0.688	60	0.809	90	0.749	87
Sri Lanka	0.612	47	0.275	25	0.444	33
St. Kitts and Nevis	0.292	7	0.571	70	0.431	29
St. Lucia	0.284	6	0.531	64	0.407	25
St. Vincent/Grenadin	0.335	9	0.464	52	0.400	23
Sudan	0.604	46	0.293	27	0.149	35
Suriname	0.714	71	0.609	76	0.661	76
Swaziland	0.598	43	0.393	39	0.496	45
Syrian Arab Rep.	0.705	70	0.469	53	0.587	65
Tanzania	0.645	52	0.066	3	0.355	15
Thailand	0.724	74	0.443	48	0.583	64
Tonga	0.187	2	0.393	38	0.290	6
Trinidad and Tobago	0.676	58	0.640	79	0.658	74
Tunisia	0.716	72	0.470	54	0.593	67
Uruguay	0.778	86	0.591	72	0.684	80
Vanuatu	0.150	1	0.339	30	0.245	3
Yemen	0.371	11	0.345	31	0.358	16
Yugoslavia	0.758	80	0.595	74	0.677	79
Zimbabue	0.740	77	0.363	35	0.551	54

*VADI = Vulnerability Adjusted Development Index ((VUL.NDX + GDP.NDX)/2)

TABLE 9d. COUNTRIES WITH AN OVERRATED GNP PER CAPITA

COUNTRY	GDP RANK	VADI RANK	DIFF RANK
Antigua and Barbuda	78	28	50
St. Kitts and Nevis	70	29	41
Dominica	59	20	39
St. Lucia	64	25	39
Tonga	38	6	32
Jamaica	56	26	30
Seychelles	80	51	29
St. Vincent/Grenadines	52	23	29
Vanuatu	30	3	27
Mauritius	65	40	25
Comoros	22	4	18
Barbados	86	71	15
Fiji	57	42	15
Yemen	31	16	15
Belize	61	47	14
Bolivia	32	18	14
Cape Verde	37	24	13
El Salvador	47	34	13
Malta	82	72	10
Cyprus	87	78	9
Senegal	36	27	9
Grenada	55	48	7
Mauritania	29	22	7
Bahamas	88	82	6
Chad	7	1	6
Honduras	42	36	6
Botswana	60	55	5
Paraguay	58	53	5
Trinidad and Tobago	79	74	5
Gabon	77	73	4
Haiti	21	17	4
Kuwait	92	89	3
Mali	10	7	3
Singapore	90	87	3
Algeria	69	68	1
Bangladesh	9	8	1
Kiribati	15	14	1

* The VADI (Vulnerability Adjusted Development Index) Rank is dervied from a simple average of the GNP per capita index and the Vulnerability Index, as shown in Appendix 9c.

APPENDIX 10: COUNTRIES CONSIDERED IN THIS STUDY

Developed Countries

Australia
Austria
Belgium
Canada
Denmark
Finland
France
Germany
Greece
Iceland
Ireland
Italy
Japan
* Luxemburg
Netherlands
New Zealand
Norway
Portugal
Spain
Sweeden
Switzerland
United Kingdom
United States

Developing Countries

All other countries for which data was available.
* Data was not generally available for ex-East European Socialist Countries countries and a few Asian and African countries.

* Not included in the vulnerability index due to lack of data

APPENDIX 10: COUNTRIES CONSIDERED IN THIS STUDY

Small Island Developing Countries and Territories

Antigua and Barbuda
Bahamas
* Bahrain
Barbados
Bermuda
* Brunei
Cape Verde
Comoros
Cyprus
Dominica
Fiji
Grenada
Kiribati
Maldives
Malta
Mauritius
* Netherlands Antilles
* New Caladonia
* Sao Tome and Principe
Seychelles
* Solomon Islands
St. Lucia
St. Kitts and Nevis
St. Vincent/Grenadines
* Togo
Tonga
* Tuvalu
Trinidad and Tobago
* Western Samoa
Vanuatu

Large Island Developing Countries

* Cuba
Domenican Republic
Haiti
* Indonesia
Jamaica
Madagascar
Papua New Guinea
Phillipines
Singapore
Sri Lanka

Non-Island Developing Countries

All other countries for which data is available

* Data was not generally available for ex-East European Socialist Countries countries and a few Asian and African countries.