

Identifying Countries that are Particularly Vulnerable to the Adverse Effects of Climate Change: An Academic or a Political Challenge?

Richard J.T. Klein*

In light of the scarce funds currently available for adaptation, some Parties to the UNFCCC have suggested a prioritisation between eligible countries on the basis of their vulnerability to climate change, and to develop a vulnerability index for doing so. Article 4.4 of the Convention commits developed countries “to assist developing countries that are particularly vulnerable to the adverse effects of climate change in meeting costs of adaptation to those adverse effects.” This raises the question as to what it means to be “particularly vulnerable”, and how it is decided which countries fall into this category. In the absence of an agreed method to measure vulnerability, the many facets to the concept give rise to many possible interpretations of what constitutes “particularly vulnerable”. Eventually, the decision on how to compare potential impacts of climate change on, for example, human life, physical infrastructure and biological diversity requires a subjective judgement as to which expected outcomes are “better” or “worse”. Academics or other experts cannot therefore provide an objectively “true” answer to this political question.

I. Introduction

The United Nations Framework Convention on Climate Change (UNFCCC) commits developed countries “to assist developing countries that are particularly vulnerable to the adverse effects of climate change in meeting costs of adaptation to those adverse effects” (Article 4.4). Ever since the Convention was agreed in 1992, the question has arisen of what it means to be “particularly vulnerable”, and how it is decided which countries fall into this category. One would not normally expect that a country prefers to be seen as “particularly vulnerable” to the adverse effects of climate change, but a country that is classified that way would be eligible for additional financial support for adaptation.

There is therefore an overt political dimension to what appears to be a purely academic question. This paper outlines concerns about recent and proposed attempts to “measure” vulnerability so as to arrive at a ranking of “particularly vulnerable” countries, and thus to prioritise resource allocations

for adaptation. It summarises the ambiguous interpretations of the phrase “particularly vulnerable” in the Convention and the negotiations, and presents selected examples relevant to climate policy to illustrate the political challenge of developing indices. First, however, it introduces the concept of vulnerability as one that is poorly defined, has no agreed metric and requires normative input for its assessment.

* Senior Research Fellow, Stockholm Environment Institute, Stockholm, Sweden. This paper was inspired by a question posed by Jan Cedergren, Chair of the Adaptation Fund Board. It is based on presentations I gave at the seminar “Mitigation of and Adaptation to Climate Change” organised by the Kyoto Sustainability Initiative (Kyoto, 25 March 2008), and at the “Resilience – Vulnerability Colloquium” organised by the Stockholm Resilience Centre (Stockholm, 10-11 April 2008). I thank the participants in both events for stimulating discussions. Thoughtful comments by Camilla Bausch, Jan Cedergren, Tom Downing, Jochen Hinkel, Juan Hoffmaister, Annett Möhner, Till Pastorius, Fiona Rotberg and Oskar Wallgren on earlier versions of this paper helped greatly to improve the exposition. Any remaining errors are mine.

II. Vulnerability: A Poorly Defined Concept without an Agreed Metric

The concept of “vulnerability” is central to both scientific and policy discussions on climate change. It has important communicative value: it describes in a powerful way that change is not always for the good. Vulnerability captures notions of possible loss, damage, and impact; of threat, risk, and stress; of uncertainty and insecurity; of a lack of power and control; and of a number of other factors that contribute to a feeling or state of being vulnerable. Unlike many other academic terms used to describe specific attributes of a system, the word vulnerability is also in widespread common use. As a result, most people have an intuitive understanding of what is meant when they read the scientific reports and policy documents in which the term appears. Unfortunately, people’s intuitive understandings are not always the same.

Vulnerability is not the only word used by academics and policymakers that can create confusion because of its common use. Many scientific disciplines use existing words to describe specific situations or characteristics. If these situations or characteristics can be observed, measured and compared objectively and quantitatively, confusion is usually limited. However, if no obvious metrics exist for a particular term, or existing metrics are contradictory, then the information conveyed by the term is bound to be ambiguous or inconsistent, unless there is widespread prior agreement about the term’s meaning.

“Welfare”, like vulnerability, is a term that people understand intuitively. Yet for an economist the term precisely describes one particular property of a society. Moreover, based on an agreed definition

of welfare, the economist has tools for measuring and comparing it and expressing it in a common metric (e.g. gross domestic product per capita). Similarly, “intelligence” is a concept, defined by cognitive scientists, for which a metric has been developed for its measurement and comparison (viz. intelligence quotient).¹ Researchers on vulnerability have not yet reached the point of their counterparts in economics or cognitive sciences: for vulnerability such operational definitions do not exist.²

Nonetheless, a quick glance at the recent literature shows that vulnerability has become a popular concept in a very diverse set of research fields. It includes studies of vulnerability to terrorism, to poverty, to computer viruses, to oil spills, to globalisation, to radiation, to SARS, to earthquakes, to financial collapse, to political change, and so on. According to the literature, households can be vulnerable, as can ecosystems, airplanes, urban infrastructure, carbon stocks, coastal zones, countries and companies. The two research fields that have dominated research on vulnerability, however, are natural hazards and climate change.

In 1976, well before there was widespread awareness of the potential adverse effects of climate change on nature and society, O’Keefe et al. introduced the notion of vulnerability to the natural-hazard community. They used it to point out that socio-economic conditions, rather than natural-system phenomena, are frequently the main causes of disasters.³ This point has since been reinforced by many, including Nobel Laureate Amartya Sen, who said: “[N]o substantial famine has ever occurred in any independent and democratic country with a relatively free press.”⁴

The term was introduced to the climate change community in the early 1990s. Fifteen years later Füssel and Klein found that the definition and interpretation of vulnerability had evolved over time, reflecting the different purposes for which vulnerability has been assessed.⁵ Initial vulnerability studies focused on the assessment of impacts. Results of these studies were used primarily to make the case for greenhouse gas emission reductions, because they showed what could be the consequences of climate change if it were allowed to continue unabated. Later studies analysed vulnerability with the aim of identifying options and strategies to adapt to the possible impacts of climate change, and thus reduce vulnerabili-

1 The use of the terms “welfare” and “intelligence” is for illustrative purposes only. The author is aware that there is ongoing scientific and public debate on the value and meaning of these concepts.

2 Karen O’Brien et al., “Why Different Interpretations of Vulnerability Matter in Climate Change Discourses”, 7 *Climate Policy* (2007), 73, at p. 74; Cezar Ionescu et al., “Towards a Formal Framework of Vulnerability to Climate Change”, 14 *Environmental Modeling and Assessment* (2009), pp. 1 et sqq., at p. 2.

3 Phil O’Keefe et al., “Taking the Naturalness Out of Natural Disasters”, 260 *Nature* (1976), 566, at pp. 566–567.

4 Amartya Sen, “Democracy as a Universal Value”, 10 *Journal of Democracy* (1999), pp. 3 et sqq., at pp. 6–7.

5 Hans-Martin Füssel and Richard J.T. Klein, “Climate Change Vulnerability Assessments: An Evolution of Conceptual Thinking”, 75 *Climatic Change* (2006), pp. 301 et sqq., at p. 324.

ty.⁶ More recently the capacity (of households, regions, sectors or countries) to adapt has become a focus of research.⁷

The Intergovernmental Panel on Climate Change now defines vulnerability as “the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes.”⁸ Unfortunately this is not an operational definition, and it provides no guidance to Parties to the UNFCCC on how to interpret Article 4.4 cited above. None of the research on vulnerability to date has resulted in a systematic and agreed way of assessing, measuring, expressing, and comparing the vulnerability of countries to climate change.⁹

III. The Legal Ambiguity

1. The Convention

In spite of its being poorly defined, the word “vulnerable” appears four times in the Convention; it is preceded by the adverb “particularly” three times.¹⁰ Its first mention is in the nineteenth preambular paragraph, which already appears to give at least a partial answer to the question of which countries are particularly vulnerable:

“Recognizing further that low-lying and other small island countries, countries with low-lying coastal, arid and semi-arid areas or areas liable to floods, drought and desertification, and developing countries with fragile mountainous ecosystems are particularly vulnerable to the adverse effects of climate change,”

The second mention is in Article 3.2, which is the principle that “[t]he specific needs and special cir-

cumstances of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change, and of those Parties, especially developing country Parties, that would have to bear a disproportionate or abnormal burden under the Convention, should be given full consideration.” The third mention is in Article 4.4, cited in the first paragraph of this paper, which can be considered as making the first part of Article 3.2 operational.

Article 4.8 of the Convention reiterates in part the nineteenth preambular paragraph, listing several groups of countries with “specific needs and concerns”:

“In the implementation of the commitments in this Article, the Parties shall give full consideration to what actions are necessary under the Convention, including actions related to funding, insurance and the transfer of technology, to meet the specific needs and concerns of developing country Parties arising from the adverse effects of climate change ... especially on:

- (a) Small island countries;
- (b) Countries with low-lying coastal areas;
- (c) Countries with arid and semi-arid areas, forested areas and areas liable to forest decay;
- (d) Countries with areas prone to natural disasters;
- (e) Countries with areas liable to drought and desertification;
- (f) Countries with areas of high urban atmospheric pollution;
- (g) Countries with areas with fragile ecosystems, including mountainous ecosystems.

...”

The group of least developed countries gets a special mention in the Convention.¹¹ Article 4.9 states that “[t]he Parties shall take full account of the specific needs and special situations of the least devel-

6 For example, Joel B. Smith and Stephanie S. Lenhart, “Climate Change Adaptation Policy Options”, 6 *Climatic Research* (1996), pp. 193 et seq.; Samuel Fankhauser, Joel B. Smith and Richard S.J. Tol, “Weathering Climate Change: Some Simple Rules to Guide Adaptation Decisions”, 30 *Ecological Economics* (1999), at p. 67; Ian Burton et al., “From Impacts Assessment to Adaptation Priorities: The Shaping of Adaptation Policy”, 2 *Climate Policy* (2002), at p. 145; W. Neil et al., “Adaptation to Climate Change in the Developing World”, 3 *Progress in Development Studies* (2003), at p. 179.

7 For example, Gary W. Yohe and Richard S.J. Tol, “Indicators for Social and Economic Coping Capacity: Moving Toward a Working Definition of Adaptive Capacity”, 12 *Global Environmental Change* (2002), at p. 25; Joel B. Smith, et al. (eds), *Climate Change, Adaptive Capacity and Development* (London: Imperial College Press, 2003); W. Neil Adger and Katherine Vincent, “Uncertainty in Adaptive Capacity”, 337 *Comptes Rendus Geoscience* (2005), at p. 399; Nick Brooks et al., “The Determinants of Vulnerability and Adaptive Capacity at the National Level and the Implications for

Adaptation” 15 *Global Environmental Change* (2005), at p. 151; Torsten Grothmann and Anthony Patt, “Adaptive Capacity and Human Cognition: The Process of Individual Adaptation to Climate Change”, 15 *Global Environmental Change* (2005), at p. 199.

8 Martin L. Parry et al. (eds), *Climate Change 2007: Impacts, Adaptation and Vulnerability, Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge: Cambridge University Press, 2007), at p. 883.

9 Put more boldly, this applies to the vulnerability of any type of entity to any type of stimulus.

10 The only time “vulnerable” appears without this adverb is in Article 4.10, which refers to Parties with economies that are vulnerable to the adverse effects of the implementation of measures to respond to climate change.

11 A total of 48 least developed countries are currently Party to the Convention.

oped countries in their actions with regard to funding and transfer of technology.”

2. The Kyoto Protocol and the Adaptation Fund

The Kyoto Protocol contains the word “vulnerable” once, in Article 12.8. This article provided the basis of what later became the Adaptation Fund:

“The Conference of the Parties serving as the meeting of the Parties to this Protocol shall ensure that a share of the proceeds from certified project activities [under the Clean Development Mechanism] is used to cover administrative expenses as well as to assist developing country Parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation.”¹²

Meanwhile, the question of which countries might be considered particularly vulnerable remained unsolved. The Adaptation Fund Board faced this issue in 2008 when preparing the Strategic Priorities, Policies and Guidelines of the Adaptation Fund.¹³ In Paragraph 10 it states:

“Eligible Parties to receive funding from the Adaptation Fund are understood as developing country Parties to the Kyoto Protocol that are particularly vulnerable to the adverse effects of climate change including low-lying and other small island countries, countries with low-lying coastal, arid and semi-arid areas or areas liable to floods, drought and desertification, and developing countries with fragile mountainous ecosystems.”

This is the same listing as in the UNFCCC preamble, but the additional word “including” implies that the possibility exists that countries not covered by the preamble could still be particularly vulnerable and therefore eligible for funding from the Adap-

tation Fund. An approach towards the prioritisation among eligible Parties is presented in Paragraph 16 of the Strategic Priorities, Policies and Guidelines of the Adaptation Fund. It lists seven criteria that “[t]he decision on the allocation of resources of the Adaptation Fund among eligible Parties shall take into account.” The first of these criteria is “Level of vulnerability”; other criteria include “Level of urgency and risks arising from delay” and “Adaptive capacity to the adverse effects of climate change.”

The Strategic Priorities, Policies and Guidelines of the Adaptation Fund do not provide further detail on the use of these seven criteria, and neither do the Draft Provisional Operational Policies and Guidelines for Parties to Access Resources from the Adaptation Fund, which are scheduled to be adopted at the seventh meeting of the Adaptation Fund Board, in September 2009.¹⁴

3. The Bali Action Plan and the Subsequent Negotiations

While the Adaptation Fund Board follows the UNFCCC preamble, in 2007 Parties had put forward a different grouping of “particularly vulnerable” countries in the Bali Action Plan.¹⁵ The Bali Action Plan launched “a comprehensive process to enable the full, effective and sustained implementation of the Convention through long-term cooperative action, now, up to and beyond 2012, in order to reach an agreed outcome and adopt a decision at its fifteenth session [in Copenhagen in December 2009].” The so-called Copenhagen Agreed Outcome is intended to shape international climate policy for many years to come, and the Bali Action Plan lists the issues Parties wish to see addressed in the outcome. These include:

- “1(c) Enhanced action on adaptation, including, inter alia, consideration of:
 - (i) International cooperation to support urgent implementation of adaptation actions ... taking into account the urgent and immediate needs of developing countries that are particularly vulnerable to the adverse effects of climate change, especially the least developed countries and small island developing States, and further taking into account the needs of countries in Africa affected by drought, desertification and floods;

¹² Note the presence of the definite article before “costs of adaptation”. In Article 4.4 of the Convention there is no definite article.

¹³ Decision 1/CMP.4, Adaptation Fund, FCCC/KP/CMP/2008/11/Add.2, 19 March 2009, at pp. 21–22.

¹⁴ Draft Provisional Operational Policies and Guidelines for Parties to Access Resources from the Adaptation Fund, AFB/B.6/5, Adaptation Fund Board, sixth meeting, Bonn, 15–17 2009.

¹⁵ Decision 1/CP.13, Bali Action Plan, FCCC/CP/2007/6/Add.1, 14 March 2008, at p. 3.

- ...
- (iii) Disaster reduction strategies and means to address loss and damage associated with climate change impacts in developing countries that are particularly vulnerable to the adverse effects of climate change.”

In Paragraph 1(c)(i) above, the word “especially” does not exclude the possibility of support to developing countries not listed here. However, it implies that a certain priority be given to the countries listed.

The Bali Action Plan established the Ad hoc Working Group on Long-term Cooperative Action under the Convention (AWG-LCA). During the negotiations under the AWG-LCA, some Parties challenged the implicit prioritisation in Paragraph 1(c)(i) and proposed ways of establishing the vulnerability of developing countries. Bangladesh, for example, proposed the development of a vulnerability index during discussions on the Adaptation Fund in Poznań in December 2008.¹⁶ Other Parties proposed alternative listings of countries, with reference to the Bali Action Plan, the UNFCCC preamble or Article 4.8, depending on which listing would ensure their inclusion.

The negotiating text prepared by the Chair of the AWG-LCA and discussed at its sixth session in June 2009 as the basis for a Copenhagen Agreed Outcome states that “[i]n prioritizing support, the level of vulnerability, determined by national circumstances, respective financial and technical capabilities, levels of risk and impacts as well as levels of poverty and climate change exposure, should be taken into account.”¹⁷ In addition to its focus on particularly vulnerable countries, the negotiating text also states that in providing support, priority shall or should be given to “particularly vulnerable

populations, groups and communities, especially the poor, women, children, the elderly, indigenous peoples, minorities and those suffering from disability.”¹⁸

The 199-page revised negotiating text, made available by the Chair of the AWG-LCA after the sixth session, still includes the text cited in the previous paragraph, as well as various alternatives.¹⁹ In total it contains 152 mentions of the word “vulnerable” and 42 of the word “vulnerability”. The phrase “particularly vulnerable” appears 90 times, and “particular vulnerability” once. The revised negotiating text reveals that Parties do not agree on what it means to be “particularly vulnerable” and how to decide which countries fall into this category. The idea of establishing a vulnerability index that can provide an “objective” answer is therefore increasingly viewed with interest. However, the remainder of this paper will explain that a vulnerability index will not resolve the ambiguity, because the “level of vulnerability” is not a measurable and quantifiable attribute that can be objectively determined.

IV. The Political Dimension to Establishing an Index

In the absence of an agreed method to measure vulnerability, the many facets to the concept give rise to many possible interpretations of what constitutes “particularly vulnerable”.²⁰ Different people have different views on how to consider, for example, risks to people’s lives and livelihoods, risks to ecosystems, and risks to infrastructure and economic assets. The ensuing ambiguity is reflected in the range of (mainly index-based) approaches developed by academics to compare and rank the vulnerability of countries.^{21 22}

16 Earth Negotiations Bulletin, COP14 #6, 6 December 2008, available on the Internet at: <<http://www.iisd.ca/download/pdf/enb12390e.pdf>>, at p. 1 (last accessed on 18 August 2009).

17 Negotiating Text, FCCC/AWG/LCA/2009/8, sixth session of the AWG-LCA, Bonn, 1–12 June 2009, para 33, at p. 15.

18 Ibid, para 31(c), at p. 15.

19 Revised Negotiating Text, FCCC/AWG/LCA/2009/INF.1, paras 31 and 33, at pp. 52–54.

20 For a detailed discussion see P. Mick Kelly and W. Neil Adger, “Theory and Practice in Assessing Vulnerability to Climate Change and Facilitating Adaptation”, 47 *Climatic Change* (2000), at p. 325; Jörn Birkmann (ed.), *Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societies* (Tokyo: United Nations University Press, 2006); Cezar Ionescu et al., “Towards a Formal Framework of Vulnerability to Climate Change”, 14 *Environmental Modeling and Assessment* (2009), at p. 1.

21 For an overview see W. Neil Adger et al., *New Indicators of Vulnerability and Adaptive Capacity*, Technical report 7 (Norwich: Tyndall Centre for Climate Change Research, 2004), at pp.13–28.

22 Examples of existing relevant indices include those developed by Jonathan P. Atkins, Sonia Mazzi and Christopher D. Easter, *A Commonwealth Vulnerability Index for Developing Countries: The Position of Small States*, Economic paper 40 (London: Commonwealth Secretariat, 2000); Richard H. Moss et al., *Vulnerability to Climate Change: A Quantitative Approach* (College Park, MD: Joint Global Change Research Institute, Battelle Pacific Northwest National Laboratory, 2001); Peter Lawrence et al., *The Water Poverty Index: An International Comparison*, Keele Economic Research Papers 2002/19 (Keele: Keele University, 2002); Ursula Kaly et al., *The Environmental Vulnerability Index (EVI)* (Suva: South Pacific Applied Geoscience Commission, 2004).

In spite of the academic effort to date, the political dimension of deciding which countries are particularly vulnerable (and thereby prioritised for funding) makes it unlikely that agreement will be reached on one common metric of vulnerability, and one approach to measure it.²³ This is not to say that measuring vulnerability is a futile exercise. However, a clear distinction must be made between the positive and the normative steps involved in assessing and measuring vulnerability.²⁴ Identifying countries that are particularly vulnerable to the adverse effects of climate change involves two normative steps. Decisions are needed on:

- the factors to be considered in measuring countries' vulnerability (as well as other methodological aspects, such as attaching relative weights to these factors);
- the criteria to be applied in establishing what constitutes "particularly vulnerable" (e.g. an index value above a certain agreed threshold).

One way of ensuring that the academic and political challenges of measuring vulnerability are not confused is for the negotiators to assume responsibility for decisions on these two politically sensitive steps, rather than to expect independent experts to provide a solution to which all Parties can agree. Parties are not unfamiliar with the use of indices to inform resource allocations, as shown in the remainder of this section. Experience with indices in the Resource Allocation Framework, in the classification of least developed countries, and in the use of the Human Development Index may inform negotiations on the level of vulnerability of developing country Parties.

1. The Resource Allocation Framework

In accordance with Article 11.1 of the Convention, the Global Environment Facility (GEF) is an entity entrusted with the operation of the financial mechanism of the Convention. Under the Resource Allocation Framework (RAF) designed by the GEF, resources are being allocated to countries based on their potential to generate global environmental benefits and their capacity, policies and practices successfully to implement GEF projects. The RAF is based on two indices: the GEF Benefits Index and the GEF Performance Index.

For climate change, the GEF Benefits Index seeks to measure the potential global benefits that can be realised from climate change mitigation activities in a country (i.e. it does not apply to adaptation activities).²⁵ It combines baseline greenhouse gas emissions for the year 2000 in tons of carbon equivalent with a carbon intensity adjustment factor computed as the ratio of the carbon intensity in 1990 to the carbon intensity in 2000. The GEF Performance Index seeks to measure each country's capacity to implement successfully GEF programmes and projects based on its current and past performance.²⁶ It is composed of a portfolio performance indicator, a country environmental policy and institutional assessment indicator, and a broad framework indicator.²⁷

The RAF was proposed to facilitate objective and transparent decisions on a politically sensitive issue. However, there has been much criticism on the framework.²⁸ Mace states that "prior to its adoption, the proposed RAF was heavily criticised by both developed and developing countries for

23 For an extension and elaboration of this argument, see Jon Barnett et al., "The Hazards of Indicators: Insights from the Environmental Vulnerability Index", 98 *Annals of the Association of American Geographers* (2008), at p. 102.

24 Thomas E. Downing et al., *Vulnerability Indices: Climate Change Impacts and Adaptation*, (Nairobi: United Nations Environment Programme, 2001), at pp. 8–9; Jochen Hinkel, *Transdisciplinary Knowledge Integration: Cases from Integrated Assessment and Vulnerability Assessment*, Ph.D. thesis (Wageningen: Wageningen University, 2008), at pp. 34–37.

25 GEF, *GEF Benefits Index of Climate Change (GBICC)* (Washington, DC: Global Environment Facility, undated), available on the Internet at: <http://www.gefweb.org/uploadedFiles/Policies/Resource_Allocation_Framework/GEF-4_Indicative_Allocations/GBI_Climate_Change.pdf> (last accessed on 18 August 2009).

26 GEF, *GEF Performance Index* (Washington, DC: Global Environment Facility, undated), available on the Internet at: <http://www.gefweb.org/uploadedFiles/Policies/Resource_Allocation_Framework/GEF-4_Indicative_Allocations/GPI.pdf> (last accessed on 18 August 2009).

27 More details on the RAF can be found at: <http://www.gefweb.org/interior_right.aspx?id=82> (last accessed on 18 August 2009).

28 Detailed comments are presented by Mary Jane Mace, "Funding for Adaptation to Climate Change: UNFCCC and GEF Developments Since COP-7", 14 *Review of European Community and International Environmental Law* (2005), pp. 225 et seq., at pp. 243–245; Glenn M. Wiser, *Legal Analysis of the GEF Resource Allocation Framework* (Washington, DC: Center of International Environmental Law, 2007), at pp. 30–60; GEF Evaluation Office, *Mid-Term Review of the Resource Allocation Framework, GEF/ME/c.34/2* (Washington, DC: Global Environment Facility, 2008), at pp. 14–21.

seeking to use indicators (in effect, eligibility criteria for GEF funding) that have not been expressly agreed by the various convention COPs.” At the 25th GEF Council Meeting in June 2005, countries raised strong objections to the proposal of a RAF.²⁹ Among other things, they stated:

“We specifically oppose the ranking and categorization of recipient countries through non-transparent assessments based on questionable criteria. GEF resources should not be pre-allocated on such a basis.”

The mid-term review of the framework by the GEF Evaluation Office concludes that “what could have been a relatively straightforward performance-based allocation system has evolved into a complex framework.” It also concludes that the complexity of implementation rules in the RAF does not provide encouragement for flexible and dynamic use of resources. And while it states that data and indicators for assessing global environmental benefits reflect the best available information today, it recommends improvement of the global benefits indices and their weights.

On adaptation, the mid-term review notes the following:

“On climate change, adaptation and vulnerability to climate change are not reflected in the indices. International experts strongly agree that more should be done to balance funding between adaptation and mitigation in developing countries. However, no agreement emerged on an internationally agreed best practice or standard to reflect the scale of vulnerability or adaptation needs.”

An additional difficulty is that while the performance of mitigation can be expressed in a common metric (avoided CO₂-equivalent), there is no agreed metric to express the performance of adaptation.

2. Least Developed Countries

Another example of the use of indices with which Parties may be familiar is the definition of the group of least developed countries (as in Article 4.9). A country is designated as a “least developed country” on the basis of three criteria, designed to measure a country’s state of development.³⁰

- its income level, measured by gross national income per capita;
- its stock of human assets, measured by a human assets index;
- its economic vulnerability, measured by an economic vulnerability index.

The original economic vulnerability index combined export concentration, the instability of export earnings, the instability of agricultural production, the share of manufacturing and modern services in gross domestic product, and population size. The proportion of people displaced by natural disasters was added in 2003; remoteness from world markets was added in 2006.^{31 32}

As outlined above, least developed countries are sometimes explicitly included in the group of countries considered to be particularly vulnerable to climate change. Yet the definition of “least developed countries” is itself based in part on a measure of vulnerability (i.e. economic vulnerability). It is unclear how the two types of vulnerability are assumed to influence one another, but the existence of multiple and nested indices may create a risk of circular reasoning on vulnerability.

3. The Human Development Index

In addition to the human assets index and the economic vulnerability index both used to define the group of least developed countries, there are very few indices that are sufficiently uncontested to be of widespread use in international policy processes (including resource allocations). The Human Development Index (HDI) is one such index, although it is not often referred to within the context of the UNFCCC. It combines normalised measures of life expectancy, literacy, educational attainment, and

29 Contained in Annex A (untitled) of Joint Summary of the Chairs, 1 July 2005 (revised), GEF Council Meeting, Washington, DC, 3–8 June 2005, at p. 19.

30 UNCTAD, *The Least Developed Countries Report 2008: Growth, Poverty and the Terms of Development Partnership* (New York, NY and Geneva: United Nations, 2008), at iii.

31 For more information on the economic vulnerability index see Patrick Guillaumont, *An Economic Vulnerability Index: Its Design and Use for International Development Policy*, Research paper no. 2008/99 (Helsinki: United Nations University World Institute for Development Economics Research, 2008).

32 Details on all criteria for identifying least developed countries can be found at: <<http://www.un.org/esa/policy/devplan/profile/criteria.html>> (last accessed on 18 August 2009).

gross domestic product per capita for almost all countries in the world. Since 1990 it has been reported annually by the United Nations Development Programme in its Human Development Reports.³³ Given the widely recognised link between a country's development status and its vulnerability to climate change (both in the academic literature and in the negotiations under the Convention), the HDI may also be considered when defining countries as particularly vulnerable. However, the HDI does not consider the biogeographical characteristics of countries that may cause them to be particularly vulnerable (e.g. small islands, countries affected by drought, floods and desertification).

V. Discussion and Conclusions

"Vulnerability" is a multi-dimensional concept for which there is no broadly agreed operational definition, and no common metric to express it. As a result, it is *technically* difficult to compare countries with different levels of vulnerability. In addition, due to the normative judgment required in the assessment of vulnerability, it is also *politically* difficult to agree on a method that would allow for such comparisons and for the identification of countries that are particularly vulnerable to the adverse effects of climate change. Academics' attempts at ranking countries on the basis of their vulnerability to climate change³⁴ have been inconclusive or contradictory, and none have been used to inform resource allocation decisions. While there are calls for the development and use of a vulnerability index to guide the prioritisation of countries, it is unlikely that Parties could reach agreement on any proposed approach to the comparative assessment of countries' vulnerability to climate change. Any resulting ranking is likely to be contested by countries that, according to the ranking, are not particularly vulnerable and therefore not prioritised for adaptation funding.

The preamble of the Convention recognises certain groups of countries as particularly vulnerable on the basis of their biogeographical characteristics.

The same groups of countries are also eligible for funding from the Adaptation Fund, although the wording of the Strategic Priorities, Policies and Guidelines does not exclude the eligibility of other developing countries. The Bali Action Plan identifies as particularly vulnerable the least developed countries, small island developing states, and countries in Africa affected by drought, desertification, and floods, thus using a combination of socio-economic and biogeographical characteristics. The negotiating text presented by the AWG-LCA Chair contains an implicit definition of vulnerability. It suggests that a country's level of vulnerability is determined by national circumstances, respective financial and technical capabilities, levels of risk and impacts, and levels of poverty and climate change exposure.³⁵ In principle these factors can all be combined in an index, although there are many possible ways of doing so.

The Resource Allocation Framework of the GEF demonstrates the difficulty in reaching agreement on the use of indicators and indices for the purpose of allocating resources for mitigation activities. It suggests that the political dimension involved in the development and use of indices to support or justify funding decisions presents a major challenge to the acceptability of any index. There is no indication that it will be less difficult for Parties to agree on or accept a vulnerability index to guide resource allocation decisions for adaptation.

The ambiguity surrounding the questions of which countries are particularly vulnerable and how to determine this is at the heart of the political problem of prioritisation. This paper does not offer a solution to this problem. Instead it emphasises that negotiators would be misguided if they think they can rely on external experts to develop a definitive, objective and unchallengeable method to rank countries according to their vulnerability to climate change. There is no objectivist "truth" in vulnerability assessment; any agreed approach will have to be the socially constructed outcome of a negotiation process. Academics and other external experts may well provide input into this process, but eventually it requires normative decisions on how vulnerability is defined, what constitutes "particular vulnerability", and which countries can be designated as such. These normative decisions represent a negotiated compromise of different and biased interpretations of vulnerability. Such negotiation is the work of politicians, not of academics.

33 UNDP, Human Development Indices: A Statistical Update (New York, NY: United Nations Development Programme, 2008).

34 Including those listed in footnote 22.

35 Negotiation Text, FCCC/AWGLCA/2009/8, sixth session of the AWG-LCA, Bonn, 1–12 June 2009, para 33, at p. 15.