



Background Paper

Development Aid in a Changing Climate: The Challenge of Fragility in the Least Developed World

Publication No. 2010-12-E
26 February 2010

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***Development Aid in a Changing Climate:
The Challenge of Fragility in the Least Developed World
(Background Paper)***

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DEVELOPMENT AID IN A CHANGING CLIMATE: THE CHALLENGE OF FRAGILITY IN THE LEAST DEVELOPED WORLD

1 INTRODUCTION

On 12 January 2010, a magnitude 7.0 earthquake struck near Haiti's capital city, Port-au-Prince, causing enormous social and economic damage. Shortly after the incident, news reports announced outbreaks of violence which were attributed to water and food scarcity, and officials warned of rising tension that could lead to street battles.¹ On 16 January, Canadian Prime Minister Stephen Harper said the quake virtually wiped out international attempts to improve life for the Haitian people, and that development efforts would have to start from scratch.² Official development assistance to Haiti had increased considerably in the years prior to the earthquake, totalling US\$580 million in 2006, US\$702 million in 2007, and US\$912 million in 2008.³ The devastating impacts of the earthquake raise a question that resonates across many parts of the least developed world: Is enough official development assistance being invested to build resilience to unpredictable natural disasters?

Haiti is one of 49 least developed countries (LDCs)⁴ prone to environmental changes and disasters.⁵ The United Nations Framework Convention on Climate Change deems the LDCs to be the most susceptible to the adverse effects of climate variability⁶ and change,⁷ owing largely to their vulnerable geographic locations and low adaptive capacity.⁸ (In contrast, the LDCs contribute the least to global greenhouse gas emissions.)⁹ How vulnerable is the least developed world to climate variability and change, and what impact does this vulnerability have on the rest of the international community?

Several attempts have been made to draw attention to the vulnerable situation of the LDCs, in terms of both development and climate change adaptation. In 2000, 152 heads of state signed the United Nations Millennium Declaration, recognizing the special development needs of the least developed world and pledging to increase development assistance to the LDCs.¹⁰ In 2001, the Marrakech Accords developed under the United Nations Framework Convention on Climate Change established the LDC Fund and LDC Expert Group to help prepare and implement National Adaptation Programmes of Action. These programs are intended to identify priority activities that respond to the "urgent and immediate" needs of the LDCs with regard to climate adaptation.¹¹ Moral and humanitarian considerations aside, are there other reasons for the international community to pay attention to the issues facing the world's most troubled societies?

Presented in this document is a brief examination of the impacts of climate variability and change on socio-economic stability in the least developed world, followed by a broad analysis of some of the major implications for the rest of the international community of heightened fragility in the LDCs, and finally, a summary of the key

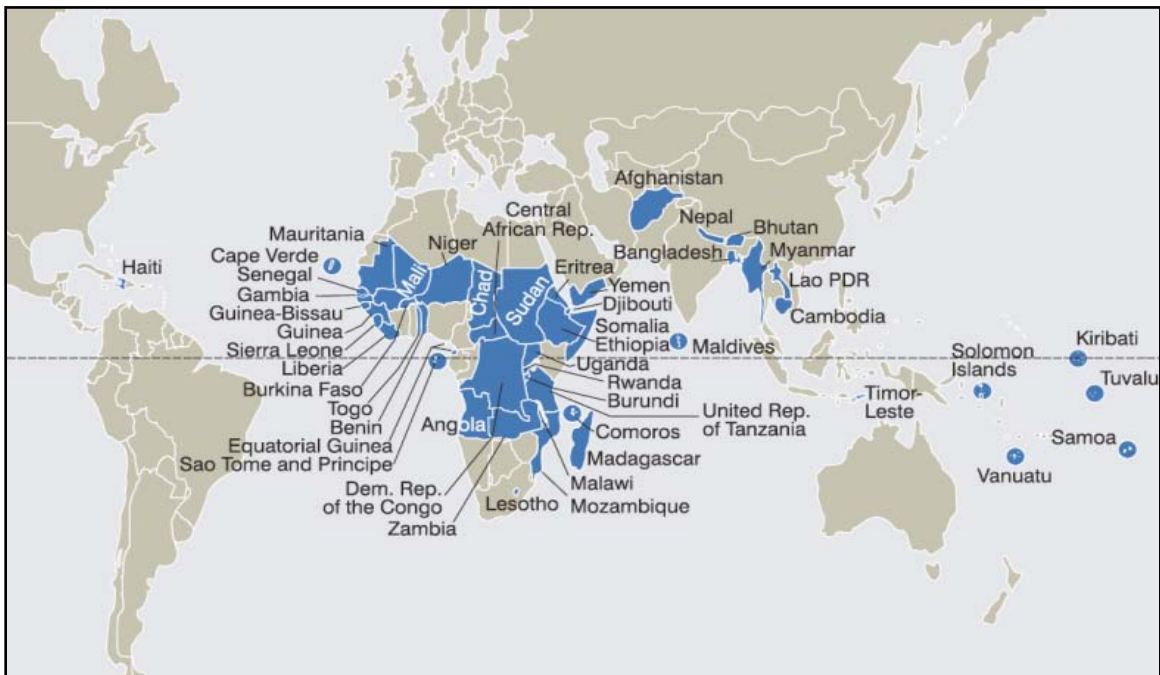
benefits and challenges involved in making climate adaptation an essential component of development assistance.

2 CLIMATE CHANGE IN THE LEAST DEVELOPED COUNTRIES

The Intergovernmental Panel on Climate Change (IPCC) maintains that the LDCs have a low adaptive capacity to climate variability and change because they lack the necessary resources, finances and institutions to implement effective adaptation measures.¹² For example, in 2004, the LDCs represented only 0.6% of the global gross domestic product (GDP), but accounted for 11.3% of the world population.¹³ Nearly 50% of LDC inhabitants live on less than \$1 a day, only 58% have access to improved water sources, and about 19% live in poor housing conditions. The LDCs also have the highest average population growth in the world (5%, compared to 1.2% in developing countries), which further exacerbates their susceptibility to climate variability and change.¹⁴

The impacts of climate variability and change within the least developed world vary according to geographic, socioeconomic, and political conditions, requiring in-depth, context-specific analysis beyond the scope of this document. Drawing on evidence from the IPCC's Fourth Assessment Report, the following sections present only a broad analysis of key past, present and future socioeconomic sensitivities to climate variability and change in regions with the highest concentration of LDCs: sub-Saharan Africa, South and Southeast Asia and Small Islands in the Caribbean and the Pacific (Figure 1).

Figure 1 – The 49 Least Developed Countries and Cape Verde^a



^a Cape Verde graduated from LDC status in December 2007.

Source: United Nations Council on Trade and Development, [Statistical Profiles of the Least Developed Countries](#), 2005, p. 4.

2.1 SUB-SAHARAN AFRICA

The IPCC considers sub-Saharan Africa to be among the most vulnerable regions to climate variability and change.¹⁵ This is largely due to the region's poor adaptive capacity, owing to multiple factors, including endemic poverty; limited access to improved water sources; food and energy insecurity exacerbated by population growth; poor sanitation and health conditions; limited access to capital; and complex governance issues and socio-political conflicts. Since the 1960s, sub-Saharan Africa has been experiencing a greater warming trend, except around the coast and inland lakes of eastern Africa, where decreasing temperatures have been more prevalent. Changes in seasonality, interannual variability in rainfall patterns, and weather extremes have also been observed in different parts of the continent.

The day-to-day economic development of sub-Saharan Africa is largely dependent on the region's climate, particularly within the agricultural and water resources sectors. For instance, droughts during the mid-1980s caused economic losses totalling several hundred million US dollars, mainly in southern Africa, the Sahel and the Somali Peninsula. In West Africa, rainfall declines from the 1970s to the 1990s caused the Sahelian, Sudanese and Guinean ecological zones to shift southward by 25 to 35 km. Furthermore, climate variations – in addition to a range of other causal factors such as poverty, poor drug treatment and land-use change – have been linked to the spread of a number of diseases, including malaria, cholera and meningitis. Malaria is a leading cause of death in Africa, estimated to kill 525,000 to 2.025 million African children annually, and to cause an average 1.3% reduction in economic growth for countries with the highest burden of the disease.

Given the poor adaptive capacity of sub-Saharan Africa, future climate change is expected to further exacerbate the region's socioeconomic vulnerabilities. Examples of the projected impacts include sea-level rise and increased risk of flooding in coastal areas; additional changes in rainfall patterns and water availability; heightened water stress and food insecurity in some regions; further deterioration of fish stocks and agricultural lands (e.g., 2% to 4% agricultural GDP losses are projected in western and central Africa by 2100); expansion of malaria transmission zones southward and in east African highlands; and other ecosystem changes with wide socioeconomic impacts.

2.2 SOUTH AND SOUTHEAST ASIA

South and Southeast Asia are populous regions susceptible to natural disasters such as floods and cyclones (about 42% of the world's tropical cyclones occur along the coastlines of monsoon Asia).¹⁶ In recent years, rising temperatures and rainfall variability in both regions have increased the frequency and severity of extreme weather events in some areas. For example, Southeast Asia experienced a decadal increase of 0.1 to 0.3 °C between 1951 and 2000, and a decline in the number of rainy days between 1961 and 1998. In the past 20 years, changes in extreme weather events have also been associated with El Niño.¹⁷ Diseases such as cholera, hepatitis, malaria and dengue fever have been linked to both climate-related and

non-climatic factors (e.g., rainfall, severe floods, El Niño–related droughts, poverty, poor sanitation, and poor access to safe drinking water).

The economies of South and Southeast Asia are highly dependent on agriculture and natural resources, and are therefore vulnerable to climatic and environmental conditions. In recent years, agricultural production in many parts of Asia has declined because of increasing water stress, owing partly to the effects of climate change (e.g., rising temperatures, reduced rainfall, and increased frequency of El Niño). For instance, in the past decade, an increased number of droughts in Southeast Asia triggered fires that burnt approximately 3 million ha of peatland, and caused crop failures and mass starvation. In addition, coastal erosion attributed to sea-level rise has led to loss of lands at different rates across the continent. Other anthropological factors such as rapid urbanization, population growth and inefficient resource management are further eroding the region's ecological wealth.

Given the susceptibility of the region's highly populated mega-deltas¹⁸ to sea-level rise, the IPCC predicts additional climate-induced financial and social impacts for South and Southeast Asia. Population growth is expected to increase the strain on natural resources, heightening the risk of regional instability and conflict. This is of particular concern in South Asia, where India, Pakistan and Bangladesh alone are expected to augment the region's population by an estimated 900 million over the next 50 years.

2.3 SMALL ISLANDS

Small islands have characteristics that make them especially vulnerable to the effects of climate change, sea-level rise, and extreme events.¹⁹ They are also prone to natural hazards, which have generally increased in intensity and duration since the 1970s. Over the 20th century, sea levels have experienced an average mean relative rise of 1 and 1.6 mm per year in the Caribbean and Pacific regions respectively, according to some measurements.

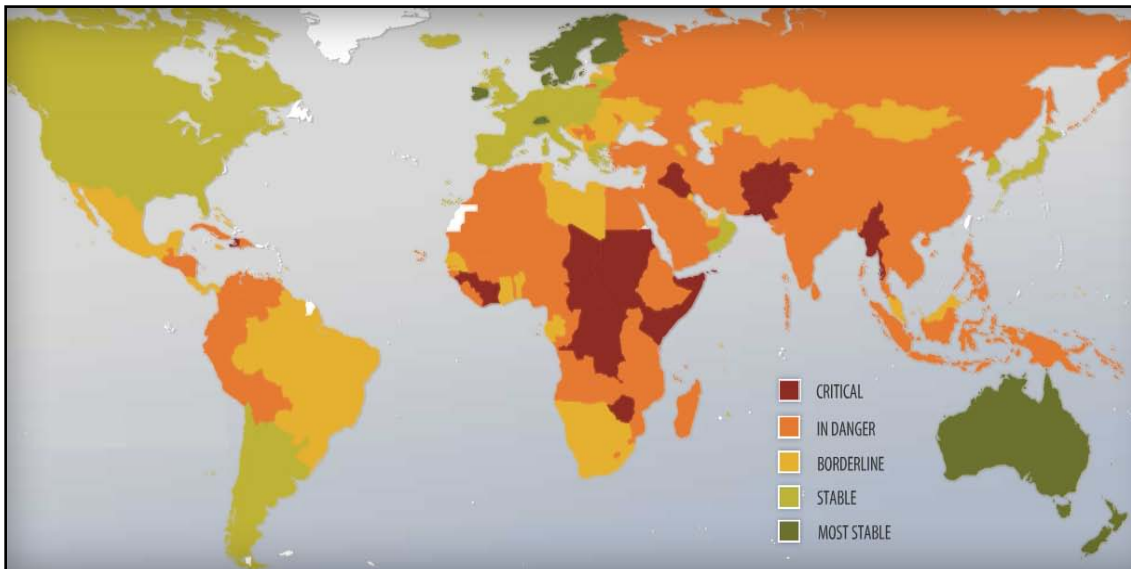
Small islands are dependent on limited freshwater sources and natural resources (particularly coastal resources), with most settlements, urban centres and institutions concentrated along coastal zones. Rapid and unplanned movements of inland farmers to coastal settlements are undermining urban conditions and making many islanders more vulnerable to physical and biological hazards such as tropical cyclones and diseases. This situation is exacerbated by a range of factors, including pollution, over-fishing, rapid population growth, unemployment, political instability, and a widening gap between rich and poor. In some ways, globalization too has increased the vulnerability of some island states by introducing additional external stresses, including energy costs, population movements, terms of trade, and susceptibilities to international and financial crises. On the other hand, globalization has also had positive effects, for instance, by increasing the connectivity of small islands to the rest of the world.

Future climate change is expected to intensify ecological challenges on small islands, for example, by triggering more sea-level rise, and as a result, increasing coastal erosion, saline intrusion into freshwater sources, and the risk of floods.

3 LOCAL STRAINS, GLOBAL IMPACTS

State fragility²⁰ is common across the least developed world, as demonstrated by a number of indices. The Country Indicators for Foreign Policy 2007 fragility index²¹ classifies 37 of the 49 LDCs among the world's 50 most fragile states.²² Similarly, other more frequently cited indices, such as the Human Development Index²³ and the Failed States Index, consistently classify the LDCs among the least privileged, drawing further attention to the least developed world. Forty-one of the 49 LDCs are among the 50 states with the lowest Human Development Index, and 31 LDCs are among the 50 states most at risk of failure, according to the Failed States Index. As Figure 2 demonstrates, sub-Saharan Africa, which has the highest concentration of LDCs, also has the highest concentration of states with a "critical" Failed States Index.²⁴ It is important to note, however, that considering the diverse characteristics that distinguish the vulnerabilities of individual societies, the fragility of a given state is subjective and cannot be adequately determined by any single indicator.

Figure 2 – Failed States Index 2009



Source: Adapted from Foreign Policy, *The Failed States Index 2009*.

The previous section outlined how different geographies and socioeconomic environments contribute to dissimilar vulnerabilities to climate variability and change across the least developed world. Similarly, different social groups within a given society experience disproportional impacts according to factors such as age, gender, health, mobility, social status, and access to wealth.²⁵ In many ways, the disparate impacts of climate variability and change act as magnifiers of state fragility in the LDCs, and can damage social cohesion, particularly in states where governance and institutions are already weak.²⁶ Such local fragility can have regional and international impacts, as demonstrated in the following sections.

3.1 SECURITY

The IPCC maintains that many socio-political disasters are caused partly by an environmental stressor (e.g., natural resource scarcity or natural disasters) combined with other factors such as disease, conflict and other long-term or “creeping” factors (e.g., economic degradation).²⁷ For example, the history of social unrest in Haiti has been partly attributed to the country’s depleted post-colonial ecological conditions – including widespread deforestation and soil erosion – which have contributed to national poverty and to an unstable and violent political culture.”²⁸ Similarly, the civil war in Darfur is deemed to have its roots in resource scarcity, namely water shortages and reduced grazing rights. According to an Institute for African Alternatives publication, the war began as a medium intensity conflict, in 1985, at the height of a widespread drought in Darfur.²⁹ Traditionally, fur farmers, who owned a share of the livestock cared for by Zaghawa and Meheria herders, allowed the herders to enter the Marrah Mountains during poor grazing periods (December to April/May) to enrich the soil with animal droppings. When the animals began to die during the drought, the farmers withdrew and sold their livestock and subsequently refused the herders entry into the mountain. The situation triggered conflict that eventually escalated to full-scale civil war.

Likewise, armed conflict is induced by the availability of high-value resources, such as the blood diamonds of Sierra Leone and the gold, tantalum and cassiterite of the Democratic Republic of Congo. In regions where “conflict items” are already a concern, adding conflict over basic human needs could intensify existing instability.

The authors of a 2008 United Nations University publication argue that while non-violent conflict is a normal facet of political and social life in all states, organized large-scale violence is a “symptom” rather than a “cause” of fragility, and is therefore best prevented by addressing its causal factors (i.e., the causes of state fragility). When violence does occur, “it is usually too late to respond effectively except through costly operational responses such as military intervention.”³⁰ This is consistent with the prevention paradigm advocated by the International Institute for Sustainable Development, which maintains that preventive action against conflict is more economically efficient than reactive action and can be achieved partly through environmental management and sustainable development.³¹

Table 1 presents estimates of the cost of intervention to the international community in past conflicts within four LDCs: Cambodia, Haiti, Rwanda and Somalia. All four cases have caused spill-over problems affecting the security and economies of neighbouring countries.

Table 1 – Cost of Conflict to Outside Powers

	Cambodia (Post-Cold War)	Haiti (1990s)	Rwanda (1994-1995)	Somalia (1990-1995)
Total cost (US\$ billions)	12	5	4.5	7.3

Source: Table prepared by the author using data obtained from Michael E. Brown and Richard N. Rosecrane, eds., *The Costs of Conflict: Prevention and Cure in the Global Arena*, Carnegie Commission on Preventing Deadly Conflict, Carnegie Corporation of New York.

Table 2 shows the degree to which international peacekeeping expenditure in the LDCs, not including official development assistance, increased between 2000 and 2008.³²

Table 2 - International Peacekeeping Expenditures in the Least Developed Countries, 2000-2008 (US\$ millions)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Burundi	-	-	-	40	304	239	118	-	32
Central African Republic and Chad	-	-	-	-	-	-	-	182	301
Congo, Dem. Rep.	246	389	480	636	901	1,055	1,085	1,116	1,191
Darfur	-	-	-	-	-	-	-	1,276	1,500
Eritrea	164	185	210	184	180	156	126	113	100
Haiti	-	-	-	35	377	480	484	535	575
Liberia	-	-	-	548	741	707	676	688	604
Sierra Leone	521	618	603	449	265	86	-	-	24
Sudan	-	-	-	-	219	801	990	846	821
Timor-Leste	528	454	288	196	82	2	147	153	173
<i>Total (US\$ millions)</i>	<i>1,459</i>	<i>1,646</i>	<i>1,581</i>	<i>2,088</i>	<i>3,069</i>	<i>3,526</i>	<i>3,626</i>	<i>4,909</i>	<i>5,321</i>

Source: Table prepared by the author using data obtained from Organisation for Economic Co-operation and Development, [Aid to fragile states: Focus on Haiti](#).

In Canada, preliminary estimates of the total incremental costs³³ from 2001-2002 to 2007-2008 for the Afghanistan mission – which has been a foreign policy priority since 2001 – range from \$7.66 billion to \$10.47 billion, according to the Office of the Parliamentary Budget Officer. The Office states that about \$5.8 billion to \$7.42 billion was spent on military operations, \$0.84 billion to \$2.08 billion on veteran benefits, and \$0.97 billion on foreign aid.³⁴

The international community may manage conflict in fragile states in a number of ways, ranging from early conflict prevention to peacemaking (military intervention) to post-conflict peacekeeping.³⁵ Any decision to provide assistance or intervene in an existing conflict is shaped by a host of political, humanitarian and economic factors, and can lead to varying degrees of benefits, risks and uncertainties that must be weighed carefully. Outside powers could also choose the no-response (or disengagement) option, which may be especially attractive in cases where intervention is perceived to be too risky or not worth the expenses. On the other hand, disengagement from crises that may seem geographically isolated could result in adverse costs to other societies. Consider, for example, the potential consequences of heightened instability anywhere in a world of interdependent trade links, borderless organizations (e.g. nongovernmental organizations and advocacy groups), and real time global communication (e.g., BlackBerries). Similarly, consider the consequences in multicultural societies. The following sections address two prominent considerations in this regard: migration and trade.

3.2 MIGRATION

Local instability raises the risk of humanitarian crises and heightens concerns over refuge and resettlement. According to figures published by the United Nations High Commissioner for Refugees (UNHCR), the LDCs generated about 11.55 million people “of concern”³⁶ in 2007, over 4.57 million of whom were refugees (see Appendix A). Four conflict zones alone (Afghanistan, Myanmar, Somalia and Sudan) accounted for 67% of these refugees. The same year, the total number of refugees from all countries worldwide amounted to approximately 9.68 million.³⁷

At the 1995 climate change conference in Berlin, following a series of devastating floods and typhoons in Bangladesh, Atiq Rahman of the Bangladesh Centre for Advanced Studies stated: “If climate change makes our country uninhabitable, we will march with our wet feet into your living rooms.”³⁸ Climate change is expected to result in forced migration³⁹ and increase the number of environmentally displaced persons,⁴⁰ who, according to the UNHCR, totalled an estimated 24 million in 2002.⁴¹ Most observers predict between 150 million and 200 million forced migrants due to climate-related events by 2050.⁴²

As discussed in the previous section, environmental stressors in fragile states could heighten instability and potential conflict. This could in turn create circumstances where civilians are compelled to undertake great risks in search of asylum in another country – a situation that could be unfavourable for both asylum-seekers and their potential host country. For example, in the winter of 1991–1992, nearly 40,000 “boat people” tried to escape Haiti’s political turmoil by sea towards the United States. Many drowned, and most survivors were initially redirected by the Coast Guard to the US naval bay at Guantanamo Bay in Cuba where they were interviewed to determine whether they were seeking political asylum or simply escaping poverty. As the Guantanamo facilities became overloaded with refugee claimants, the US government ordered the Coast Guard to return all boat people to Haiti, regardless of their status. The issue came before the US Supreme Court following allegations that the government had violated the 1951 Convention Relating to the Status of Refugees (known as the Geneva Convention), which was established in the aftermath of World War II⁴³ to protect the right of refugees⁴⁴ to be granted asylum outside their home country if they have a valid fear of persecution (known as the principle of *non-refoulement*). In June 1993, the Court ruled in favour of the government’s position that the Convention applied only to refugee claimants who had already managed to reach US soil.⁴⁵

Similarly, the Australian “Pacific Solution” was introduced in 2001 to process on foreign soil asylum seekers arriving through the Indian Ocean. The policy was triggered when a Norwegian freighter rescued 433 boat people (mostly Afghans) who were subsequently denied permission to disembark in Australia. After New Zealand accepted 131 of the asylum seekers as refugees, Australia redirected the remaining individuals to Australian-funded camps on Manus Island in Papua New Guinea and in the small island state of Nauru. Until the policy ended in 2008, the widely criticized Pacific Solution diverted over 1,600 boat people of various origins, including Afghans, Burmese, Indonesians, Iraqis and Sri Lankans. According to UNHCR spokesperson Jennifer Pagonis, “many bona fide refugees caught by the policy spent long periods of

isolation, mental hardship and uncertainty – and prolonged separation from their families.”⁴⁶

Canada’s current inland refugee system does not recognize climate migrants; however, when justified by humanitarian and compassionate considerations, discretionary power can be used to accept asylum seekers in “compelling and exceptional circumstances.”⁴⁷ A worldwide increase in the number of environmentally displaced persons and the possible increase in the number of political asylum seekers because of the indirect consequences of climate change (e.g., due to instability and conflict as discussed previously) are likely to strengthen the humanitarian (and possibly political) motives to admit more displaced migrants into Canada. Refugees have made many contributions to Canadian society; however, they also come with economic and social costs (e.g., healthcare, education, and other forms of social assistance).

3.3 TRADE

Local or regional instability may disrupt businesses and trade links, for instance, by cutting off supply chains, damaging infrastructure or leading to inhospitable business environments.⁴⁸ Despite the fact that the LDCs represent less than 1% of the world GDP, many have a wealth of natural resources and raw materials, and contribute to major global industries, particularly energy and mining. Table 3 presents the exports of the LDCs to the European Union, Asia, Australia and North America in 2008 (country breakdown available in Appendix B). Between 2001 and 2004, foreign direct investment in the least developed world increased from \$6.8 billion to \$10.7 billion, 70% of which was concentrated in six oil-producing countries: Angola, Chad, Equatorial Guinea, Mauritania, Sudan and Yemen.⁴⁹

Table 3 – Imports of the European Union-27, Asia, Australia and North America from the LDCs in 2008

	European Union (27) ^a	Asia and Australia ^b	North America	World
Agricultural products				
Value (US\$ millions)	4,616	6,192	806	11,613
Share of total imports	2.02%	1.78%	0.28%	0.93%
Fuels and mining products				
Value (US\$ millions)	20,557	59,777	29,594	109,928
Share of total imports	9.01%	17.16%	10.17%	8.83%
Manufactured products				
Value (US\$ millions)	11,359	2,991	9,224	23,575
Share of total imports	4.98%	0.86%	3.17%	1.89%

- a. Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.
- b. Australia, China, Hong Kong (China), India, Indonesia, Japan, Malaysia, New Zealand, Pakistan, Philippines, Singapore, Taipei Chinese and Thailand.

Source: Table prepared by the author using data obtained from World Trade Organization, [World trade developments in 2008](#), Table I.9.

4 MAINSTREAMING CLIMATE ADAPTATION INTO DEVELOPMENT STRATEGIES

The Organisation for Economic Co-operation and Development (OECD) maintains that climate change is a long-term threat that may jeopardize international development efforts and objectives. “Development-as-usual” risks contributing to climate vulnerabilities if it fails to account for future ecological changes and potential natural hazards, for instance, by triggering human settlement in areas facing an increasing risk of natural hazards. Climate adaptation⁵⁰ is therefore critical to the economic and social dimensions of sustainable development and needs to be “mainstreamed” into regular development strategies (i.e., “implemented as part of a broader suite of measures within existing development processes and decision cycles.”)⁵¹ In agricultural development, for instance, climate adaptation can be mainstreamed by incorporating climate-proof farming practices and land-use at the community level, adapting sectoral policies to account for possible crop changes at the legislative level, and introducing climate-sensitive poverty alleviation strategies at the national and international levels.

An OECD policy brief argues that while naturally occurring hazards could strike anywhere, many natural disasters are, in part, human-made since the magnitude of disaster is determined by the adaptive capacity of the struck society.

We can distinguish between *natural hazards*, which are geophysical events such as volcanic eruptions, floods, earthquakes or tsunamis, and *natural disasters*, which involve the interaction of natural hazards and social systems. Two societies might face a similar *exposure* to natural hazards, but they may have different vulnerabilities to the damages that ensue from the hazard [emphasis in the original].⁵²

(Consider, for example, the difference between the impacts of the 2010 magnitude 7.0 earthquake in Haiti and those of the magnitude 8.8 earthquake in Chile less than two months later. The Chile earthquake, although stronger in strength, caused far less devastation, owing to the country’s relatively high adaptive capacity to natural hazards.)

Based on the evidence discussed in the previous sections, the LDCs are susceptible to both *natural hazards*, due to geographic vulnerability to climate variability and change, and *natural disasters*, due to existing infrastructural, socioeconomic and socio-political vulnerabilities. The cause for concern is not limited to the possibility of sudden natural hazards; it includes long-term environmental changes (e.g., changes in rainfall patterns and natural resources), which also could result in disastrous outcomes. For example, as previously discussed, Haiti’s depleted environment, which arguably contributed to widespread poverty and a political culture of instability and violence, was not the result of a single natural hazard, but of years of destructive environmental exploitation.

While adaptation needs are context-specific and vary according to a host of natural, financial, cultural and political factors, commonalities across the least developed world can signal broad considerations for mainstreaming climate adaptation into

development strategies. Box 1 summarizes some of the major goals and constraints associated with realizing this task in fragile states.

Box 1 – Summary of Major Goals and Constraints of Mainstreaming Climate Adaptation into Development Strategies

Broad-Scale Resilience Goals
<ul style="list-style-type: none"> • Ability to protect citizens from both anticipated and unpredictable threats • Ability to respond creatively to and recover from stress without disrupting basic functions • Ability to manage conflicts without resorting to violence • Ability to maximize on the potentially positive impacts of climate variability and change
Major Constraints
<ul style="list-style-type: none"> • Ecological barriers that may diminish the feasibility of development efforts (e.g., sea-level rise on some islands may render migration the only adaptation option) • Financial and technological limitations depending on the capacity of different states and individuals • Structural barriers within governments and development cooperation agencies • Functional differences across aid organizations that are difficult to unite towards a universal goal • Social, cultural, and cognitive barriers that may affect the choices and actions of local individuals • Uncertainty of some climate information (e.g., regional forecasts) • Tradeoffs between adaptation and development objectives (e.g., long-term climate-proof development versus short-term relief management)

Source: Summary prepared by the author using data obtained from W. N. Adger et al., "[Assessment of Adaptation Practices, Options, Constraints and Capacity](#)," Chapter 17 in *Climate Change 2007: Impacts, Adaptation and Vulnerability*, Contribution of Working Group II to the Fourth Assessment Panel of the Intergovernmental Panel on Climate Change, M. L. Parry et al., eds., Cambridge University Press, Cambridge, UK, 2007; and Dan Smith and Janani Vivekananda, [Climate Change, Conflict and Fragility: Understanding the linkages, shaping effective responses](#), International Alert, Initiative for Peacebuilding, November 2009.

The power structure of the political economy of fragile states warrants special consideration to ensure that aid is being allocated as intended, and to avoid potentially counterproductive investments. For example, improved international trade provisions could generate financial opportunities that favour a small group of elites rather than the collective interest. Similarly, financial limitations at the local level may contribute to further inequalities between rich and poor within societies where few people can afford the necessary adaptation technologies.⁵³ Established development principles such as "country ownership"⁵⁴ could therefore become counterproductive in cases where the reliability of local governments may be questionable. Furthermore, sovereignty issues may arise if local governments reject development cooperation from foreign bodies.⁵⁵

Divergent interests, preferences, beliefs and experiences influence individual behaviour and choice, and may limit trust in climate adaptation and risk management. For example, in 2000 experts anticipated serious flooding in Mozambique following unusual cyclone activity that caused substantial rainfall in the Limpopo river basin. Traditionally, Mozambicans foresee flooding when ants leave their nests as groundwater rises. However, the river overflowed so rapidly on this occasion that groundwater did not rise in advance. Evacuation alerts were not entirely effective because some local leaders did not trust foreign expertise. One

local chief's response was, "Who are you and why should I do what you say? Since the times of my ancestors, floods have only occurred after ants leave their homes." About 700 people drowned in the flood.⁵⁶ Culture-sensitive communication can therefore be critical in overcoming informational barriers.

Transforming an established social system is inherently a long-term and incremental process of trial and error. Some analysts have argued that adaptation can most effectively be implemented following widespread disasters – such as wars or natural disasters – which may diminish structural barriers within institutions and create a constructive political climate for legal, economic and social change. It is assumed that, in post-disaster circumstances, consensus, resources and political will are more easily attainable because the disaster risks are still high in the consciousness of various international, national and local agencies. Conversely, pressure to return to pre-disaster conditions may also hinder long-term development strategies in favour of more immediate concerns. While short-term disaster relief is sometimes necessary to meet immediate needs (as demonstrated by the aftermath of the 2010 earthquake in Haiti, for instance), short-term risk reduction that ignores long-term capacity-building may increase the vulnerability to future events.⁵⁷

As a general rule, early implementation of climate-sensitive development can improve the economics and effectiveness of aid to mitigate potential disasters from climatic changes or hazards.⁵⁸ The OECD advises developers to pay particular attention to policies and projects with long-term potential for economic development and poverty reduction (e.g., transport networks, urban development master plans, etc.), maintaining that development initiatives could be greatly enhanced by building in timely climate adaptation measures.⁵⁹ According to the US Federal Emergency Management Agency, "a dollar spent on mitigation saves two in coping."⁶⁰

5 CONCLUSION

The National Security Strategy of the United Kingdom (2008) recognizes climate change as "potentially the greatest challenge to global stability and security," and deems both mitigation and adaptation "critical" to future security, global prosperity and the prevention of humanitarian disasters.⁶¹ The adverse implications of climate change are particularly concerning in an increasingly interconnected world, where political borders are, at best, porous. In both the physical and cultural sense, societies are integrating in complex ways that strengthen the collective interest to help the world's most fragile states mitigate the emerging humanitarian and socio-political threats of a changing climate. One critical approach to enhancing the effectiveness and sustainability of development investments in the LDCs is to mainstream climate adaptation into regular development strategies in an effort to support long-term capacity-building.

NOTES

1. Steven Edwards and Jorge Barerra, "[Fears of violence as Haitians grow desperate for water, food](#)," Canwest News Service, 17 January 2010.
2. Jorge Barrera and Linda Nguyen, "[International community must 'start from scratch' in Haiti, Harper says](#)," *Global News*, 17 January 2010.
3. Organisation for Economic Co-operation and Development [OECD], [Aid to fragile states: Focus on Haiti](#).
4. "Least Developed Country" (LDC) is a United Nations designation for countries deemed "highly disadvantaged in their development process (many of them for geographical reasons), and facing more than other countries the risk of failing to come out of poverty." According to the latest status review (March 2009), the determinants of LDC status are (1) *low income* (based on a three-year average estimate of the gross national income per capita, with a US\$905 threshold for addition to the list and a US\$1,086 threshold for graduation from LDC status); (2) *weak human assets* (based on the Human Assets Index, which provides information regarding the level of development of human capital using indicators for health, nutrition, literacy, and education); and (3) *economic vulnerability* (based on the Economic Vulnerability Index, which reflects the risk posed to a country's development by exogenous shocks using seven indicators: population size; remoteness; merchandise export concentration; share of agriculture, forestry and fisheries in gross domestic product; homelessness owing to natural disasters; instability of agricultural production; and instability of exports of goods and services). See United Nations Conference on Trade and Development, "[UN recognition of the Least Developed Countries](#)."
5. Ibid.
6. This paper uses the following Intergovernmental Panel on Climate Change (IPCC) definition of *climate variability*: "variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all spatial and temporal scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability)" (see [Annex I, "Glossary,"](#) in *Climate Change 2007: The Physical Science Basis – Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, eds. S. Solomon et al., Cambridge University Press, Cambridge, UK, 2007, p. 944).
7. This paper uses the following IPCC definition of *climate change*: an identifiable "change in the state of the climate [...] that persists for an extended period, typically decades or longer; [and that] may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use" (ibid., p. 943).
8. *Adaptive capacity* is defined by the IPCC as "the whole of capabilities, resources and institutions of a country or region to implement effective adaptation measures" (see [Annex I, "Glossary,"](#) in *Climate Change 2007: Mitigation of Climate Change – Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, eds. B. Metz et al., Cambridge University Press, Cambridge, UK, 2007, p. 809). For more on differential adaptive capacity, see W.N. Adger et al., "[Assessment of adaptation practices, options, constraints and capacity](#)," Chapter 17, in *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, eds. M. L. Parry et al., Cambridge University Press, Cambridge, UK, 2007, pp. 717–43.

9. In 2004, sub-Saharan Africa, which contains the highest concentration of LDCs, emitted approximately 0.9 tonnes of carbon dioxide per capita, in comparison to 20.2 and 9.2 tonnes per capita in North America and Europe respectively. See Jason Anderson, Malcolm Fergusson and Carolina Valsecchi, [An Overview of Global Greenhouse Gas Emissions and Emissions Reduction Scenarios for the Future](#), IP/A/CLIM/NT/2007-07, European Parliament, 2008.
10. United Nations General Assembly, [Resolution adopted by the General Assembly: 55/2. United Nations Millennium Declaration](#), September 2000.
11. United Nations Framework Convention on Climate Change, [Least Developed Countries Portal](#).
12. Adger et al., in *Climate Change 2007: Impacts, Adaptation and Vulnerability* (2007).
13. The United Nations Conference on Trade and Development, [Statistical Profiles of the Least Developed Countries](#), New York and Geneva, 2005.
14. The United Nations Office of the High Representative for the Least Developed Countries [UN-OHRLLS], *Landlocked Developing Countries and Small Island Developing States, Facts About Least Developed Countries (LDCs)*.
15. The information presented in this section is based on evidence from Michel Boko et al., Chapter 9, “Africa,” in *Climate Change 2007: Impacts, Adaptation and Vulnerability* (2007), pp. 433–67.
16. The information presented in this section is based on evidence from R. V. Cruz et al., Chapter 10, “Asia,” in *Climate Change 2007: Impacts, Adaptation and Vulnerability* (2007), pp. 469–506.
17. El Niño is a phenomenon that appears every few years, characterized by unusually warm surface waters of the Pacific Ocean along the tropical western coast of South America. It can cause global climatic anomalies in the equatorial Pacific and equatorial Asia and North America.
18. The coastal zones of Asia contain 11 mega-deltas of over 10,000 square kilometres in area. These deltas contain seven megacities and are home to millions of people.
19. The information presented in this section is based on evidence from N. Mimura et al., Chapter 16, “Small islands,” in *Climate Change 2007: Impacts, Adaptation and Vulnerability* (2007), pp. 687–716.
20. State fragility is a general term used to describe the overall condition of a state based on “a number of partially overlapping, yet analytically distinct concepts regarding vulnerability” (see David Carment, Stewart Prest, and Yiagadeesen Samy, *Determinants of State Fragility and Implications for Aid Allocation: An Assessment Based on the Country Indicators for Foreign Policy Project*, Research Paper no. 2008/46, World Institute for Development Economics Research, United Nations University, Helsinki, 2008, p. 3.) There is no universally accepted definition of state fragility; however, fragile states have been characterized in the following ways: low-income countries under stress (World Bank), poor performers (AusAID), countries that lack the capacity to implement pro-poor policies (OECD), countries at risk of instability, and failing and/or failed states.
21. The Country Indicators for Foreign Policy fragility index incorporates the following six dimensions of fragility: governance, economics, security, human development, demography and environment.
22. Carment, Prest and Samy (2008).

23. The Human Development Index, measures the average achievements in a country in three basic dimensions of human development: a long and healthy life, knowledge, and a decent standard of living. See United Nations Development Programme, [Human Development Report 2009 – HDI rankings](#).
24. Foreign Policy, *The Failed States Index 2009*.
25. Adger et al., in *Climate Change 2007: Impacts, Adaptation and Vulnerability* (2007).
26. Dan Smith and Janani Vivekananda, [Climate Change, Conflict and Fragility: Understanding the linkages, shaping effective responses](#), International Alert, November 2009.
27. Boko et al, in *Climate Change 2007: Impacts, Adaptation and Vulnerability* (2007).
28. Oli Brown, Alec Crawford and Christine Campeau, [Environmental Change and the New Security Agenda: Implications for Canada's security and environment](#), International Institute for Sustainable Development, June 2008, p. 17.
29. Mohamed Suliman, [The War in Darfur: The Resource Dimension](#), Institute for African Alternatives, 2006.
30. Carment, Prest and Samy (2008).
31. Brown, Crawford and Campeau (2008).
32. OECD, [Aid to Fragile States: Focus on Haiti](#).
33. According to the Office of the Parliamentary Budget Officer, “incremental costs are costs that would not have been incurred except for the [Afghanistan] operation.” These broadly include the cost of running the military operations; the cost of taking care of the veterans; development and reconstruction costs; increased costs at head offices of relevant departments; and the cost of diplomatic efforts. See Ramnarayanan Mathilakath, Ashutosh Rajekar and Sahir Khan, [Fiscal Impacts of the Canadian Mission in Afghanistan](#), Office of the Parliamentary Budget Officer, October 2008, p. 6.
34. Ibid., p. 7.
35. For more on the preventative versus reactionary costs of conflict, see Michael E. Brown and Richard N. Rosecrane, eds., [The Costs of Conflict – Prevention and Cure in the Global Arena](#), Carnegie Commission on Preventing Deadly Conflict, Carnegie Corporation of New York, 1999.
36. A population of concern includes refugees, asylum-seekers, returnees, internally displaced persons, stateless persons, and others of concern to the United Nations High Commissioner for Refugees.
37. United Nations High Commissioner for Refugees [UNHCR], [UNHCR Statistical Yearbook 2007 – Annex](#), December 2008.
38. Timmons J. Roberts and Bradley C. Parks, *A Climate of Injustice: Global Inequality, North-South Politics, and Climate Policy*, The MIT Press, Cambridge, Mass., 2007, p. 2.
39. For more on forced migration due to climate change, including pertinent Canadian legislation, see Penny Becklumb, [Climate Change and Forced Migration: Canada's Role](#), 2010-04-E, Parliamentary Information and Research Service, Library of Parliament, Ottawa, 2010.

40. The UNHCR defines *environmentally displaced persons* as people “who are displaced from or who feel obliged to leave their usual place of residence, because their lives, livelihoods and welfare have been placed at serious risk as a result of adverse environmental, ecological or climatic processes and events.” See Camillo Boano, Roger Zetter and Tim Morris, [Environmentally displaced people: Understanding the linkages between environmental change, livelihoods and forced migration](#), Refugee Studies Centre, Oxford Department of International Development, University of Oxford, 2008, p. 8.
41. Ibid., p. 12.
42. Claudio Guler, [The Climate Refugee Challenge](#), International Relations and Security Network, 14 April 2009.
43. The 1951 Refugee Convention was initially limited to protecting European refugees in the aftermath of World War II, and then later expanded to account for all refugees through the 1967 Protocol Relating to the Status of Refugees. See UNHCR, [The 1951 Refugee Convention – Questions and Answers, 2007 Edition](#), 2007.
44. Article 1 of the 1951 Refugee Convention defines a refugee as “a person who is outside his or her country of nationality or habitual residence; has a well-founded fear of persecution because of his or her race, religion, nationality, membership in a particular social group or political opinion; and is unable or unwilling to avail himself or herself of the protection of that country, or to return there, for fear of persecution.” See UNHCR, 2007, p. 6.
45. Constitutional Rights Foundation, *Bill of Right[s] in Action: United States Asylum Policy, “Haiti and the Boat People,”* 2000, and [Sale, Acting Commissioner, Immigration and Naturalization Service et al. v. Haitian Centers Council, Inc.](#), 113 S. Ct. 2549, 125 L. (92-344), 509 U.S. 155 (1993).
46. UNHCR, [“UNHCR welcomes close of Australia’s Pacific Solution,”](#) Briefing Notes, 8 February 2008.
47. Becklumb (2010), p. 4.
48. Brown, Crawford and Campeau (2008).
49. UN-OHRLLS, [Facts About Least Developed Countries \(LDCs\)](#).
50. For more on climate change adaptation, see Tim Williams, [Climate Change: Adaptation](#), Publication no. PRB 08-47E, Parliamentary Information and Research Service, Library of Parliament, Ottawa, 10 February 2009.
51. OECD, [Integrating Climate Change Adaptation into Development Co-operation: Policy Guidance](#), 2009, p. 60.
52. Jeff Dayton-Johnson, [Natural Disaster and Vulnerability](#), OECD Development Centre, Policy Brief No. 29, 2006, p. 7.
53. Adger et al., in *Climate Change 2007: Impacts, Adaptation and Vulnerability* (2007).
54. *Country ownership* is one of the five principles of aid effectiveness according to the [Paris Declaration on Aid Effectiveness \(2005\)](#). The purpose is for recipient countries to “exercise effective leadership over their development policies, and strategies and co-ordinate development actions” (p. 3). For more, see Allison Goody, [International Development: The Aid Effectiveness Debate](#), Publication no. PRB 09-07E, Parliamentary Information and Research Service, Library of Parliament, Ottawa, 24 June 2009.
55. Smith and Vivekananda (2009).
56. Ibid.

57. Adger et al., in *Climate Change 2007: Impacts, Adaptation and Vulnerability* (2007).
58. For more on aid effectiveness, see Goody (2009).
59. OECD (2009).
60. Dayton-Johnson (2006), p. 16.
61. British High Commissioner, *UK Climate Change Policy*, Brief provided to the House of Commons Standing Committee on Environment and Sustainable Development, November 2009.

APPENDIX A- REFUGEES FROM THE LEAST DEVELOPED COUNTRIES AT THE END OF 2007, BY ORIGIN

Least Developed Country	Refugees	Population of Concern ^a
Afghanistan	1,909,911	3,609,746
Angola	186,155	198,970
Bangladesh	10,241	17,578
Benin	265	440
Bhutan	108,098	112,241
Burkina Faso	554	822
Burundi	375,715	422,589
Cambodia	17,697	18,128
Central African Republic	98,104	301,458
Chad	55,722	237,356
Comoros	96	139
Congo	19,735	25,970
Djibouti	648	680
Equatorial Guinea	407	441
Eritrea	208,743	220,957
Ethiopia	59,832	89,368
Gambia	1,267	2,266
Guinea	8,278	10,213
Guinea-Bissau	1,028	1,290
Haiti	22,280	32,539
Kiribati	38	38
Lao People's Democratic Republic	10,013	10,181
Lesotho	7	20
Liberia	91,537	139,439
Madagascar	284	289
Malawi	97	8,287
Maldives	17	19
Mali	994	5,130
Mauritania	33,108	34,125
Mozambique	222	907
Myanmar	191,256	277,629
Nepal	3,363	105,512
Niger	827	1,104
Rwanda	80,955	98,711
Samoa	2	3
Sao Tome and Principe	33	33
Senegal	15,896	16,801
Sierra Leone	32,127	37,157
Solomon Islands	48	70
Somalia	455,356	1,476,006
Sudan	523,032	2,007,976

Least Developed Country	Refugees	Population of Concern ^a
Timor-Leste	6	72,598
Togo	22,501	27,219
Tuvalu	2	2
Uganda	21,341	1,839,494
United Republic of Tanzania	1,255	4,176
Vanuatu	0	0
Yemen	1,631	78,952
Zambia	196	692
TOTAL	4,570,920	11,545,761

a. A population of concern includes refugees, asylum-seekers, returnees, internally displaced persons, stateless persons, and others of concern to the United Nations High Commissioner for Refugees.

Source: Table prepared by the author using data obtained from UNHCR, *UNHCR Statistical Yearbook 2007 - Annex*, "[Country Data Sheets](#)," Table 1, 31 December 2008.

APPENDIX B – IMPORTS OF THE EUROPEAN UNION-27, ASIA, AUSTRALIA AND NORTH AMERICA FROM THE LEAST DEVELOPED COUNTRIES IN 2008

European Union (27) ^a			Asia and Australia ^b			North America		
	Value (US\$ millions)	Share of Total Imports		Value (US\$ millions)	Share of Total Imports		Value (US\$ millions)	Share of Total Imports
Agricultural Products								
LDCs (totals)	4,616	2.02%	LDCs (totals)	6,192	1.78%	LDCs (totals)	806	0.28%
Uganda	527	0.23%	Myanmar	2,120	0.61%	Liberia	167	0.06%
Ethiopia	481	0.21%	Tanzania	392	0.11%	Bangladesh	163	0.06%
Tanzania	418	0.18%	Bangladesh	303	0.09%	Ethiopia	140	0.05%
Madagascar	396	0.17%	Solomon Islands	295	0.08%	Malawi	65	0.02%
Senegal	320	0.14%	Mozambique	257	0.07%	Madagascar	42	0.01%
Bangladesh	318	0.14%	Benin	248	0.07%	Tanzania	37	0.01%
Malawi	273	0.12%	Burkina Faso	243	0.07%	Sudan	33	0.01%
Togo	256	0.11%	Vanuatu	221	0.06%	Haiti	30	0.01%
Mozambique	228	0.10%	Afghanistan	186	0.05%	Uganda	20	0.01%
Congo, Dem. Rep. of	205	0.09%	Lao People's Dem. Rep.	172	0.05%	Togo	16	0.01%
Sudan	159	0.07%	Nepal	150	0.04%	Rwanda	11	0.00%
Others (39)	1,055	0.46%	Others (39)	1,604	0.46%	Others (39)	82	0.03%
Fuels and Mining Products								
LDCs (totals)	20,557	9.01%	LDCs (totals)	59,777	17.16%	LDCs (totals)	29,594	10.17%
Angola	11,150	4.89%	Angola	25,691	7.38%	Angola	22,125	7.60%
Equatorial Guinea	5,701	2.50%	Sudan	11,995	3.44%	Equatorial Guinea	3,460	1.19%
Mozambique	1,041	0.46%	Yemen	7,434	2.13%	Chad	3,446	1.18%
Mauritania	797	0.35%	Equatorial Guinea	5,038	1.45%	Guinea	211	0.07%
Guinea	595	0.26%	Myanmar	3,238	0.93%	Congo, Dem. Rep. of	116	0.04%
Congo, Dem. Rep. of	507	0.22%	Congo, Dem. Rep. of	1,699	0.49%	Sierra Leone	52	0.02%
Zambia	337	0.15%	Mauritania	1,039	0.30%	Mauritania	47	0.02%
Senegal	93	0.04%	Zambia	991	0.28%	Zambia	46	0.02%
Others (42)	338	0.15%	Others (42)	2,653	0.76%	Others (42)	92	0.03%

DEVELOPMENT AID IN A CHANGING CLIMATE

European Union (27) ^a			Asia and Australia ^b			North America		
	Value (US\$ millions)	Share of Total Imports		Value (US\$ millions)	Share of Total Imports		Value (US\$ millions)	Share of Total Imports
Manufactured Products								
LDCs (totals)	11,359	4.98%	LDCs (totals)	2,991	0.86%	LDCs (totals)	9,224	3.17%
Bangladesh	7,696	3.37%	Bangladesh	746	0.21%	Bangladesh	4,562	1.57%
Cambodia	1,063	0.47%	Nepal	464	0.13%	Cambodia	2,822	0.97%
Madagascar	387	0.17%	Myanmar	367	0.11%	Haiti	455	0.16%
Congo, Dem. Rep. of	322	0.14%	Vanuatu	298	0.09%	Lesotho	396	0.14%
Lesotho	248	0.11%	Cambodia	204	0.06%	Madagascar	319	0.11%
Liberia	235	0.10%	Senegal	173	0.05%	Equatorial Guinea	203	0.07%
Myanmar	229	0.10%	Angola	126	0.04%	Congo, Dem. Rep. of	150	0.05%
Angola	188	0.08%	Bhutan	124	0.04%	Nepal	104	0.04%
Lao People's Dem. Rep.	170	0.07%	Liberia	91	0.03%	Lao People's Dem. Rep.	45	0.02%
Equatorial Guinea	159	0.07%	Lao People's Dem. Rep.	69	0.02%	Angola	35	0.01%
Nepal	118	0.05%	Samoa	69	0.02%	Afghanistan	22	0.01%
Sierra Leone	80	0.04%	Tanzania	43	0.01%	Tanzania	19	0.01%
Ethiopia	72	0.03%	Zambia	35	0.01%	Malawi	14	0.00%
Others (37)	406	0.18%	Others (37)	181	0.05%	Others (37)	79	0.03%

a. Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

b. Australia, China, Hong Kong (China), India, Indonesia, Japan, Malaysia, New Zealand, Pakistan, Philippines, Singapore, Taipei Chinese and Thailand.

Source: Table prepared by the author using data obtained from World Trade Organization, [World trade developments in 2008](#), Table I.9.