

## CHAPTER II

### CHAPTER II

#### **Compromised futures? Youth development and the effects of climate change**

Climate change is a real phenomenon, and its effects are apparent. There are important tipping points that may already have been reached or passed, causing irreversible damage to many human and ecological systems.

As highlighted in chapter I, the warming temperatures driving climate change can have a direct impact on human activities, and their negative effects can be compounded by existing ecological and social situations. The impact of climate change is, and will continue to be, exacerbated by a variety of interlinked and overlapping factors, undermining the health and safety of populations, compromising food security, threatening livelihoods, and eroding economic security (Intergovernmental Panel on Climate Change, 2007a).

Although climate change affects individuals of all ages, young people can expect to bear a particularly heavy burden because they will live longer and will face this challenge throughout their lifetimes. The situation of youth in less developed countries is especially tenuous. The combination of geography, geology, and uneven social and economic development has made those living in certain areas of Africa, Asia, and the Small Island Developing States (SIDS) more vulnerable than others to climate change and its consequences. In some of the countries within these regions, youth make up as much as one third of the population (United Nations, 2009c), and many of them are already facing a difficult transition to adulthood owing to social and economic instability and widespread poverty. Should climate change continue unabated, existing deficits and limitations could deepen. Such a situation would have immediate and short-term effects on youth and their communities, but it could also pose a major threat within the long-term trajectory of global development. As noted in chapter I, the young women and men living in Africa and Asia represent the vast majority of the world's youth. Failing to address climate-related challenges that can undermine their successful integration into society could ultimately perpetuate or even exacerbate widespread poverty and inequality.

In this chapter the relationship between youth development and the impact of climate change is examined. Particular attention is given to the development of young people in those contexts most vulnerable to the effects of climate change, including health and safety, food security, and livelihood stability. Migration and conflict are also explored as possible consequences of climatic instability. The chapter raises the question of compromised futures: Will climate change hinder the ability of young women and

men to participate fully in society, and can addressing climate change bring about a better future?

## **The compound effects of climate change on health and safety**

Good health constitutes an essential asset, as it lies at the core of human capacity to function effectively in any society. Unless timely and effective action is taken, extreme weather events, water scarcity, higher sustained temperatures, and other phenomena associated with climate change are likely to pose a serious threat to human health and safety.

### **Extreme weather events increase health hazards...**

Extreme weather events constitute a serious natural hazard and can affect human health and safety both directly and indirectly. They are often responsible for physical injury and loss of life, and they may exacerbate already sub-standard living conditions, increasing the exposure of vulnerable residents to many types of disease (Abatzoglou and others, 2007; United Nations Development Programme, Bureau for Crisis Prevention and Recovery, 2004). The incidence of extreme weather is expected to grow with climate change. In fact, the frequency and intensity of many natural hazards have already increased. Since 1980 the number of people affected by extreme weather events has doubled, and by 2015 it could increase by another 50 per cent. Between 1980 and 2007, 98 per cent of those affected by natural disasters were the victims of climate-related events (Ganeshan and Diamond, 2009).

Many young people live in areas where extreme weather events tend to hit hardest. In parts of sub-Saharan Africa, the risk of drought is relatively high, while in the coastal areas of this subregion and in South Asia, Central America, and the Caribbean and Pacific islands, serious flooding poses the greatest threat (United Nations Development Programme, Bureau for Crisis Prevention and Recovery, 2004). The intensification of extreme weather events is likely to be a major factor affecting the health and safety of many youth living in these areas, especially those residing in South Asia, Central America, and the small island developing States of the Caribbean and Pacific regions

(United Nations Development Programme, Bureau for Crisis Prevention and Recovery, 2004; Center for Hazards and Risk Research at Columbia University, 2005).

While extreme weather events are more likely to affect the subregions mentioned above, other parts of the world are vulnerable as well, as climate change is a truly global phenomenon. Populations unaccustomed to particular natural hazards often do not have adequate response mechanisms in place. An upsurge in demand for emergency services and supplies following a natural disaster may put a severe strain on institutions, creating a force multiplier effect whereby health concerns are elevated to a health and safety crisis.

### **...particularly where sanitation is poor and wastewater management insufficient**

In many of these contexts, the higher incidence of extreme weather events combined with poor sanitation can give rise to pervasive health threats. Climate change is often associated with periods of excessive or insufficient precipitation. Where flooding occurs the water can become contaminated with human and animal excrement, while extended drought can reduce the amount of water available for washing and sanitation. Under such circumstances, cholera, typhoid and diarrhoeal diseases can flourish (McMichael and others, 2003; Prüss-Üstün, Bos, and Gore, 2008).

More than a quarter of the world's youth live in countries where at least two thirds of the population does not have access to adequate sanitation (World Health Organization and United Nations Children's Fund, 2006). All of these countries are in Africa, Asia, or Oceania. According to the Townsend Centre for International Poverty Research, some 30-50 per cent of youth in most African countries are deprived of adequate sanitation, and the situation is the same for at least 30 per cent of young people in six Asian countries (United Nations, 2007b). Health conditions can deteriorate rapidly under circumstances such as these. At present, the incidence of diarrhoeal diseases potentially attributable to climate change is highest in South-East Asia, where more than 100 million young women and men reside (United Nations

Framework Convention on Climate Change, 2007a; United Nations, 2009c).

Even in countries with adequate sanitation and water treatment facilities, extreme weather events may disrupt water supplies as systems are overloaded during and after intense storm activity. Water contaminated with biological and chemical toxins (wastewater) may spill over into bodies of water and agricultural lands. Wastewater exposure and consumption not only threatens human health but may also devastate ecosystems.

### **Reduced access to clean water compromises health**

Climate change has a direct impact on water quality, with negative implications for health. Clean water is essential for survival (Prüss-Üstün, Bos and Gore, 2008). However, potable supplies will come under growing pressure as the warming temperatures associated with climate change increase water pollution from bacterial growth and algal blooms (Intergovernmental Panel on Climate Change, 2007b), leading to a rise in the transmission of diarrhoeal diseases and bacterial infections—often with deadly consequences. Already, more than 560 million African youth do not have access to safe drinking water (United Nations, 2007b).

Extended periods of drought expected in some areas as a result of climate change could further limit access to clean water for many, leading to health consequences associated with malnutrition, dehydration, and inadequate sanitation.

### **Higher temperatures increase exposure to disease...**

Not all of the manifestations of climate change with implications for health are as dramatic as the extreme weather events and water scarcity issues addressed above. The fact is that the warming temperatures alone can increase youth exposure to health risks, including vector-borne diseases. A prime example is dengue fever, which has been identified by the World Health Organization as one of the endemic diseases to which a significant proportion of the global population will be exposed. The geography of this disease is related to consistently warm temperatures and adequate precipitation.

With the warming effect of climate change, the areas where the disease and its host can survive are expected to grow, and in many of the areas in which dengue fever is presently found, its virulence is likely to increase (McMichael and others, 2003).

Dengue is one of the world's most important vector-borne diseases, affecting more than 2.5 million people worldwide (see box II.1). Most of the reported fatalities from this disease have been among children and young adults (Centers for Disease Control and Prevention, Division of Vector-Borne and Infectious Diseases, 2008; World Health Organization, 2009). More than 600 million young men and women live in areas infested with the *Aedes aegypti* mosquito, which transmits dengue, and both the mosquito and the incidence of the disease have experienced a dramatic resurgence since the 1970s (Centers for Disease Control and Prevention, Division of Vector-Borne and Infectious Diseases, 2008).

### Box II.1

#### Dengue: a resurgent virus

Dengue is a mosquito-borne viral infection that causes a severe flu-like illness, and in some cases a potentially lethal complication called dengue haemorrhagic fever (DHF) may develop. Dengue occurs in tropical and subtropical regions, typically in and around urban areas, and in recent years has become a major international public health concern.

Over the past few decades the incidence of dengue has grown dramatically. According to World Health Organization estimates, some 50 million people may be infected with the virus each year. In 2007 alone there were more than 890,000 cases of dengue reported in the Americas, and 26,000 of these were DHF.

Today, dengue is endemic in more than a hundred countries in Africa, the Americas, the Eastern Mediterranean, South-East Asia, and the Western Pa-

cific, with the last two regions being the most seriously affected.

The past six years have seen unusually high rates of dengue infection in South-East Asia and the Western Pacific, and climate change may be partly to blame. The *Aedes aegypti* mosquito, which transmits the virus, does better in warm, wet weather, and with climate change, these regions have experienced rising temperatures and longer rainy seasons.

Climate change is not the only factor influencing the resurgence of dengue. Increased urban migration and poor sanitation and water storage are also significant contributors, especially in developing countries. Even in the more developed countries of a vulnerable region, however, the problem has grown more acute. For example, Singapore, a model of dengue control, saw a major outbreak in 2005 and, following a 2006 decline, increased incidence in 2007.

As temperatures continue to rise it will become more difficult to prevent the spread of the disease, even with improved fumigation and prevention methods.

There is no specific treatment for dengue fever.

**Sources:** Krista Mahr (2007), "Vagabond virus: dengue fever is spreading, and some think climate change is to blame", p. 38; and World Health Organization (2009), "Dengue and dengue haemorrhagic fever".

#### ...and increase the threat of heat stress

The rising temperatures climate change brings can increase the incidence of heat stress and heat-related mortality, and those without adequate housing or health services are most vulnerable to this threat (McMichael and others, 2003). According to figures compiled by

the Townsend Centre for International Poverty Research, more than half of all African youth lack adequate shelter, and the same is true for more than one third of young people in some countries in Asia and in Latin America and the Caribbean (United Nations, 2007b). It is these youth who are most likely to feel the heat.

### The food security dilemma

Food security is already being threatened by climatic shifts. This issue raises important concerns about hunger, poverty, health, and productivity—and therefore about broader prospects for human development. Food availability and access constitute one of the most basic and essential requirements for maintaining healthy and productive lives. At present, hunger and malnutrition combined comprise the number-one threat to human health (World Food Programme, 2009). Climate change will continue to affect all aspects of food security, especially in Africa, Asia, and Latin America and the Caribbean (Bates and others, 2008; Food and Agriculture Organization of the United Nations, 2009b), where more than 1 billion young men and women live (United Nations, 2009c).

Food insecurity is likely to be particularly challenging for developing countries that are vulnerable to extreme weather events and that have low incomes and a high incidence of hunger and poverty (Intergovernmental Panel on Climate Change, 2007b; Food and Agriculture Organization of the United Nations, 2009b). Residents of these areas are already at risk and will find it hard to overcome the food production and income losses resulting from extreme weather events. Such a situation could mean short-term and long-term losses in food availability and access. Short-term infrastructural damage from extreme weather events of growing intensity may also make food distribution difficult.

Young women are likely to be the most seriously affected by compromised food security. The results of research carried out in India indicate that nutritional deficits are greater among girls than among boys when food is scarce and/or when food prices are high. The research also shows that rainfall shortages, which serve to reduce food availability, are more strongly correlated with death among girls than among

boys (Stern, 2007). Distinct social and cultural preferences and customs affecting girls and boys translate into different gender-specific vulnerabilities within and across regions. In most cases, these norms work to the detriment of young females (United Nations Children's Fund, Innocenti Research Centre, 2008).

Much of the potential threat to food security comes from the negative effect climate change could have on agriculture. Agricultural productivity could decline between 9 and 21 per cent in developing countries as a result of climate change (Food and Agriculture Organization of the United Nations, 2009b). It is likely that such a decrease would derive largely from shifts in hydrological patterns and compromised water availability, as agriculture accounts for 70 per cent of global water use (Bates and others, 2008; Food and Agriculture Organization of the United Nations, 2009a).

Projections indicate that with the combination of climate change, population growth, and the consequent increase in demand for food, energy, and biofuels, almost half of the global population could be living in areas of high water stress by 2030 (United Nations World Water Assessment Programme, 2009). The anticipated rise in temperatures and sea levels owing to climate change will affect the availability of freshwater sources, with a negative impact on both quantity and quality. In addition, the rate of glacier and snow-cover retreat is likely to increase throughout the twenty-first century, reducing water availability and hydropower potential and changing the seasonality of meltwater flows in regions where major mountain ranges are key water supply sources (Intergovernmental Panel on Climate Change, 2007b).

Rice, wheat, and maize production has declined in some parts of Asia because of the increase in water stress brought about by climate change. At present, the world's highest rates of malnutrition attributable to climate change are found in South-East Asia (United Nations Framework Convention on Climate Change, 2007a; Bates and others, 2008). Communities in China, India, and Pakistan, which together account for more than 40 per cent of the world's youth, will be especially hard hit by the reduction in meltwater flows from the Himalayas and other high, mountainous areas. In fact, India is



expected to be in a state of water stress before 2025 (United Nations Environment Programme/GRID-Arendal, 2007; Bates and others, 2008).

Hardest hit by compromised food security will be the rural areas of Africa (Food and Agriculture Organization of the United Nations, 2009b), where more than half of the region's young people live (United Nations, 2008). The greatest challenge within this context will arise from the impact of climate change on water resources. In rural Africa, groundwater and rainfall are essential inputs for food production and are the main sources of potable water. One area currently experiencing a serious water deficit is the Sahel region, where longer and more intense droughts constitute one of the most dramatic climatic changes recorded in any region. The situation is expected to worsen in the coming years, affecting more than 60 million young women and men (Bates and others, 2008). Outside the Sahel, groundwater supplies are expected to decrease by as much as 10 per cent, even with a 1°C increase in temperature (Bates and others, 2008).

Although the less developed nations are likely to face the greatest threat to food security, developed countries may be affected as well. In northern Australia and the southern United States, for example, food production could decline as a result of drier surface conditions (Cline, 2007). These countries are much better prepared to deal with such a challenge, however, as any projected losses are buffered by the relative strength and stability of their economies (Intergovernmental Panel on Climate Change, 2007a).

### **Climate change mitigation and food security: an added challenge?**

Ironically, some climate change mitigation efforts may themselves undermine food security, especially in less developed areas. The production of biofuels and other forms of bioenergy presents one of the greatest challenges in this regard (Food and Agriculture Organization of the United Nations, 2009a). Bioenergy is the largest new source of agricultural demand in recent years, and this has important implications for food production and availability in areas where agricultural capacity is diminishing. It takes a lot more grain to power the world than to feed it; the corn equivalent of the en-

ergy used for a few minutes of driving would feed a person for an entire day, and that same person could be fed for a year with the equivalent energy burned from a full tank of ethanol in a four-wheel-drive sports utility vehicle (Nellemann and others, 2009). As noted above, the growing prevalence of this type of agricultural production will also contribute to increased water stress (United Nations World Water Assessment Programme, 2009).

With the rising demand for biofuel the commodity value of feedstock grains will increase, making the production of corn and other source crops more profitable. However, this will pose a problem for areas lacking economic security, as the added value means higher food prices in the short and long terms and therefore reduced access to food (Food and Agriculture Organization of the United Nations, 2009a). Such pressures are already being felt: increased biofuel production was identified as one of the factors contributing to the food crisis in early 2008, which led to food riots in some countries. By 2016, food prices are expected to rise by 20 to 50 per cent (Organization for Economic Cooperation and Development and Food and Agriculture Organization of the United Nations, 2008).

## **THE IMPACT OF CLIMATE CHANGE ON YOUNG PEOPLE'S LIVELIHOODS**

Climate change is likely to affect employment patterns in different ways. Rates of unemployment are already higher among youth than among adults, and with most of the world's young people living in areas where dependence on natural resources and persistent poverty intersect, climate change could pose a serious threat to youth livelihood patterns and economic stability. On a more positive note, adaptation and mitigation efforts are opening the door to a new category of employment—green jobs—across a multitude of sectors, and young people could be the segment of the labour market best positioned to access them. However, as previously indicated, this new type of employment may be linked to other development challenges.

## Negative consequences

As is the case in many of the other contexts described thus far, youth in developing countries—especially those in rural areas—are likely to feel the impact of climate change on their livelihoods sooner and more directly than will their peers in developed countries (see box II.2). The more socio-economically vulnerable regions include many communities that depend on the natural environment for their livelihoods, with employment concentrated in sectors such as agriculture, forestry, and fisheries. The effects of climate change on these sectors will vary, but the outlook is largely negative for the developing world as a whole (Intergovernmental Panel on Climate Change, 2007a; Food and Agriculture Organization of the United Nations, 2009b; 2009c). Agriculture is one of the largest and most important employment sectors, but it is also extremely vulnerable to climate-related damage. In the short term, agricultural production is threatened by soil degradation and erosion, crop damage, and reduced harvests resulting from extreme weather events such as droughts, heatwaves, severe storms, and floods—all of which are expected to occur with greater frequency and intensity. The situation may be exacerbated in the long term by the higher sustained temperatures and systemic water scarcity linked to climate change. (Intergovernmental Panel on Climate Change, 2007b; International Assessment of Agricultural Knowledge, Science and Technology for Development, 2009).

The pressure climate change is exerting on traditional livelihood patterns will intensify throughout the lives of today's young women and men if the agriculture sector continues to be the major source of employment in the developing world. At present, agriculture accounts for almost half of all employment in less developed countries (United Nations Development Programme, 2007). In Africa the majority of young people live in rural areas, where agriculture accounts for 65 per cent of total employment (World Bank, 2008a). In several Asian countries youth employment has largely shifted to industry or services, but agriculture remains a significant source of employment for young workers (Asian Development Bank, 2008).

### Box II.2

#### Marjorie's story: a Filipina shell fisher in warm waters

Climate change is affecting marine ecosystems, threatening the livelihoods of many young people who live in coastal and island environments in the developing world. Marjorie's story is a prime example.

Marjorie lives on the island of Zaragoza, just off the coast of Southern Cebu in the Philippines. The small island is inhabited by 300 families whose main occupation is fishing. As a result of rising water temperatures, fishermen on the island have had to work longer hours and go further out to sea in order to make ends meet. Some have had to resort to asking their children to help out. This is how Marjorie started fishing when she was in her early teens:

One day, when I was 13, my mother asked me if I could start fishing more seriously, as if it were a job. ... I was happy, because I had noticed the hard times we were going through, and I knew I could help to catch more fish. The problem was one year later, when my mother told me that things were worse and I had to leave school, so I could work more and save the costs of studying. ... I really wanted to go [to school], because once I graduate I will be able to help my parents send my other siblings to school.

Marjorie was able to convince her family that her work would not suffer if she were allowed to resume her education. She is back in school now, about to begin her second-to-last year of secondary studies, but she still has to work in order to help her family out and finance her education, often fishing through the night before sailing out to school at seven in the morning.

I'm just so excited at the thought of finishing school. I was supposed to graduate two years ago, and now →

I'm afraid that I won't be able to make it. ... If I don't [graduate], people will assume that I don't know anything and I won't be able to work in the city. ... If here on the island there were fish like before, I would stay, because people lived well here. But now, with the climate change, it's impossible to make a living here.

**Source:** Summarized and excerpted from United Nations Population Fund (2009), *At the Frontier: Young People and Climate Change*.

For youth in developed countries the impact of climate change on employment opportunities may not be as negative. In industrialized nations young people tend to be overrepresented in the service sector, which is less likely to be affected by changing weather trends. Statistics for 2007 indicate that in New Zealand, 25 per cent of youth aged 15-24 years were employed in the retail industry and another 12 per cent worked in the accommodation, cafes, and restaurants sector, compared with respective rates of 13 and 5 per cent for all workers (New Zealand Department of Labour, 2007). A similar picture emerges from youth employment data in the United States; in 2008, 18 per cent of young people between the ages of 16 and 24 were employed in retail trade, and 23 per cent worked in the leisure and hospitality industry (United States Bureau of Labor Statistics, 2008). Although the service sector appears to be less vulnerable than many other sectors to the consequences of climate change, there may be some negative long-term effects, especially in the hospitality industry, as the impact of climate change on snowcaps, waterways, and coastal environments may reduce the appeal of many popular tourist destinations.

### **Potential positive consequences— including green jobs**

Shifting perspectives on sustainable development, including concerns over climate change, have created a growing market for green jobs across many sectors including energy supply, recycling, agriculture, and transportation. Green jobs represent an opportunity to make development truly sustainable, as they are spe-

cifically geared towards reducing the ecological footprint of economic activities. Simultaneously, they can play an important role in efforts to address rising unemployment. Green jobs will be explored in greater detail in chapter III.

## **THE MIGRATION EQUATION**

The nature and extent of the impact of climate change on human population distribution remains unclear. Historically, migration has been an important coping strategy for dealing with climate stress (Brown, 2008; Raleigh, Jordan and Salehyan, 2008). In Africa, droughts and floods have led to increased reliance on migration as an adaptation measure (Bates and others, 2008); over the past 20 years more than 10 million people in the region have been displaced owing to environmental degradation and desertification (International Organization for Migration, 2009). In the Sahel, reduced agricultural yields have been a key factor driving migration for roughly 30 years (Brown, 2008); climate change will continue to undermine agricultural productivity in the area and may be responsible for prolonged periods of drought (Intergovernmental Panel on Climate Change, 2007a), further threatening the livelihoods of the nearly 60 million young women and men living there.

Analysing climate-induced migration can be difficult. There is no consensus on the definition or measurement of this phenomenon, and very little relevant data are available. Moreover, migration flows in general have proven hard to predict. Nevertheless, it is reasonably safe to assert that over the next few decades more people may choose—or be forced—to move in response to the impact of climate change (International Organization for Migration, 2009). The nature and extent of climate-induced migration in the years to come will depend on a number of factors, including GHG emission levels, local population growth and distribution rates, the effects of climate change on weather patterns, and the success or failure of efforts undertaken by local and national communities to adapt to the changes. The motivation to migrate will be strongest among those whose economic security is seriously threatened or compromised by extreme weather events, water scarcity, and/or higher temperatures. It is virtually impossible

to predict how many might end up as environmental migrants in the coming decades. Projections are highly speculative and range from 25 million to 1 billion by 2050 (Brown, 2008), with 200 million being the most commonly cited figure (Myers, 2005; Stern, 2007).

Most climate-induced migration occurs within countries, and this trend is likely to continue (Boano, Zetter and Morris, 2008; Warner and others, 2009). As landlessness, poverty, and displacement continue to increase as a result of natural hazards, movement from rural areas to cities is likely to accelerate (Islam, 1996), leading to the expansion of urban slums (Raleigh, Jordan and Salehyan, 2008). Agricultural workers may continue to pursue a rural livelihood, becoming migrant farmers, but in the face of drought and soil degradation jobs may be increasingly hard to find (Warner and others, 2009). Where small countries are affected, some international migration will probably be necessary (International Organization for Migration, 2009). For residents of low-lying SIDS the impact of climate change may be dramatic, which could potentially translate into high rates of climate-induced migration (see box II.3).

### Box II.3

#### Permanent inundation and forced migration

The rising sea levels and hydrological shifts expected with climate change could lead to the permanent inundation of low-lying coastal environments. The results could be devastating for many indigenous islanders and for coastal and small island populations as a whole. The story below illustrates how one community has had to deal with the threats and realities of climate-induced displacement. If something is not done to address climatic shifts, many more will have similar tales to tell.

#### *The Carterets Islands, Papua New Guinea*

The Carterets is a group of islands, and Han is one of them. My name is Nicholas Hakata. I am from the Carterets Islands. It is a holiday paradise

island. Life on the island is easygoing and simple. We go fishing or go to the bush to check the banana plantation or just relax. But only one thing is wrong. The sea is eating our Han Island and shrinking it. We never realized the king tides could destroy our island. We may not have an island in the future. When the tide is high, the sea rises up one to two metres and flows further inland. The sea walls aren't enough to stop the sea from coming in like a river. Areas where the sea never reached are washed over now. The invading king tides left a swamp where mosquitoes are now breeding. Now there are many more mosquitoes, and our children are sick with malaria. This is the middle of the island. The sea recently passed through here and continued, almost to the other side. It destroyed everything in people's gardens. After this happened, our people were starving. We were hungry and ate only fish and coconut. [There is only one] boat that provides supplies and services to us when in need. Often it comes twice a year. It is supposed to come four times a year. When the children are hungry, it distracts them from their education. When the school bell rings, they don't want to turn up. There is nothing in their homes, and in their stomachs, so they refuse to go to school. Our Government has provided food aid, but this is a short-term service of food supply and is not sustainable.

Islanders are thinking about relocating to the Bougainville mainland, where we can produce for ourselves. Recently, we held community meetings to decide on ways to sustain ourselves. An office was set up in Buka to get things done quickly. This is because the Government has not found a solution to assist us. It has not found land to save our people on the Carterets. This situation is bad because the only solution is to relocate. If you don't, there will be no food here and one would die. We conducted a survey and came up with a relocation program. After experiencing the recent king tides, most →

islanders want to relocate and very quickly. We are also learning which skills and resources we can take to the mainland. We need to relocate 120 families. But we need finances to do this. We need 6 million kina [US\$ 2 million] to build houses and other facilities for housing 120 families on the main island of Bougainville. In the future, we plan to come back to these reefs and manage them as our fishing ground. Our reefs will be a source of income, and our children will come back and connect with their ancestral homeland.

**Source:** Nicholas Hakata (personal communication).

It is difficult to predict the extent to which young people will take part in environmental migration. On the one hand, research on famine relief has shown that in situations of induced migration those without dependants usually leave first, followed by older men and then families (Raleigh, Jordan and Salehyan, 2008). This pattern implies that a first wave of climate-induced migration may involve mostly male youth. On the other hand, the ability to migrate is a function of mobility, and prospects for success are heavily influenced by factors such as access to money, family networks, and contacts at the destination (Brown, 2008)—a reality that could limit the migratory flows of young men and women who are just beginning the process of integration into productive society.

A higher probability of conflict may also be linked to climate change and migration. The relationship between these three factors is difficult to define, as it involves many causal pathways and interlinkages. Essentially, though, it revolves around disputes over scarce resources—a situation that could both lead to and arise from migrant flows (Boano, Zetter and Morris, 2008). Whatever the causes, increased conflict of any kind could significantly undermine youth development.

### **Climate, conflict, and youth**

The relationship between climate change and conflict is complex but derives primarily from reduced economic security, increased resource scarcity (especially in areas economically dependent on natural resources), and the circumstances surrounding displacement (Ohlsson, 2000; United Nations Environment Programme, 2009). These three factors are likely to have a significant impact on the world's largest youth cohorts in Africa and Asia, where rural livelihoods and natural resource dependence are dominant.

As figure II.1 illustrates, many of the factors that push youth into situations of conflict—including economic instability, social and political exclusion, unemployment, dissatisfaction with public services, and the breakdown of traditional family and social networks (United States Agency for International Development, 2005)—may be exacerbated by the effects of climate change.

Figure II.1

The complex relationship between conflict over natural resources and climate change

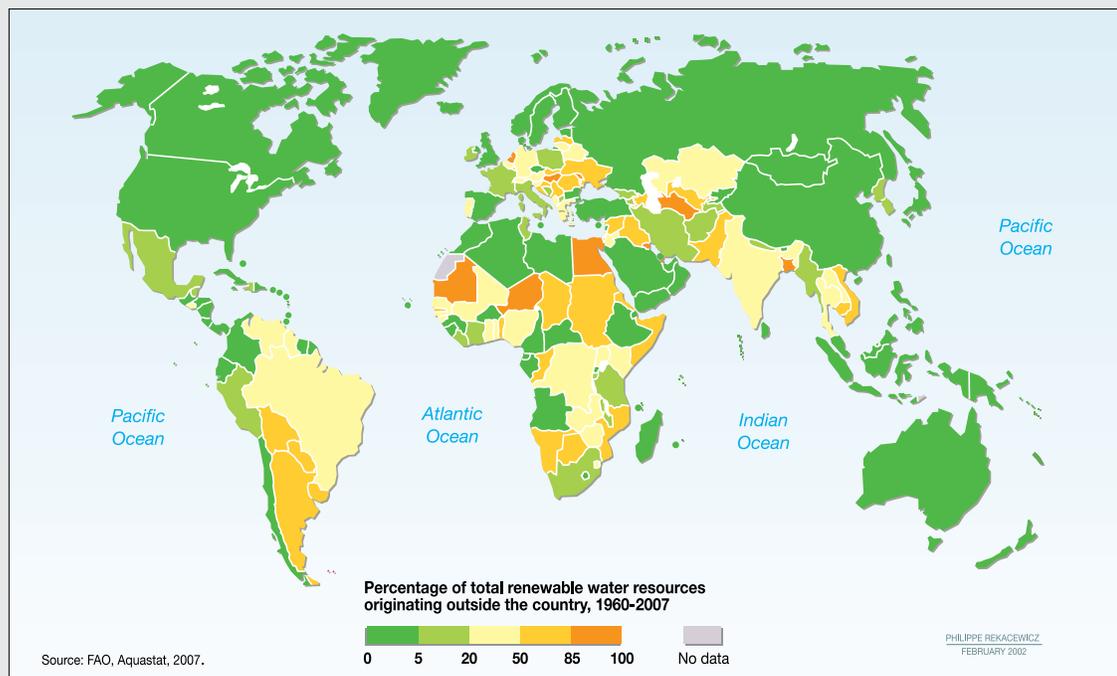


Source: United Nations Environment Programme/GRID-Arendal (2005).

Environmental stress has already been responsible for numerous internal conflicts, and climate change will only increase the strain on the environment, especially in developing regions (Raleigh, Jordan and Salehyan, 2008). Water scarcity is an example of such a threat, a case in point being the ongoing conflict in Darfur, which has been partially attributed to the persistent, worsening drought and the consequent shortage of fertile land (United Nations Environment Programme, 2009). Throughout Africa, almost all major river basins are transboundary

in nature, and any reduction in these water resources could raise tensions on the continent (United Nations Framework Convention on Climate Change, 2007a). Many countries in Central and Southern Asia that depend on water originating outside their boundaries could be similarly affected (United Nations Environment Programme, 2008a). The picture painted by figure II.2 suggests that the potential for conflict linked to water resource availability is quite high in some regions.

**Figure II.2**  
**Dependency ratio in renewable water**



Source: United Nations Environment Programme/GRID-Arendal (2009a).

Note: The dependency ratio in renewable water represents the percentage of total renewable water resources originating outside of a country. This serves as a good indicator of the potential for tension and conflict over water-sharing.

Ongoing conflict can exacerbate the consequences of climate change in affected areas. Many young people in the developing world reside in areas that have endured extended periods of armed conflict, resulting in serious resource depletion and reduced adaptive capacity (Harbom, Melander and Wallenstein, 2008). Prolonged conflict has direct and indirect health consequences relating to displacement, the breakdown of health and social services, and the heightened risk of disease transmission. Any threat climate change poses to youth development is likely to be aggravated by drawn-out conflicts.

## FINAL ANALYSIS

Climate change potentially represents a major threat to the health and socio-economic stability of youth—particularly in developing countries, where the vast majority of young people live. Certain groups, such as indigenous

youth, are especially vulnerable and are likely to encounter even greater obstacles within the contexts highlighted in this chapter (see box II.4). Unless the causes and consequences of climate change are addressed very soon, the youth of today and tomorrow may effectively be prevented from participating fully and productively in society, which could have a serious impact on national development in the long term.

### Box II.4

#### Climate change and indigenous youth

Regardless of where they live in the world, indigenous youth are among the most vulnerable to the threats posed by climate change. In some cases, they are also among those who stand to lose the most as a result of inter-

national mitigation efforts. Ironically, indigenous communities are at risk partly because of their sustainable, carbon-neutral, or even carbon-negative lifestyles.

To understand how and why indigenous youth will be affected by climate change, it is first necessary to recognize the unique, sacred relationship that exists between indigenous peoples and their environment. It is equally important to recognize that indigenous youth cannot be isolated from their cultural context. They are an integral part of their families and communities.

Indigenous peoples coexist with what have become some of the most fragile elements of the ecosystem. Many of them can be found in or around the majority of existing forest tracts, which are home to 80 per cent of the world's biodiversity. Others are long-term inhabitants of the melting ice caps in the Arctic region, the diminishing landforms of low-lying island atolls, and coastal areas (Salick and Byj, 2007). Indigenous peoples do not see land and water as commodities; for them, the earth is a living and sacred entity that provides food, medicine, shelter, and clothing (Borrows, 2006; LaDuke and Alexander, 2004). Their relationship with these elements is often a spiritual one. Once this is understood, it is easy to see why many indigenous peoples view climate change as a human rights issue (Carmen, 2008). For the world's indigenous groups, the impact of climate change on the environment and biodiversity represents a threat not only to their physical survival, but also to their cultures, languages, and world views.

Indigenous youth live an already fragile existence. In several countries, this manifests itself in alarmingly high rates of depression and suicide (Pan American Health Organization, 2007; Health Canada, 2006; Human Rights and Equal Opportunity Commission of

Australia, 2003). These young people are part of the growing phenomenon of forced displacement, violence, social exclusion, and the erosion of cultural and linguistic traditions. With climate change, some of these problems could become much worse.

Indigenous youth living in the Arctic, in semi-arid regions, or on small, low-lying islands may see their self-determination compromised if their communities are forced to relocate. Permanent displacement would have a profound physical and psychological impact, as they would lose access to nutritional inputs that make up their traditional diets and to traditional economic activities such as agriculture, hunting, and fishing. There would also be a gradual loss of the long-standing cultural traditions and location-specific language associated with their territories.

With a major disruption of their livelihood patterns, young displaced people with the least transferable skills and education run the highest risk of poverty. As they move to urban centres to seek employment, they may encounter discrimination while also experiencing a loss of identity and, for perhaps the first time, a lack of family and community support.

Indigenous children and youth are also susceptible to certain health risks associated with climate change, including plant and animal contamination, asthma and other respiratory diseases linked to declining air quality, and the increase in vector-borne diseases.

Indigenous youth and their communities are likely to be affected not only by the problems stemming from climate change but also by some of the proposed solutions. Biofuel production often involves the large-scale cultivation of single crops, which reduces biodiversity. The clearing of land for this purpose can lead to the forced displacement of indigenous communities, →

which violates the provisions of the United Nations Declaration on the Rights of Indigenous Peoples, adopted by the United Nations General Assembly on 13 September 2007. This is already occurring in some areas and in certain instances has led to conflict. Disputes may also arise over water, wood, or other dwindling resources in indigenous lands and territories.

## SUGGESTIONS FOR FURTHER READING

- Food and Agriculture Organization of the United Nations (2009). New challenges: climate change and bioenergy. Issue paper prepared for the World Summit on Food Security, held in Rome from 16 to 18 November 2009. Available from <ftp://ftp.fao.org/docrep/fao/meeting/018/k5987e.pdf>.

This brief paper, produced by the Food and Agriculture Organization of the United Nations for the 2009 World Summit on Food Security, provides a summary of the impact of climate change and bioenergy development on food security.

- Ganeshan, Shamanthy, and Wayne Diamond (2009). Forecasting the numbers of people affected by natural disasters up to 2015. Oxfam papers and reports on climate change, 2009. Available from [http://www.oxfam.org.uk/resources/policy/climate\\_change/downloads/forecasting\\_disasters\\_2015.pdf](http://www.oxfam.org.uk/resources/policy/climate_change/downloads/forecasting_disasters_2015.pdf).

Ganeshan and Diamond offer projections on the human impact of climate change, predicting that by 2015 more than 375 million people per year will be affected by climate-related disasters.

- International Organization for Migration (2009). Migration, climate change and the environment. IOM Policy Brief. Geneva, May. Available from <http://iom.ch/jahia/webdav/shared/shared/main->

[site/policy\\_and\\_research/policy\\_documents/policy\\_brief\\_envmig.pdf](http://www.unhcr.org/refworld/docid/3e6c1d1d.html).

This policy brief provides a general introduction to the dynamic relationship between migration, climate change, and the environment and describes the Organization's perspectives and involvement in this field.

- McMichael, A. J., and others, eds. (2003). *Climate Change and Human Health: Risks and Responses*. Geneva: World Health Organization. Available from <http://www.who.int/globalchange/publications/cchbook/en/>.

Produced jointly by the World Health Organization, World Meteorological Organization, and United Nations Environment Programme, this publication addresses the present and future impact of climate change on human health and proposes ways in which societies can moderate those effects through adaptation strategies and the reduction of GHG emissions.

- United Nations Children's Fund, Innocenti Research Centre (2008). *Climate Change and Children: A Human Security Challenge*. Policy Review Paper. Available from [http://www.unicef-irc.org/publications/pdf/climate\\_change.pdf](http://www.unicef-irc.org/publications/pdf/climate_change.pdf).

This policy review paper examines the vulnerability of children and young people in the context of a changing climate and in the contexts of global, national, and subnational policies and frameworks on climate change and human security. It is argued in the publication that existing agreements and policies do not sufficiently address children's issues within the broader framework of climate change.

- United Nations Framework Convention on Climate Change (2007). *Climate Change: Impacts, Vulnerabilities and Adaptation in Developing Countries*. Bonn, Germany. Available from <http://unfccc.int/resource/docs/publications/impacts.pdf>.

This publication highlights the needs and concerns of developing countries as they adapt to the effects of climate change. The book describes the impact of and adaptation to climate change in Africa, Asia, Latin America, and small island developing States.

