



Red Cross/Red Crescent Climate Guide
Climate Change: the Basics



Climate Change: the Basics

Scientific consensus: the impact of climate change on the risk of natural disasters

Climate change is already happening

Climate change is happening now. Global surface temperatures rose by over 0.7 °C during the 20th century – making it the warmest period in at least the past 1,300 years. And climate change is accelerating: 11 out of the 12 last years (1995–2006) rank among the warmest years since records began (see figure 1).

...and bringing more extremes

That 0.7 °C may not seem much. Less, for instance, than the temperature difference between day and night. So why worry? Well, think of a patient with a fever: the slightly higher temperature is only an indicator that much more is awry. In the case of the climate it is not so much the average temperature rise that is alarming. Along with the planet's rising temperature, known as global warming, glaciers have been melting, increasing the risk of lake-burst floods and threatening the water supply of millions of people.

IPCC and the scientific consensus

The scientific consensus on climate change is presented in the reports of the Intergovernmental Panel on Climate Change (IPCC), which was established in 1988 by the United Nations Environment Programme and the World Meteorological Organization. The IPCC engages thousands of the world's leading experts to review the published literature on climate change. The summaries for policy-makers are approved, line-by-line, by governments. In 2007, the IPCC was awarded the Nobel Peace Prize. This section summarizes the findings of the IPCC's most recent (2007) survey, the Fourth Assessment Report ("AR4"), especially of Working Group I, which gives an account of the science of climate change, and Working Group II, which reports on impacts, adaptation and vulnerability. The full reports are available on www.ipcc.ch.

Rainfall patterns have also changed, including drying in tropical, subtropical and Mediterranean regions, and increases in average rainfall and snow in temperate regions such as North America, northern Europe and central and northern Asia. Even more worryingly, the frequency and intensity of extreme rainfall and snowfall events have been rising, as well as the number of droughts. We have also witnessed more heatwaves and more intense hurricanes.

It is very likely caused by human activity

It is also clear that these changes are largely caused by humans. According to the Intergovernmental Panel on Climate Change (IPCC), "most of the warming observed since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentration". These greenhouse gases act as a blanket over the earth, keeping it warmer (see box page 14). They are emitted when we burn fossil fuels such as coal, oil or gas, or when we cut down and burn the trees. The current concentrations of greenhouse gases exceed the natural range that has existed for over 650,000 years.

...and it's here to stay

Climate change is here to stay – and will accelerate. This century the temperature increase is likely to range from two to four degrees Celsius (see figure 2). This rate of warming is probably without precedent during at least the last 10,000 years. The worst long-term effects can still be avoided if we substantially cut greenhouse-gas emissions. But however aggressively

we cut back on fossil-fuel use, climate change is bound to continue: the greenhouse gases already emitted stay in the atmosphere for many decades. We have no choice but to cope with the impacts. In terms of disasters, we can expect further increases in heatwaves, floods, droughts and in the intensity of tropical cyclones, as well as extremely high sea levels (see table 1).

Figure 1: Observed changes in global average surface temperature (source: IPCC, 2007)

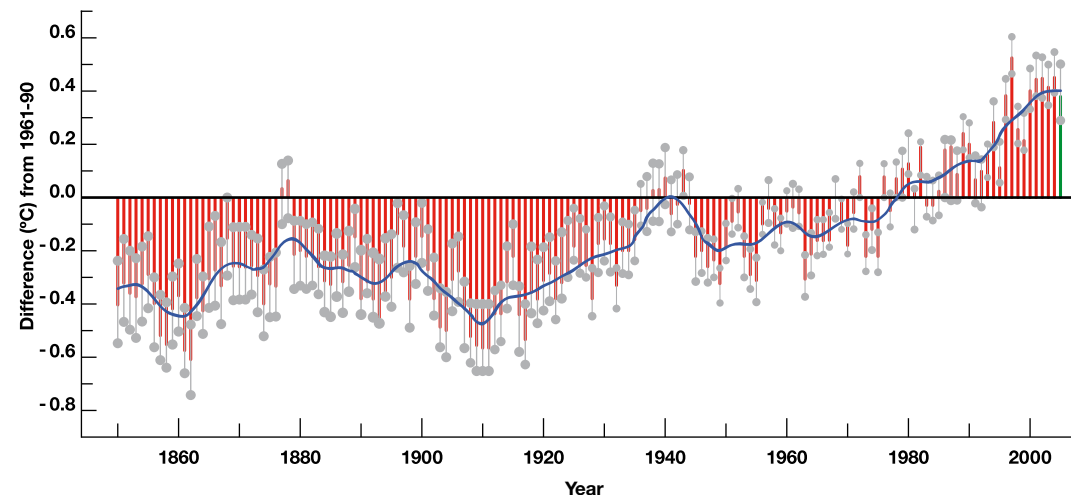
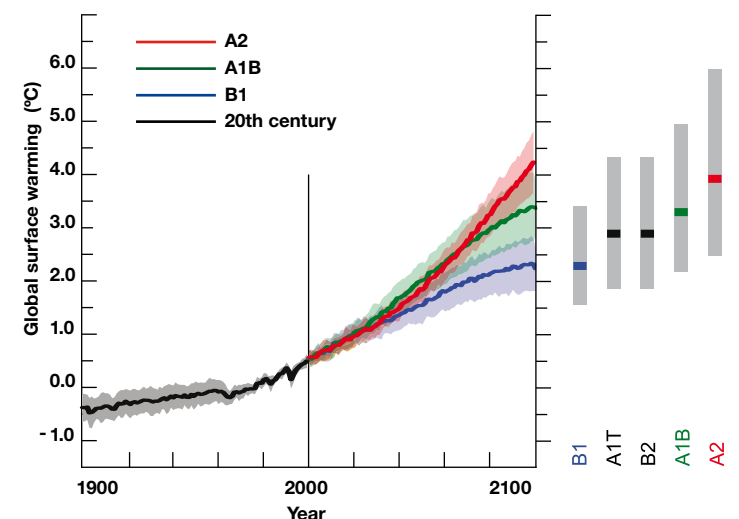


Figure 2: Warming scenarios for the 21st century (source: IPCC, 2007)



Each colored line represents the likely change in global temperature that would occur for a specific greenhouse gas emissions scenario (called A2, A1B, etc. by the IPCC). The shading around it indicates model uncertainty. The bars on the right show the likely temperatures in 2100 for the full set of IPCC emission scenarios.

The black line with grey shading represents the observed global temperatures during the 20th century.

Table 1: Examples of climate change impacts

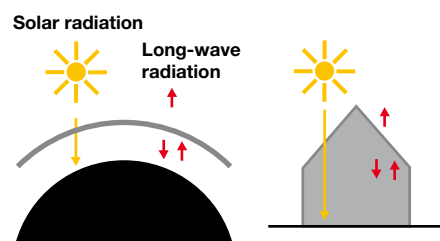
Phenomenon and direction of trend	Likelihood that trend occurred in late 20th century	Likelihood of future trend	Examples of major impacts
Over most land areas, warmer and fewer cold days and nights, warmer and more frequent hot days and nights	Very likely	Virtually certain	<ul style="list-style-type: none"> • Increased agricultural yields in colder environments, decreased yield in warmer environments • Increased insect outbreaks • Effects on water resources relying on snow melt • Reduced mortality from cold exposure • Declining air quality in cities.
Over most land areas, more frequent warm spells/heatwaves	Very likely	Very likely	<ul style="list-style-type: none"> • Reduced yields in warmer regions due to heat stress • Increased risk of bushfire • Increased water demand, water-quality problems • Increased heat-related mortality, particularly for the elderly, chronically sick, very young and socially isolated.
Over most areas, increasing frequency of heavy precipitation	Likely	Very likely	<ul style="list-style-type: none"> • Damage to crops • Soil erosion • Adverse effects on quality of surface and ground water • Water scarcity may be relieved • Increased risk of deaths, injuries, and infectious, respiratory and skin diseases • Disruption of settlements, commerce, transport and societies due to flooding • Pressures on urban and rural infrastructure • Loss of property.
Increasing area affected by drought	Likely in many regions since 1970s	Likely	<ul style="list-style-type: none"> • Land degradation • Lower yields, crop damage • Increased livestock deaths • Increased risk of wildfire • Increased risk of food and water shortage • Increased risk of malnutrition • Increased risk of water- and food-borne diseases • Migration.
Increasing intensity of tropical cyclones	Likely in some regions since 1970s	Likely	<ul style="list-style-type: none"> • Damage to crops and trees • Power outages causing disruptions of public water supply • Increased risk of deaths, injuries and disease spread through water or food • Post-traumatic stress disorder • Disruption by flood and high winds • Withdrawal by private insurers of risk coverage in vulnerable areas • Migration, loss of property.
Increased incidence of extremely high sea levels	Likely	Likely	<ul style="list-style-type: none"> • Salinization of irrigation water and freshwater systems, and decreased freshwater availability • Increased risk of deaths and injuries by drowning in floods • Migration-related health effects • Costs of coastal protection versus relocation • Potential for relocation of people and infrastructure • Tropical-cyclone effects.

Source: IPCC 2007 Working Group II, Summary for Policymakers.

A boatman repairs his boat on the dried up riverbed of the Jialing river running along southwest China's Chongqing municipality. Photo: Reuters/Stringer Shanghai



The greenhouse effect



The figure above illustrates the greenhouse effect. The temperature rise caused by greenhouse gases in the atmosphere is similar to the warming inside a greenhouse. Radiation from the sun travels through the atmosphere and warms the earth's surface. Part of the incoming energy from the sun leaves our planet in the form of heat (long-wave radiation, or infrared). On its way out through the atmosphere, this heat is absorbed by greenhouse gases that act as a blanket over the earth, keeping it warmer. We should be grateful for this effect because it makes life on earth possible. Carbon dioxide and methane are two important greenhouse gases. Adding more of these gases to the atmosphere enhances the greenhouse effect and thus increases the average temperature at the earth's surface: global warming.

Since the end of the industrial revolution, concentrations of carbon dioxide, which is produced by burning fossil fuels (coal, oil, natural gas), have risen by over 30 per cent, while methane has approximately doubled. Carbon dioxide molecules can live around 100 years in the atmosphere, and they now stand at a concentration of about 385 parts per million (ppm), as compared to a pre-industrial concentration of about 280 ppm. The current concentration of carbon dioxide is at least a quarter higher than at any other time during the past 650,000 years. If we carry on burning fossil fuel in a "business as usual" way, carbon dioxide concentrations will rise to 600 or 700 ppm by the year 2100. Even if the whole world worked very hard to limit emissions, carbon dioxide concentrations are unlikely to stabilize below 450 ppm.

It will hit the poor and the vulnerable

The impacts of climate change will fall disproportionately upon developing countries and poor people in all countries – in other words, those who have contributed least to greenhouse gas emissions. This in turn will exacerbate existing inequities in health status and access to adequate food, clean water and other resources.

A warmer world can have positive and negative effects. But even small changes will create negative impacts in the most vulnerable areas of the world, including virtually all developing countries. And the bigger the changes, the more negative the effects will be all around the globe.

...and threaten human health

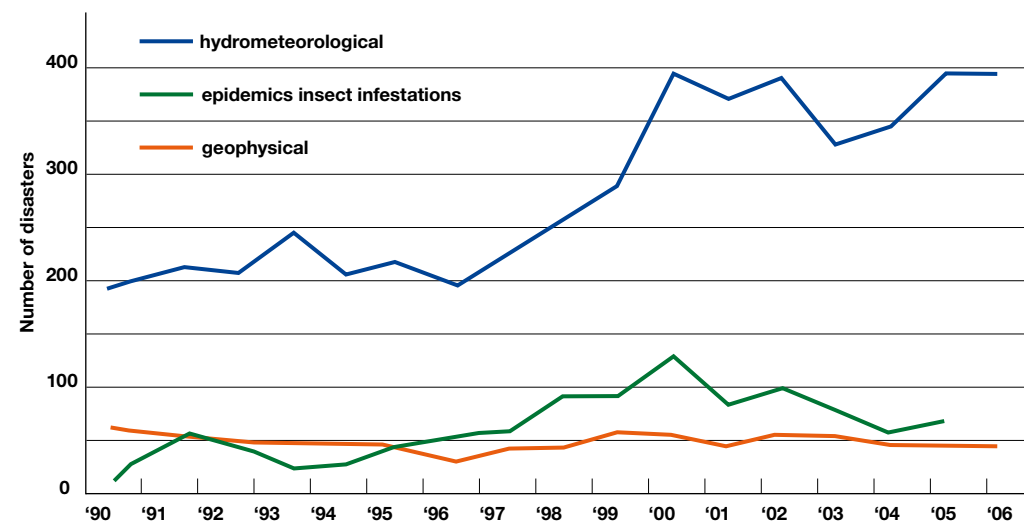
Water scarcity will increase in many areas. In Africa, up to 250 million people will suffer water stress by 2020. Food security is bound to be compromised as agricultural productivity declines.

Threats to human health include heat stress, injuries and disease brought by storms, floods and droughts, changes in the range of vector-borne diseases, and decreases in water quality, air quality and food security. Small islands face long-term sea-level rise and will also be affected by increasing storm surges and cyclones long before they are actually submerged. Densely populated river deltas in Asia are also particularly vulnerable, as are other coastal areas.

International efforts to reduce greenhouse-gas emissions are underway

Long-term climate change and its impacts can be lessened by reducing emissions of greenhouse gases. In 1992, the UN Framework Convention on Climate Change (UNFCCC) was established to reduce global warming and to cope with inevitable temperature increases. As scientific evidence for climate change grew stronger during the 1990s, parties to the UNFCCC signed the Kyoto Protocol in 1997, which includes mandatory reductions of greenhouse-gas emissions for developed countries. Some key countries, such as the US and Australia, have not ratified it. Negotiations on a new protocol began in 2007, to be concluded by 2009.

Figure 3: Annual number of natural disasters (source: CRED EM-DAT)



...but further climate change is unavoidable, so we have to adapt

The international efforts to reduce greenhouse-gas emissions are crucial to avoid the worst-case scenarios for the end of this century. In the coming few decades however, climate change is bound to continue regardless of how well those efforts succeed, simply due to the greenhouse gases we have already emitted, which stay in the atmosphere for a very long time. Therefore, in the short term, we have no choice but to deal with these changes as best as we can – "adaptation". In practice, this will work best if strategies to reduce climate-related risks are integrated in ongoing development and disaster risk reduction. This comprehensive approach to manage the rising risks is called "climate risk management".

Rising disaster impacts

In the past years, there has been a large rise in the number of disasters (from between 200 and 250 in the period 1987–97 to about double that in the first seven years of the 21st century). This rise is caused

almost entirely by an increase in weather-related disasters (see figure 3). For instance, the number of disastrous storms has doubled. Disaster statistics also show that floods are occurring not just more often but also damage greater areas than they did two decades ago. And these rises are accompanied by a rapid increase in socio-economic losses and in the number of people affected: on average 250 million people a year, up by more than 30 per cent in just a decade. Although since the 1970s, the number of people killed by natural disasters has decreased, largely due to better disaster preparedness, in the past years, that decrease has been tapering off and even reversing.

Specific examples of recent disasters that clearly fit the trend of rising risks due to climate change are: the European heatwave of 2003, which killed over 35,000 people; the devastating 2005 Atlantic hurricane season, including Katrina, the costliest disaster ever with US\$ 125 billion in damages, and Wilma, the most powerful Atlantic storm ever recorded; the massive flooding during the Asian monsoon of 2007; and floods following droughts in various parts of Africa, devastating the livelihoods of millions of people.

Reducing Greenhouse Gases

The Red Cross and Red Crescent and other humanitarian organizations are in the front line of climate change impacts.

If we are concerned about climate change and we know it is very likely to be caused by human actions, what should we do ourselves to address the root cause of the problem? This question is raised by more and more National Societies.

1. Save energy

There is a growing number of organizations and companies around the world who can advise on how to reduce National Societies' use of energy in offices and vehicles.

Often very simple technological measures like turning down heating or air-conditioning can save a lot of energy.

Better use and better maintenance of vehicles is also an energy saver.

An energy-conscious attitude by Red Cross/Red Crescent staff and volunteers can be encouraged. You can show how much energy and money have been saved after a certain period and reward staff. Competitions for the best energy-saving idea are another way of stimulating engagement.

Energy-saving measures do not only apply at national and local level but also internationally. We will need to look more closely at the energy costs of international meetings and travel and see whether there are good substitutes like teleconferencing.

2. Use green energy

After reducing your overall energy use you might want to have a look at your main energy source. Are there renewable energy sources available that don't emit greenhouse gases?

In some high-income countries energy companies enable consumers to buy green energy from renewable sources like biofuel, solar power, hydroelectricity and wind turbines.

3. Compensate for your emissions

Full carbon neutrality in which our activities do not add any greenhouse gas to the atmosphere at all is unlikely in the near future. So in addition to saving energy or using renewable energy sources we can compensate for emissions.

For example, if you have a return flight to Geneva you can calculate how much greenhouse gas this emits. You can then compensate for these emissions by paying a specialist organization to plant trees or run renewable-energy projects.

In the Red Cross and Red Crescent ideas are emerging on how risk-reduction programmes, like planting trees against landslides and desertification or (in Vietnam, for example) mangroves against storm surges, can benefit from such schemes.

4. What comes first?

In some National Societies there have been discussions about whether the Red Cross and Red Crescent should address climate change without putting our own house in order on energy use. However, the Climate Centre strongly feels that our primary responsibility is to help vulnerable people deal with rising climate risks. Assisting them is our core mandate, and if we fail to do that we fail as an organization. We don't hold planes on the ground or keep trucks in our warehouses after an emergency because they emit greenhouse gases.

Then again, the Red Cross and Red Crescent, and particularly National Societies in rich countries, can and should join the global challenge to reduce the emissions of greenhouse gases.

But we are not just seeing an increase in mega-disasters – there is also an increase in smaller ones that do not capture the attention of the world's media, but do have tremendous impacts on lives and livelihoods, particularly of the most vulnerable people. Importantly, those who depend on nature for their livelihoods are increasingly unable to figure out what to expect and what decisions to make, for example when or what to plant, particularly given changes in the timing and intensity of rainfall.

This rise in losses and people affected reflects a growing vulnerability to natural hazards, and in particular to hazards related to weather and climate such as floods and droughts, which dominate the disaster statistics. This growing vulnerability is intimately tied to development patterns: unsound environmental practices, population growth, urbanization, social injustice, poverty, and economic short-sightedness are producing vulnerable societies. And there is the risk that disasters themselves trap people in vicious circles: the most vulnerable become even more vulnerable to new disasters.

The rising vulnerability is compounded by the trends in extreme events and additional uncertainties associated with climate change. This makes the challenge of managing the rising risks and reducing our vulnerability more difficult, but also even more urgent. A changing climate means more work for humanitarian organizations.

Addressing the humanitarian consequences: a call to action

Unless mankind manages to curtail emissions of greenhouse gases, the long-term consequences of climate change will be nothing short of catastrophic, with annual economic losses up to 20 per cent of the world economy and humanitarian consequences on a much larger scale than the increase in disasters we are currently witnessing. The Red Cross and Red Crescent, and particularly National Societies in developed countries, can do their share in limiting

global emissions, for instance by promoting energy efficiency in their offices, and compensating for the emissions in their operations (see box on page 16).

But regardless of how the world manages to tackle that long-term challenge, substantial changes are already with us, and further rises in risk unavoidable, at the very least for several decades to come. And as the global climate is changing, the Red Cross/Red Crescent Movement needs to change as well. Climate change directly affects the Red Cross and Red Crescent's core mandate: assistance to the most vulnerable. Inaction is not an option: either we address the rising risks, or we fail to address our own mandate.

From human resources planning and training to programme design and implementation, our work will need to integrate new challenges and opportunities. From strategic planners in Geneva headquarters to volunteers in flood-prone villages, everybody will need to be aware that we are facing new risks, and will have to plan and act accordingly.

The main question is not *if* but *how* to address the risks of climate change. While some impacts can already be seen, or projected fairly accurately, many others will appear as surprises, or only become apparent once climate change progresses. Climate change thus not only raises the risks but also increases the uncertainties. A country may be hit by a once-in-a-century flood this year and by a heatwave or drought the next. And it may face more complex disasters, compounded by poverty, disease or conflict.

However, surprises are not something the Red Cross and Red Crescent cannot handle. In fact, they fit our core mandate: to assist the most vulnerable in *any* situation. Addressing the rising risks is not something new – we just need to integrate the notion of changing risks into everything we do, aware that the range of extreme events may be growing. We must enhance our ability to respond and help people to reduce their vulnerability. This guide contains many examples of National Societies already doing so. The following section summarizes the key elements of their approach.

Six components of good climate risk management:

There are many things National Societies can do to address the humanitarian consequences of climate change, individually and through the International Federation. The following six items summarize the key components of such *climate risk management*:

I Climate risk assessment: assessing priorities, and planning follow-up

National Societies should start taking account of the rising risks in strategies and programme design, prioritization of activities and allocation of resources. The first step is to designate a focal point, and make a preliminary assessment of the potential impacts of climate change and the implications for their mandate and programmes. *The module Getting Started helps National Societies take the first steps doing this.*

II Addressing the consequences: integrating climate change in programmes and activities

The core response should be to integrate the notion of the rising risks into the programme areas that are most affected:

- **Disaster Management**

First and foremost, climate change will bring more and different disasters, affecting all aspects of disaster management, ranging from an increase in relief operations to a need for more and better disaster risk reduction (*see the module Disaster Management*).

- **Community risk reduction**

In particular, National Societies need to step up efforts to help communities address the rising risks, through community based risk reduction, using tools such as Vulnerability and Capacity Assessments (*see the module Community risk reduction*).

- **Health and Care**

Changing disease patterns will require adjustments in programmes to address health risks and promote health and care at the community level (*see the module Health and Care*).

- **Food Security**

Climate change is a major threat to food security, particularly in Africa, and will need to be addressed in food-security programmes, both through enhanced relief and better prevention. *Few National Societies have explicitly integrated climate change into their food-security programmes. Over time, the Climate Centre will be developing additional guidance in this area.*

- **Water and Sanitation (Watsan)**

Many National Societies are addressing water and sanitation issues, which are closely coupled to our priorities to promote better health and care. It is clear that climate change will have a major impact on water in many countries, and these changes will need to be factored into the design of Watsan programmes and infrastructure. *Few National Societies have explicitly integrated climate change into their Watsan programmes. Over time, the Climate Centre will be developing additional guidance in this area.*

- **Migration and conflict**

Climate change is almost never the only reason people move, so it is important not to oversimplify the connections between climate, migration and conflict. However, climate change can indeed aggravate pressure on scarce resources, threaten livelihoods and trigger migration due to extreme events. *More research is expected in this area, and the Climate Centre will be developing additional guidance.*

New funding for climate change may help to facilitate integration of climate risk management into Red Cross/Red Crescent programmes (*see box on page 21*).

III Raising awareness

One important role of the Red Cross and Red Crescent is to help people and institutions learn about climate change and its humanitarian consequences, both through community-based activities and public-awareness campaigns. *The module on Communications helps National Societies to think through what and how they want to communicate about climate change.*

People paddle a raft down a flooded street in Sirajganj town, Bangladesh. Photo: Reuters/Rafiqur Rahman



IV Establishing and enhancing partnerships

Addressing climate change cannot be done in isolation. Risk assessments require inputs from climate experts (for instance, from the national meteorological office). Risk reduction often requires partnerships with governments, other NGOs, businesses, and others. National Societies' local reach puts them in a strong position to help bridge the gaps between national and local stakeholders. *The module Dialogues helps National Societies to build a network to knowledge centres, government agencies, and other actors.*

V International advocacy: shaping the global response to climate change

At the international level, the Red Cross and Red Crescent has to advocate for the most vulnerable people, and ensure that they are included in the global response to climate change. As the world's largest humanitarian network, the International Federation is uniquely placed to relate the humanitarian consequences of climate change to the wider arena of international humanitarian, development and climate policy, including through the UNFCCC. We also have a responsibility to call on all governments to address the problem driving climate change – the emission of greenhouse gases.

VI Documenting and sharing experiences and information

We are only starting to address the rising risks, and there is much to learn. This guide is an initial attempt to learn from experience and distill guidance. National Societies should analyse and document their experiences, in order to refine their own response to the changing risks, but also to share them with others, within and beyond the Red Cross and Red Crescent.

What the Climate Centre can do for you

The Red Cross/Red Crescent Climate Centre is a reference centre of the International Federation. Established in 2002 and based at the Netherlands Red Cross headquarters in The Hague, it helps the Red Cross and Red Crescent Movement to understand and address the humanitarian consequences of climate change. The Climate Centre assists National Societies and the International Federation through:

- Guidance on how to integrate climate change into planning and programmes
- Answers to specific questions during programme implementation
- Regular updates on climate-related news, policy and science
- Exchange of experiences and documentation of best practice
- Training and capacity building on climate risk management
- Fostering a climate change network within the Red Cross and Red Crescent
- Connections to relevant knowledge centres, NGOs and government contacts
- Assistance with communication and media strategies
- Support for the development and use of participatory audio-visual tools in climate-related programmes
- Advice on attracting (new) financial resources for climate risk reduction
- Development of Red Cross/Red Crescent policies and positions related to climate change, and advocacy.

Our support is aimed especially at National Societies in developing countries that are most vulnerable to the impacts of climate change. We also help National Societies in wealthy countries to assess their own programmes and to mobilize resources to support societies in the developing world.

Funding for climate risk reduction

Developing countries

It is widely acknowledged that climate change is a reality and that developing countries will be hit worst. Funding mechanisms are appearing to meet this challenge and can be expected to continue.

Some existing channels of funding now favour programme proposals that integrate climate risk reduction. One example is the DIPECHO programme of the European Commission (2006–7). If climate change is explicitly addressed, the proposed programme is more likely to be funded.

In addition, bilateral and multilateral donors are developing special channels for climate risk reduction (or “adaptation”) which could also be accessed by the Red Cross and Red Crescent. For example, the European Commission has announced the intention to establish a Global Climate Change Alliance with a fund of €50 million to start with. Several bilateral donor agencies have also earmarked money for adaptation.

At the global level, the UN Climate Change Convention and its Kyoto Protocol have spawned several funds for adaptation, including the Least Developed Countries Fund, the Special Climate Change Fund and the Adaptation Fund. The procedures for accessing these funds are complex but still evolving. Additionally, many other donors are increasingly supporting climate change work among vulnerable communities (including foundations, the private sector, and research bodies).

High-income countries

A growing number of industrialized countries are beginning to address climate change risks at the national level: some countries are already investing tens of millions of dollars and reserving billions. Few National Societies are engaged in these processes.

One specific area that is given a high priority by many industrialized countries is public awareness-raising about climate change. The Red Cross and Red Crescent could become more engaged in this process by highlighting the humanitarian consequences of climate change.

As scientific evidence grows and public and political pressure to act mounts, there will be more and more funding to address the rising risks. It is vital that the Red Cross and Red Crescent is engaged: to shape funding policies so that they really address the needs of the most vulnerable; to balance funding for adaptation in high-income countries and for the poorest countries; and to manage rising risk using our ability to address the needs of the most vulnerable.

The Climate Centre is actively following the global debates on funding for adaptation, particularly for developing countries and integration with bilateral and multilateral development assistance. National Societies should not hesitate to contact us for advice and help: www.climatecentre.org.