



Adaptation to Climate Change

Causes, Impacts, Responses

The climate is changing

Global climate change has become a tangible reality. Already, climate change is having devastating effects on humankind and nature in many regions of the world.

How can, and must, humankind respond to climate change? Who is most severely impacted by it? And what kind of measures can be taken?

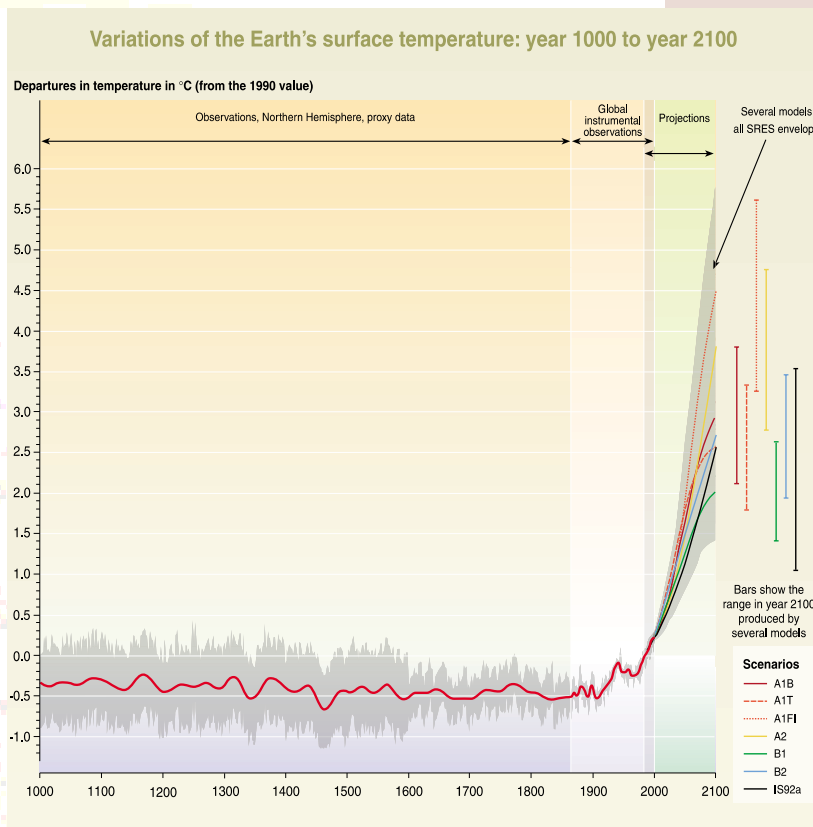
A successful development policy must address these issues, because strategies and measures to facilitate adaptation to climate change will play a key role in sustainable development processes. This brochure outlines the challenges that climate change poses to the global community and presents some of the solutions adopted by GTZ's Climate Protection Programme for Developing Countries (CaPP).



Since the end of the 19th century, globally averaged surface temperatures have increased by around 0.6 °C. As a result, sea levels have risen by as much as 20 cm during the 20th century. The Intergovernmental Panel on Climate Change (IPCC) – the scientific and consultative body working within the context of the UN Framework Convention on Climate Change – predicts a further temperature increase of up to 5.8 °C by 2100. This will raise sea levels by between 9 and 88 cm.

Human activity is largely responsible for this substantial rise in temperature, especially in the second half of the 20th century. One of the primary causes is the increasing emission of greenhouse gases such as carbon dioxide and methane. CO₂ mainly results from the combustion of fossil fuels, such as oil, gas and coal, and the destruction of tropical forests, while methane emissions are produced by waste landfills and wet rice cultivation.

The adoption of the UN Framework Convention on Climate Change in 1992 established the basis for global climate protection. Building on this foundation, the 1997 Kyoto Protocol defined binding emissions reduction commitments for the industrialized countries for the first time.



Why is adaptation to climate change necessary?

For several decades, our global climate has been changing, with increasingly severe consequences. Global climate change causes gradual and long-term climatic shifts, such as an increase in average temperature and thus a rise in sea levels. Extreme weather events are also occurring with greater frequency and intensity.

As a result, many vital sectors – such as water resources, agricultural production, coastal zones, human settlements, as well as energy supply and the health sector – are under threat worldwide.

However, the threats resulting from climate change cause highly disparate problems in the different regions of the world. Some regions will quite literally be deluged, while others will face water shortages. Some countries will experience more frequent and stronger floods and the permanent submersion of entire coastal areas. Yet in regions already prone to aridity, drought will occur with greater frequency and intensity. Other countries and regions – or, in a worst-case scenario, the same ones – are likely to suffer other extreme events, such as storms, mudslides and avalanches. Entire cities, road networks and economic regions are thus at risk.

The impacts of climate change have become more acute in recent decades, and we must assume that they are likely to intensify further. Identifying appropriate responses to climate change should therefore be a key element of the sustainable development strategies adopted by the affected countries. Yet at present, there is virtually no experience of how to manage this adaptation process. There are scarcely any systematic risk assessments predicting who will be affected, and when.

What is certain, however, is that the impacts will be felt most acutely by those with least adaptive capacity due to their lack of financial and technical resources: the poor countries, and the poor in the developing countries. For this reason, the developing countries are calling for intensive support from the industrialized countries – which are primarily responsible for climate change – in planning and implementing adaptation measures.



Visible effects of climate change

Glaciers: Glaciers are the world's climate thermometers, casting an icy spotlight upon rising global mean temperatures. Throughout the world, glaciers are shrinking. In the Himalayas, for example, glacial waters are filling the centuries-old natural catch basins far too quickly, posing a risk to human life, ecosystems and infrastructure, such as hydro-electric plants. In East Africa, Mount Kilimanjaro's ice cap is melting, while in Central Europe, glacial retreat may result in long-term problems with water supplies. The shrinking of the Alpine glaciers is scientifically proven and is further accelerated by extreme heat waves, as in summer 2003.

Two-thirds of **Africa** is already affected by aridity and drought, and desertification is advancing. Climate change is intensifying these trends.

In parts of the **Indian sub-continent**, on the other hand, precipitation is increasing significantly. In northern India and in Bangladesh, more

and more houses are washed away during the monsoons and many lives are lost through drowning. Yet other provinces are reliant on consignments of water, delivered by train, after years of extreme drought.

Islands in the Pacific Ocean are severely affected, and the impact of rising sea levels is felt acutely by local communities. Parts of these islands are already submerged, and if sea levels rise by a further 1 m, the Marshall Islands and Tuvalu will vanish into the sea.



Developing countries are especially vulnerable

The vulnerability of people in a given area to the effects of climate change depends on two key factors:

- the vulnerability of the surrounding natural landscape unit to weather extremes and climatic shifts, and
- the adaptive capacity of the local population.

Developing countries are particularly vulnerable since they are often located in high-risk natural landscape areas and their adaptive capacity is undermined by poor socio-economic development.

In principle, the situation is not new: populations in affected areas have always had to adapt to climatic changes. However, due to their speed and intensity, the changes predicted for the coming decades far exceed the adaptive capacities of societies and institutions. Traditional adaptation methods and mechanisms are no longer adequate, and the societies affected are likely to become even more vulnerable.

This applies above all to poorer population groups in the developing countries. They suffer most from the impacts of climate change as they are often directly dependent on the natural environment and agriculture for their survival. Both will be severely impacted by the ongoing process of climate change. Yet due to extreme poverty and a lack of education and infrastructure, most people have virtually no chance of switching to alternative sources of income. The impacts of climate change will worsen the already grave conditions of life faced by the very poor – a vicious circle which will further entrench poverty.

What action is being taken by the international community?

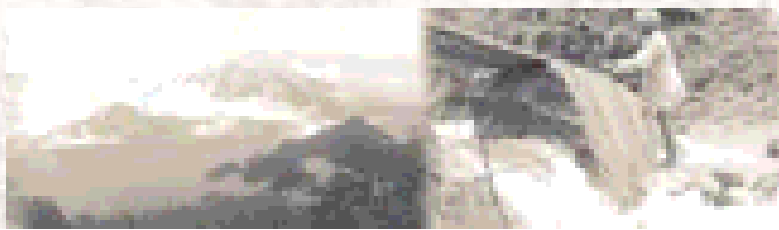
The inherent risk of global climate change is that it will further exacerbate poverty and social conflict worldwide. Combating the negative impacts of climate change is an important goal for the industrialized and developing countries alike. International donors are increasingly recognizing that successful current and future development in the African, Asian and Latin American countries is seriously jeopardized as a result of climate change.

The obligation to support the developing countries in adapting to climate change is already agreed in the Climate Change Convention. These countries are now pushing more vigorously for this pledge to be honoured. Since 1995, various decisions have been adopted on ways of providing support to poor countries that lack the financial, technical and human resources to prepare appropriate adaptation measures. Since the 2002 session of the Conference of the Parties, at the latest, adaptation to climate change has become a key issue in the climate process.

The international community provides funding for adaptation via the Global Environment Facility (GEF) and the three designated Climate Funds which were established as part of the implementation of the Climate Change Convention and the Kyoto Protocol.

Vulnerability and Adaptation Resource Group (VARG)

To assist the developing countries in adapting to the impacts of climate change, international organizations have set up various joint working groups such as the Vulnerability and Adaptation Resource Group (VARG). Based on shared learning and an exchange of experience, these groups develop strategies to integrate adaptation measures into national development programmes. The German Federal Ministry for Economic Cooperation and Development (BMZ), KfW Group (KfW Bankengruppe) and CaPP are involved in VARG, together with the World Bank, the United Nations Development Programme (UNDP), the Organisation for Economic Cooperation and Development (OECD) and other national and international organizations. Some members of VARG have produced a joint publication entitled "Poverty and Climate Change: Reducing the Vulnerability of the Poor through Adaptation", which examines adaptation to climate change from a poverty reduction perspective.



Adaptation to climate change – strategies of the Climate Protection Programme

The German Federal Government is committed to achieving the UN Millennium Development Goals and has adopted the "Programme of Action 2015" as Germany's contribution to their implementation. Together with the guiding vision of sustainable development, this Programme provides the framework for German development policy, with poverty alleviation being the key goal. The Climate Protection Programme for Developing Countries (CaPP) supports these endeavours.

Millennium Development Goals (MDG)

The United Nations Millennium Summit in 2000 defined the most important challenges facing the UN in the 21st century and adopted them as the Millennium Development Goals (MDG). The overarching objective of these eight development goals is to achieve sustainable development and halve the proportion of people living in absolute poverty by 2015. However, the attainment of many of the goals – such as eradicating extreme hunger, ensuring environmental sustainability, combating diseases such as malaria, or achieving universal primary education – is directly or indirectly jeopardized by the impacts of climate change.

Besides reducing greenhouse gas emissions, primarily through the Clean Development Mechanism (CDM)¹, adaptation to climate change is a further focus of CaPP's work. Here, CaPP's strategy is to initiate an integration process which incorporates the various aspects of adaptation to climate change more fully:

- into German and international development cooperation, and
- into partner countries' strategies and policies (mainstreaming).
- These two levels cannot be seen as separate, but are mutually reinforcing.

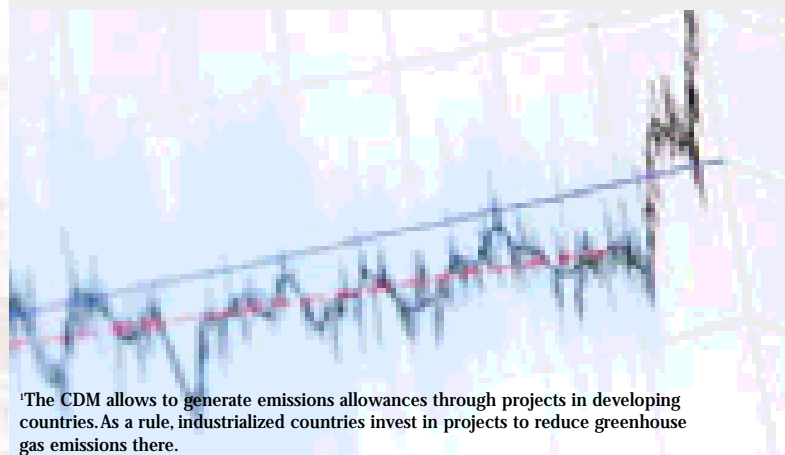
The German Federal Ministry for Economic Cooperation and Development (BMZ) has responded to the developing countries' increasingly vocal demands for support in implementing adaptation measures and has expanded CaPP's terms of reference.



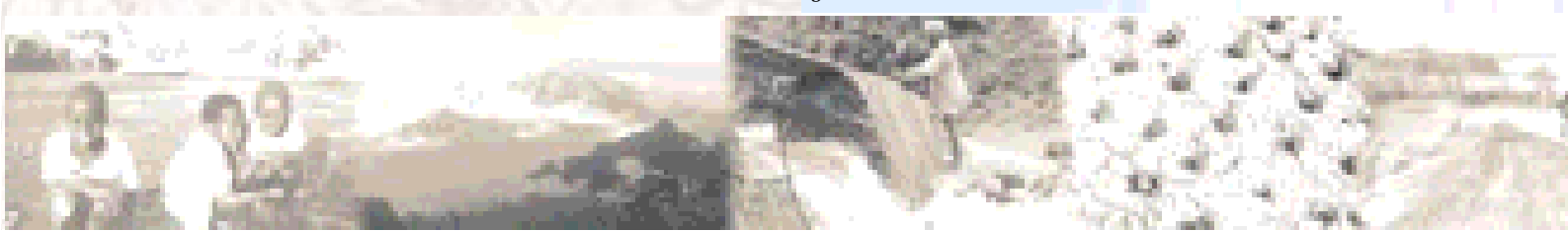
Integrating adaptation into development cooperation

Awareness of the long-term risks associated with the impacts of climate change must be embedded in German development cooperation, and – more broadly – in the international donor community.

Many development programmes and projects aim to achieve long-term improvements, but these could be reversed by the impacts of climate change. Here, CaPP provides practical support with the integration of adaptation measures into project activities. This is useful, for example, in projects aimed at disaster reduction, coastal zone and water management, the conservation of natural resources and ecosystems, or rural development.



¹The CDM allows to generate emissions allowances through projects in developing countries. As a rule, industrialized countries invest in projects to reduce greenhouse gas emissions there.





Management of water catchment areas – a starting point for adaptation

India is proud of its self-sufficiency in food. It relies on an intensive system of irrigation agriculture, operated on just 35% of the cultivated land and allowing virtually no scope for any further increase in yield. By contrast, around two-thirds of India's agricultural land is cultivated extensively through rain-fed farming. These tracts of land offer the greatest potential in terms of long-term food security for India's growing population, which includes a large proportion of poor and very poor people. But these areas are at risk of being lost to agriculture as a result of extreme weather events, such as prolonged drought, erosion or flooding, which would result in millions of people losing their livelihoods.

In order to counter this development on a long-term basis, measures for adaptation to climate change will now be built into the *Indo-German Bilateral Watershed Management Project*. GTZ has been working with the Indian Ministry of Agriculture since 1989 on the management of smaller water catchment areas. The focus is on sustainable use of natural resources and improving living conditions for the local population.

In response to an Indian proposal, CaPP is supporting the project in a pilot region in Rajasthan which was affected by drought for many years. The following core activities are being built into the project:

- Raising awareness of adaptation measures among all the project partners
- Giving greater consideration to climate variability in agricultural planning
- Further developing water-conserving irrigation techniques
- Taking up, refreshing and disseminating (traditional knowledge and adaptation strategies, e.g. during periods of extreme drought
- Reducing the local population's vulnerability to climate risks through income-generating measures
- Supplementing subsistence agriculture through market-oriented cultivation, e.g. of oilseed or medicinal plants

Mainstreaming in partner countries' projects and strategies

When developing national adaptation strategies, particular care must be taken to ensure that they fit in with national plans for development and poverty reduction, such as the Poverty Reduction Strategies (PRS).

Projects identified as effective adaptation measures within this framework can be developed, planned and reviewed jointly with the partner countries. CaPP supports the conceptual development of new projects and the integration of partner countries' practical adaptation projects into existing German development programmes.

Climate protection project in Tunisia

Tunisia has invited Germany to assist with the development of an innovative and comprehensive climate protection project. CaPP has supported the process' conceptual development. The planned project contains, firstly, a Clean Development Mechanism (CDM) component, in order to open up and benefit from the financial and technical opportunities available to projects undertaken within the CDM framework. Secondly, it aims to develop strategies and concepts for adaptation to climate change. As one of the world's water-poorest countries, Tunisia is particularly vulnerable to the effects of climate change: Agriculture in Tunisia utilizes 80% of the country's water resources and employs almost a quarter of the workforce. The predicted and highly negative impacts of climate change on water resources would have devastating economic consequences for this sector. In response to this potential ecological and economic crisis, the most vulnerable sectors must now be identified, long-term risk assessments undertaken, and initial pilot projects on adaptation to climate change implemented.

The first phase will focus less on the adoption of "hard" adaptation measures, such as dike-building; instead, the emphasis will be on developing human and administrative capacities.

However, there is no universal blueprint for this process, as every partner country requires strategies tailored to their individual circumstances. The observed and anticipated effects of climate change, as well as the country's natural resources, institutional architecture and economic and demographic structure, all play a key role in this context. Traditional adaptation strategies which often already exist at local level must also be integrated into project planning and implementation.



Are you interested in working with us?

CaPP offers opportunities for joint work on climate change in a variety of areas:

- Supporting the development of a national adaptation plan
- Integrating climate protection aspects into national sustainable development programmes
- Planning, integrating and implementing practical adaptation measures within the development cooperation framework
- Planning new projects for development cooperation with partner countries
- Monitoring strategies and processes in cooperation with international organizations
- Capacity- and institution-building

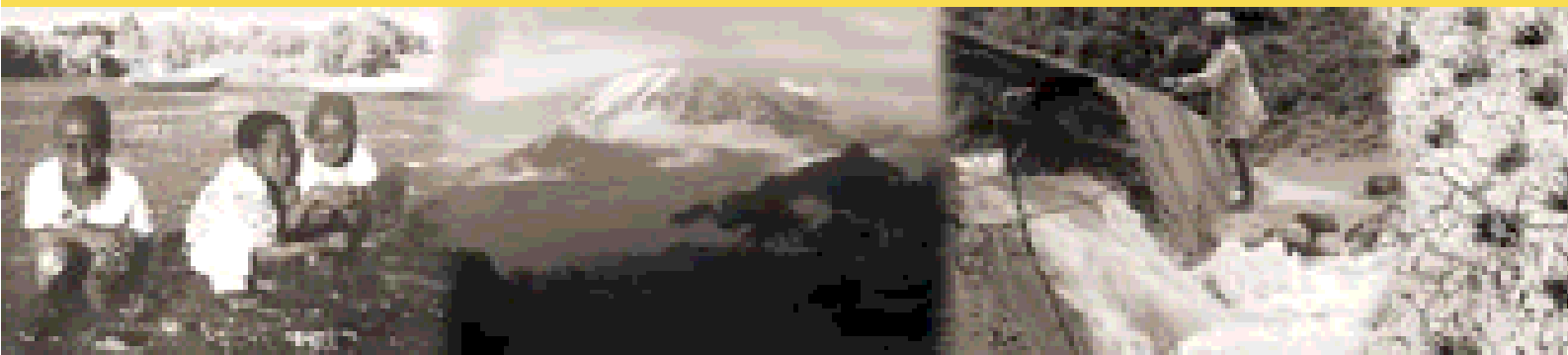
If you are interested in working with us, please contact

- the GTZ Office or a GTZ project in your country. You can find a list of addresses at www.gtz.de, or
- the German Embassy in your country, which can establish the contact with GTZ, or
- CaPP directly at: climate@gtz.de



In practical cooperation, the following information is useful for us when developing a joint project:

- Do you have an initial idea of the type of cooperation you wish to undertake with GTZ?
- Please check whether your country has adopted or is preparing a National Adaptation Plan of Action (NAPA), a national report on climate protection, or a strategy paper. If so, please explain how your idea fits in with these papers.
- Does your idea relate to poverty reduction or the Millennium Development Goals (MDG)?
- Have you discussed your idea with the agency responsible for climate protection in your country?
- Are adaptation activities already being undertaken by other bi- or multilateral organizations in your country?



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