



# Tackling Climate Change

Contributions of Capacity Development

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# PREFACE

Dear reader,

Climate change is not a new issue. The risks associated with climate change were already a topic of discussion at the Earth Summit in Rio de Janeiro back in 1992. However, only after another 15 years climate change has now gained its rightful place at the top of the (development) policy agenda. For this to happen it took numerous UN climate conferences, the release of Al Gore's global warming documentary 'An Inconvenient Truth', the Stern Review on the Economics of Climate Change, and finally the publication of the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).

Now, governments are under pressure to agree a new and effective climate regime for the time after the end of the first commitment period under the Kyoto Protocol. Germany has tabled an ambitious reduction offer for such a post-2012 agreement.

In international cooperation, too, Germany is taking its responsibilities seriously. The Federal Ministry for Economic Cooperation and Development (BMZ) began funding numerous climate-change mitigation and adaptation projects in its partner countries as early as 1993, and has substantially increased the resources available for this area of work since then. Other government departments – such as the Federal Environment Ministry (BMU) – are providing further funding. This year, Germany became the first country to earmark a share of the profits from the auctioning of emission certificates to support climate projects in newly industrializing and developing countries.

The challenges facing the developing countries and international cooperation are immense. Most of the poorer developing countries have played no part in causing climate change, but will nevertheless be exposed to its catastrophic impacts. Apart from the developed countries, also large newly industrializing countries with legitimate interests in economic growth, such as China and India, will have to increasingly decouple their resource consumption from economic growth if climate change is to be kept in check.

At GTZ, we can draw on many years of experience in more than 100 countries in sectors that are now the key to effective climate change mitigation: energy, transport, buildings, industry, waste management, forestry and agriculture. The same applies to thematic areas where the pressure to adapt is greatest: e.g. agriculture, water and the conservation of biodiversity.

Building on these experiences, and with forward-looking ideas and strong alliances, we are supporting our clients and partners in their endeavours to tackle climate change. In doing so, we are placing the emphasis on implementation. We focus on results and on building the requisite capacities in our partner countries to achieve them.

Climate change is firmly anchored on GTZ's agenda as a rapidly expanding field of work. This brochure provides an overview of our work in this area and our strategies and services, illustrated with numerous examples of our projects.



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Cornelia Richter

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## INNOVATION – BROAD IMPACT – ALLIANCES

Climate change is happening, and it will change the face of our planet. But how dramatic will the changes be? That, according to the scientific community, depends entirely on us and how we shape our patterns of production and consumption in the future. Climate change can only be kept in check with a rapid and dramatic decoupling of economic growth from greenhouse gas (GHG) emissions. Due to the inertia of the global climate system, however, we must prepare for the impacts of greenhouse gas emissions produced over the past decades and the global warming that they will cause for a century or more to come.

### **Climate Change puts Sustainable Development at Risk**

Committed to sustainable development, GTZ is working to tackle the challenge of climate change. After all, sea-level rise, increasingly frequent droughts and floods, as well as shifting climatic zones are already putting development successes at risk – especially in GTZ partner countries, whose adaptive capacities are often very weak. Cutting greenhouse gas emissions and promoting adaptation to climate change are two global challenges of unparalleled importance.

As a service provider for the German government and other clients, GTZ is making innovative and effective contributions to mitigate climate change and promote adaptation to its impacts. In doing so GTZ is working in close alliance with strong international partners. In the dynamic policy field of

climate change, GTZ advises clients and partners on useful approaches and investments highlighting in what context they are most promising. This is of particular importance given the multiplicity of relevant emitting or vulnerable sectors and the growing engagement of numerous actors in this field.

### **Innovation: Leading the Way for Development**

Climate change raises new questions. How can the necessary decoupling of GHG emissions from economic growth be achieved? What should be the priorities in adaptation to invest scarce resources? How can local and national decision-makers be encouraged to bring about changes today which will yield benefits in the future? GTZ is working to develop innovative approaches and practice-oriented solutions to these questions and is advising on their implementation. GTZ funds pilot projects to test fresh ideas and feed the results back into national and international policy, whether it concerns e.g. the further development of the carbon market beyond 'classic' Clean Development Mechanism (CDM) projects or international financing instruments for avoiding deforestation. The same applies to the development of mitigation and adaptation strategies at the national and municipal level, and the integration of adaptation into partners' sector policies and programs as an element of risk management.

### Disseminating Tried and Trusted Techniques

Although the challenges posed by climate change are immense and some of the issues are new, elements of the solutions and most of the technologies needed to stabilize global warming are well-known and already available on the market. GTZ supports their application in numerous areas, and has done so for many years: good examples are the promotion of renewable energies, energy efficiency, and forest conservation. This is true also for adaptation to climate change: once the risks and necessary solutions have been identified and prioritized, it is often possible to use familiar techniques, such as efficient irrigation methods to improve water security and to combat water stress or the planting of mangrove forests to protect coastal zones. In many instances, we do not have to reinvent the wheel. In these cases, GTZ is stepping up its efforts to encourage the rapid dissemination of proven, efficient and locally appropriate solutions. Here, innovative approaches are only needed to overcome obstacles to the dissemination of the solutions.

### Taking the Climate Challenge Seriously

GTZ intends to systematically optimize the contribution by all relevant projects and programs to the reduction of greenhouse gas emissions. Conversely, adaptation measures will be initiated in cases where climate change would endanger the sustainability of the programs' impacts. In this context, it is important to identify measures that enable projects to also improve the adaptive capacity of partner countries.

### Working Together in Effective Alliances

GTZ draws on its expertise and many years of experience in nearly all sectors of relevance to climate change mitigation and adaptation. However, global challenges such as climate change require international cooperation of strong partners. This is why GTZ is building alliances with leading international institutions from the political, scientific and business spheres. By building on their comparative strengths, GTZ and its alliance partners develop innovative solutions from conception to implementation, and jointly work on their rapid and efficient dissemination.

### GTZ – Your Partner for Climate Change Mitigation and Adaptation

Innovation where necessary, dissemination where possible, working hand-in-hand with strong alliance partners: these are the three principles guiding GTZ's efforts to make effective contributions to tackling the global challenge of climate change.





## CORPORATE PROFILE

### Our Organisation

As an international cooperation enterprise for sustainable development with worldwide operations, the federally owned Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH supports the German Government in achieving its development-policy objectives. It provides viable, forwardlooking solutions for political, economic, ecological and social development in a globalised world. Working under difficult conditions, GTZ promotes complex reforms and change processes. Its corporate objective is to improve people's living conditions on a sustainable basis.

### Our Clients

GTZ is a federal enterprise based in Eschborn near Frankfurt am Main. It was founded in 1975 as a company under private law. The German Federal Ministry for Economic Cooperation and Development (BMZ) is its major client. The company also operates on behalf of other German ministries, the governments of other countries and international clients, such as the European Commission, the United Nations and the World Bank, as well as on behalf of private enterprises. GTZ works on a public-benefit basis. All surpluses generated are channelled back into its own international cooperation projects for sustainable development.

### Worldwide Operations

GTZ has operations in more than 120 countries in Africa, Asia, Latin America, the Mediterranean and Middle Eastern regions, as well as in Europe, Caucasus and Central Asia. It maintains its own offices in 92 countries. The company employs nearly 12,000 staff, more than 9,000 of whom are national personnel. About 1,500 people are employed at Head Office in Eschborn near Frankfurt am Main and at various locations within Germany.

### GTZ – A Partner for Climate Change Mitigation and Adaptation

Climate change mitigation and adaptation feature in the day-to-day work of 322 GTZ projects worldwide, accounting for approximately one fifth of GTZ's total business volume or around one billion euros. Climate change mitigation and/or adaptation is a main objective of around eight percent of all GTZ projects and programs. Another 12 percent contribute indirectly through their activities to protecting the climate or adapting to the impacts of climate change without this being their main objective.

The range of project types is broad: from small-scale support measures to large-scale supraregional programs. Around two thirds of all climate-related projects are being implemented in Asia and in Africa, 13 percent in Latin America, and eight percent in Europe and Central Asia; supraregional projects account for the remaining 20 percent.

## Fields of Activity of Climate-Related Projects

Statistically, mitigation- and adaptation-oriented projects account for equal shares of the GTZ portfolio. In assisting partners to reduce their greenhouse gas (GHG) emissions, the main fields of activity are energy supply – especially renewable energies – and the forestry sector, including avoiding deforestation but also afforestation, followed by ozone protection projects with significant climate protection impacts. A somewhat smaller share of GTZ's portfolio is dedicated to energy efficiency in buildings, GHG reduction in industry, and the provision of climate policy advice on emission reductions. In the major area of adaptation to climate change, adaptation-related projects in the water sector, agriculture and natural resource management represent the main focus of attention, followed by policy advice on adaptation to climate change and activities on disaster risk management.

With 40 additional projects and a business volume of 75 million euros, GTZ participates at the International Climate Protection Initiative of the German Federal Environment Ministry (BMU). The scope of GTZ projects ranges from consultancy for effective climate protection policies, support for commercialization of sustainable technologies up to progressive strategies for adaptation measures. These projects will be implemented in Asia, Africa and Latin America as well as in Central Asia and the MENA region.

## Experience and Flexible Implementation Processes

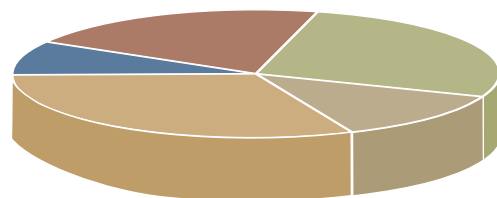
In the climate arena, GTZ draws on many decades of experience in the development and management of complex programs in all relevant policy areas and sectors, and on its wide-ranging national and international network.

In addition to the classic commissions undertaken within GTZ's public-benefit business, many other forms of cooperation are possible. They include, for instance, the delivery of well defined, results-oriented service packages via GTZ International Services (IS). In 2008, 19 GTZ IS projects were explicitly or indirectly linked to climate.

Furthermore, there is the possibility of co-financing ongoing projects, e.g. with a view to their expansion into other regions, such as in the case of the wide-ranging partnership with Dutch development institutions, which focuses on renewables and has a business volume of some 60 million euros. Climate change also plays a role in GTZ's development partnerships with the private sector, so called public-private partnerships (PPP). GTZ is currently implementing 27 climate-relevant projects in the form of PPP with a business volume of 7.1 million euros. Three of these projects explicitly focus on climate change. Finally, 'administration twinning' or the placement of integrated experts in institutions in the partner country, via the Center for international Migration and Development (CIM), offers further potential for cooperation. At present, only around two percent out of a total of 737 such integrated experts are working on climate change in the narrower sense. However, the work of a further 14 percent of these experts contributes indirectly to protecting the climate and supporting adaptation to climate change in the partner countries.

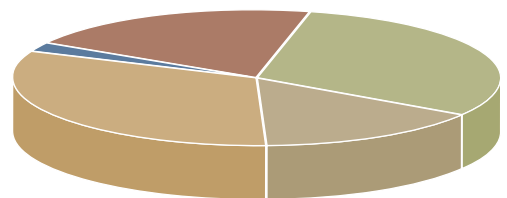
Hence, we pool our diverse sectoral expertise and regional know-how and offer our clients the best possible, individually-tailored and sustainable solutions to the challenges of climate change.

NUMBER OF CLIMATE-RELATED PROJECTS



■ Africa	26.7 %
■ Latin America/Caribbean	12.7 %
■ Asia	31.4 %
■ Europe and Central Asia	8.4 %
■ Supraregional	21.8 %

CLIMATE-RELATED BUSINESS VOLUME



■ Africa	30.7 %
■ Latin America/Caribbean	15.1 %
■ Asia	32.1 %
■ Europe and Central Asia	2.0 %
■ Supraregional	20.1 %

Note: BMU projects commissioned in 2008 are not included.



# INTRODUCTION

Our planet warms continually with us humans being responsible. Climate change destroys the habitats of many plants and animals as well as our own. With this news the United Nations Intergovernmental Panel for Climate Change (IPCC) alarmed the world. The alarm showed effect: Since the fourth report of the IPCC climate change has dominated headlines all over the world.

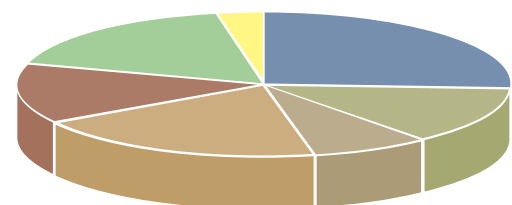
According to the IPCC, global average temperature has risen by 0.74 degrees Celsius compared to pre-industrial times. Would the world temperature rise further than another two degrees Celsius, consequences would become uncontrollable according to the European Union. However, both, IPCC and the Stern report hold out the prospect that climate change can be mitigated. According to Nicolas Stern, the world community would have to spend only one percent of its annual gross domestic product (GDP) to stop such a disastrous development of climate change.

The poorest countries are suffering most from climate change. It endangers successes in poverty alleviation and the attainment of the Millennium Development Goals as well as the ecological, economic and social stability of developing countries. For this reason, tackling climate change is also one of the main elements of sustainable development. However, developing countries often lack the financial means as well as political and organizational preconditions for responding to climate change and adapting to it. Therefore, enhancing partner countries' capacities required to deal with climate change is one of GTZ's major concerns.

## Protecting the Climate – Developing the Economy

Greenhouse gas (GHG) emissions produced by humans are the cause of the accelerated climate change. In 2004, industrialized nations comprising only 20 percent of the world population emitted 46 percent of global GHGs. If these nations and the developing countries do not change their development patterns, GHG emissions will rise by 270 percent by the year 2100. This growth will take place mostly in emerging economies due to considerable increase in population and economic production. The latter is indispensable for the development of poorer countries, however, the objective should be to decouple GHG emissions from economic growth.

SHARE OF DIFFERENT SECTORS IN TOTAL ANTHROPOGENIC GHG EMISSIONS IN 2004\*



Energy supply	25.9 %
Transport	13.1 %
Residential and commercial buildings	7.9 %
Industry	19.4 %
Agriculture	13.5 %
Forestry**	17.4 %
Waste and wastewater	2.8 %

Source: IPCC Fourth Assessment Report 2007

\*in terms of CO<sub>2</sub>-equivalent, \*\*Forestry includes deforestation



Already at the 1992 Earth Summit in Rio de Janeiro, the world community created the United Nations Framework Convention on Climate Change (UNFCCC) to counteract climate change. On the basis of this Convention, the United Nations agreed on the Kyoto Protocol in Japan in 1997. Therein, industrialized countries and developed economies in transition commit to cutting their CO<sub>2</sub> emissions by five percent between 2008 and 2012 compared to 1990 levels. In the meantime, 182 countries have ratified the Protocol. In the ongoing negotiations for a post-2012 regime, the EU aims to win the support of the USA and major developing country emitters for binding reduction agreements and a commitment to limit global warming to two degrees Celsius.

### A Challenge for International Cooperation

To achieve this goal, global GHG emissions will have to fall by at least 50 percent by 2050 compared to 2000 levels. In the face of increasing emissions in developing countries, economically feasible approaches to reduce emissions in these countries must be developed and demonstrated. At the same time, particularly developing countries face the challenge of designing adaptation strategies to climate change.

### Cost-Efficient Emission Reductions

For reducing GHG emissions, several paths are available. On the one hand, GTZ supports partner country governments in developing sectoral policies and measures to reduce GHG emissions. On the other, the Kyoto Protocol offers a concrete mechanism to reduce GHGs – the Clean Development Mechanism (CDM). If developing countries save GHG emissions, for example by using renewable energies for electricity generation or by improving their energy efficiency, they can generate certified emission reductions (CERs) and sell them on the world market. In various countries GTZ supports progressive CDM projects and provides advice for the creation of favorable framework conditions for a participation in the carbon market.

### Prepared for Climate Change

Adaptation to climate change is essential in many areas. GTZ supports partner countries in enhancing their capacities to deal with the impacts of climate change. These activities, for example, include the installation of early warning systems, efficient watershed management where water resources are at risk, or the introduction of drought-tolerant seeds in drought-prone areas. Adaptation means examining policies, programs and investments with regard to climate change vulnerability and modifying them, if necessary. Developing partners' potentials and competencies needed in the context of climate change, and facilitating learning and change processes are some of the prime tasks to which GTZ is dedicated. Capacity Development – as conceived by GTZ – strengthens the decision-making capacity of individuals, organizations and societies.

Climate change is a challenge that GTZ responds to in its daily work: with adapted strategies and capacity development for a sustainable development in its partner countries.





## POLICY ADVICE

### ACROSS BORDERS

Climate change does not stop at national borders – its impacts can be felt by people all over the world. To tackle climate change, the international community must work closely together. International agreements, such as the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, are key to limiting global warming and to coping with whatever impacts are inevitable. In order to implement the commitments made and to benefit from the market mechanisms established under these agreements, governments need to adjust relevant policies, set up necessary organizational structures and sensitize and train their staff and other actors.

GTZ advises the German government in development-related matters of international climate policies including at international negotiations. On behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ), and in cooperation with several bilateral donors, GTZ in this context supports trainings of partner country negotiators and policy dialogues in the framework of the European Capacity Building Initiative. In partnership with selected international and local organizations, GTZ further provides policy advice to partner governments for the implementation of international agreements on climate change.

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**Services:**

- Supporting cost-efficient national climate strategies including adjusting sectoral policies, capacity development and institution building
  - Helping create necessary framework conditions to participate in the Clean Development (CDM) and upcoming avoided deforestation mechanisms
  - Transferring know-how and climate-friendly technology to partner countries
  - Pilot applications of concepts discussed in the international arena and supporting partners in drawing conclusions and lessons learned
  - Fostering political dialogue to exchange results of research and experiences with climate change strategies
- .....

Through policy advisory services, decision makers profit from improved knowledge on climate-related issues. National implications of concepts discussed in international debates will be better understood. Partner countries representatives can hence more actively shape international negotiations. They can apply state-of-the-art approaches in their national climate change strategies and better access international financing mechanisms.

## TAKING THE INITIATIVE

### > Supraregional

Industrialized countries have the obligation to support developing countries in their efforts against climate change and its negative impacts. The German government is taking its responsibility and the Bali Roadmap seriously and is giving numerous impulses to foster sustainable energy and climate policies in partner countries.

The German Federal Environment Ministry's (BMU) International Climate Protection Initiative, supported by GTZ in cooperation with KfW, is exemplary. The Initiative's financing is unique: The international projects implemented by the Initiative are financed from revenues from the sale of emission allowances through the emission trading system. This makes Germany the first country to invest the proceeds of auctioned emission allowances directly in national and international climate protection and adaptation measures.

Commissioned by BMU, GTZ has established a Berlin-based office to support the Ministry in developing and implementing the Climate Protection Initiative. Projects under the Initiative will realize significant emission savings in partner countries and help meet pressing adaptation needs.

## PREPARING FOR CHANGE

### > Tunisia

With 1,300 kilometers of coastline and more than 300 days of sun per year, Tunisia is a primary destination for tourists. Yet, the country is also severely affected by the impacts of climate change. The expected sea level rise is just one example: Climate change will not only put tourism at risk, but also the economically important agriculture as well as health and environment sectors. Increasing average temperatures and the continuous decrease of already scarce water resources add to the country's strained climatic situation.

The Tunisian Government has recognized these challenges and ratified both the UN Climate Change Convention and the Kyoto Protocol. On behalf of BMZ, GTZ supports Tunisia to analyze the impacts of global warming and to develop a national adaptation strategy for both the agriculture and health sectors. Capacity development for decision makers in the affiliated ministries was key for integrating comprehensive adaptation measures into the national agenda. Pilot projects and action plans have since been extended to the water, energy and tourism sectors. Examples include the establishment of national parks to protect the country's biodiversity, as well as measures to actively combat desertification. Supported by GTZ, the Tunisian Government has now created the necessary legal, institutional, and professional structures to adequately answer to the different challenges of climate change. The project's main partners include related Tunisian ministries, the United Nations Development Program (UNDP) and the Global Environment Facility (GEF).





# KEEPING CLIMATE CHANGE IN MIND

## A PRINCIPLE

GTZ operates in more than 120 countries around the globe. These countries are as different as the topics addressed. But there is one thing that many projects have in common: they are exposed to climate change or can make important contributions to reducing greenhouse gas (GHG) emissions. The World Bank assumes that more than a fourth of all development projects are exposed to climate change risks. But developing countries do not only face the highest climate change risks, they also offer the most cost-efficient CO<sub>2</sub> savings potentials.

If a broad impact is to be achieved, activities in the area of climate change must not be limited to single projects focused purely on climate protection or adaptation. Climate aspects rather have to be integrated into all relevant programs, too. GTZ rises up to this challenge. In the future, GTZ projects will be examined with the help of the so-called Climate Check, a tool used to determine the climate risks that projects face, as well as the potential that they offer for contributing to further emission reductions. The results will be taken into account in the program design.

The Climate Check used in this context consists of the following tools:

- **Climate Proofing:** Which concrete climate risks are single projects facing currently or in the future? This tool identifies them and helps derive strategies for adapting the project design to climate change
- **Emission Saving:** How can projects contribute to curbing the increase in GHG emissions in partner countries? This tool shows how certain potentials for emission reductions can be put into practice

In addition to the Climate Check, the Portfolio Screening is used as a tool for advising contracting clients and partners on which current and conceivable projects in partner countries offer significant potentials for contributing to emission reductions and adaptation.

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### Services:

- **Advice governments of partner countries on how to integrate climate aspects in policies and (investment) programs, foremost:**
  - **What are the effects of climate change on the sector, the target group or region in which an investment is planned? What are the biggest risks; how can the program respond?**
  - **Where are especially large and cost-saving or cost-efficient emission reductions potentials in policies and investment programs?**
- .....

The effects of the Climate Check on development cooperation projects and partner countries are obvious: It sensitizes partners, as well as GTZ staff to all climate-relevant aspects in sector policies, investment programs and cooperation projects. Accordingly, climate risks can already be taken into consideration at the planning stage of public spending programs so that poor investment decisions can be avoided and the sustainability of project outcomes can be enhanced. Partner countries' policies, programs and projects may be updated to strengthen adaptation capacities or to contribute to the mitigation of climate change. The Portfolio Screening tool facilitates the development, particularly, of new, impact-oriented project ideas.

FOREWARNED IS FOREARMED

> India

Strengthening ethnic groups in the management of natural resources, supporting the National Bank for Agriculture and Rural Development, enhancing decentralized watershed management – these three GTZ programs in India are facing a common challenge: they are all exposed to climate risks. With the help of a Climate Proofing, climate change impacts on the project’s work were outlined. Project staff and local partners asked themselves such things as whether the tree species planted today will still be adapted to climate conditions in 40 years. Or, whether investments in rural areas made with the help of bank loans are endangered by future climate impacts like droughts or floods. Climate Proofing has brought together practical, local knowledge with sector-specific know-how and one result is that climate risks are no longer vague possibilities but rather real threats that are better understood thanks to the Proofing process. In the meantime, GTZ and partners have developed an increased awareness for expected climate-induced changes. By doing so, they stand a chance to prepare, develop adaptation strategies and integrate them into their work at an early stage.

ALL GOOD THINGS COME IN THREES ...

> Germany

Good examples speak louder than words. GTZ has decided to lead by example and make its headquarters carbon neutral! In a three-step strategy – reduce, substitute, compensate – it aims to cut company GHG emissions to zero. Thanks to the ‘job-ticket’, many employees commute to work by bus or train or take the bike during the summer. Video conferences substitute more and more business trips and insulated buildings reduce energy losses. Fossil fuel electricity has gone out of fashion, ‘green’ power, on the other hand, is in. Whereas in 2002, 1,000 GTZ headquarters staff members produced 17,000 tons of CO<sub>2</sub>-equivalents, the figure fell to 11,000 tons in 2005. In the future, GTZ will compensate unavoidable business trips by headquarter’s staff and other emissions with the help of a self-designed Clean Development Mechanism (CDM) Gold Standard project.





# CARBON MARKETS

## A CLEAN BUSINESS

In mitigating climate change every ton of greenhouse gas emissions that can be saved is one step in the right direction. For the climate it does not matter where globally this step is taken. It is for this reason that the Kyoto Protocol established the Clean Development Mechanism (CDM). It allows companies in industrialized countries to fulfil their obligations to cut emissions by acquiring certified emission reductions (CERs) from mitigation projects in developing countries. In addition to this compliance market, created by the Kyoto Protocol, a voluntary market has emerged. In the latter companies, organizations and individuals purchase emission offsets voluntarily, mainly to demonstrate Corporate Social Responsibility or to show personal integrity.

To participate in the compliance market, developing countries need to fulfil several requirements. A functioning Designated National Authority (DNA), which can approve CDM proposals, qualified personnel and service providers to design and implement CDM projects need to be in place. GTZ has years of experience working in the carbon market and hence can access extensive networks in partner countries. In its efforts, GTZ cooperates closely with several CDM project developers, the Gold Standard Foundation and with distinguished climate experts in partner countries.

### Services:

- Support favorable conditions for CDM in developing countries (including establishing DNAs, national CDM strategy studies, sector studies of GHG reduction potential)
- Feasibility studies for potential CDM projects, development of CDM project documents for the registration process
- Disseminate general knowledge on the CDM, carbon market and climate policy
- Promote the further development of CDM by supporting pilots particularly regarding programs of activities and sector wide approaches
- Source emission reductions, including match-making and clarification of legal aspects

GTZ's support results in improved performance of state and private actors in their new roles and functions in the carbon market and facilitates their access to the market. Industrialized countries benefit from the CDM by pursuing the most cost-efficient emission reductions. Host countries benefit from additional foreign investment, co-financing and technology transfer that results in more economically, socially and ecologically sustainable development. In this way, carbon markets help create win-win-situations for all parties. Truly a clean business!

BROKER FOR QUALITY PROJECTS

> India

India is booming. Rapid industrialization and fast-paced urbanization are clear indicators. Promotion of energy efficiency and the increased utilization of renewable energies rank high on the national agenda, making India a primary market for CDM-projects.

To foster high-quality CDM projects, GTZ International Services has created the Carbon Procurement Unit (CPU). "We primarily identify eligible Indian CDM projects and assist German customers who wish to buy the resulting emission certificates," explains Mr. Umamaheswaran from the CPU. A good example is RWE, one of the biggest power generators in Europe and, therefore, a major GHG emitter. "After we have introduced RWE to a number of CDM project owners in India, the company may now count on about three million CERs from Indian partners until the end of 2012 and use them to meet parts of its CO<sub>2</sub> reduction obligations. This way, RWE can achieve its reduction targets in an economically efficient way, the Indian project owners receive the required funding to implement the projects, and the overall emissions of GHGs are reduced." Furthermore, the CPU provides advisory services to project actors and conducts technical feasibility studies. Currently, it is pursuing approximately 300 CDM projects of various sizes with a total volume of about 20 million CERs stemming from power generation based on biogas, biomass, and other renewable energies. In all of its efforts, the CPU cooperates closely with Indian public and private companies, such as Urban Development Companies, power generators, energy intensive industries, and NGOs.

FIT FOR THE CARBON MARKET

> Tunisia

On behalf of The German Federal Ministry for Economic Cooperation and Development (BMZ), GTZ supports Tunisia since 2006 in the development of personnel and institutional capacities necessary to access the CDM market. This includes supporting the establishment of the DNA and the rules needed to evaluate and approve CDM project proposals. Following their training, authorities, local project initiators, and Tunisian consulting companies can now identify and realize the potential to finance local GHG emission reductions via the carbon market. Since the start of the cooperation, the number of DNA approved projects has increased from two to 26, which would translate into 46 million tons of CO<sub>2</sub>-equivalents emission reductions should the projects be registered with the UN and completed. Thus, Tunisia has emerged as an attractive and capable partner in the international carbon market, as well as one of the leading countries for CDM in Africa.





# ENERGY

## POLITICALLY CORRECT

There is no development without energy, no progress without energy, no higher standard of living without energy. Global demand for energy is constantly growing, which leads to an increase in greenhouse gas (GHG) emissions that spur climate change. From 1970 to 2004, CO<sub>2</sub> emissions in the energy sector rose by 145 percent, and there is no end in sight. So far, developing and newly industrializing countries have only contributed a small share to GHG emissions. However, already by 2030 their share will have reached 60 to 75 percent.

Solving the climate change challenge is impossible without the cooperation of developing and newly industrializing countries, and there are plenty possibilities to choose from. Therefore, GTZ advises governments all over the world on energy policy and in doing so helps realizing attractive solutions.

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**Services:**

- Advice on favorable political framework conditions for climate-friendly energy supply and their implementation, like regulations for power supply from renewables
  - Integrated climate protection: strategies to reduce and avoid CO<sub>2</sub> in the energy sector
  - Change management for GHG emission reductions via sector reforms, privatization, and setting up surveillance and regulation authorities and instruments
  - Support the introduction of standards and energy-efficiency labelling schemes, demand side management, and to energy-service providers
- .....

In many countries the impacts can be observed: where favorable legal and institutional framework conditions are in place, renewable energies and increased energy efficiency are thriving. The benefits are evident in countries like India and Brazil, as well as in Thailand and Tunisia, where GTZ cooperates closely and constructively with the respective governments. Even in remote areas energy supply is improving substantially and economic development is gaining momentum.





## RELIABLE GRID ENERGY

Once political framework conditions are underway, securing a sustainable energy supply is effected in different ways in urban and rural areas. In developing and newly industrializing countries, population density in urban areas is particularly high. In cities and for the industrial sector, a more efficient use of energy, provision of modern energy supply grids and energy services, as well as the use of renewable energies is important. In this context, large energy providers in developing countries are crucial players in responding to climate change through the implementation of suitable measures.

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**Services:**

- **Techno-economic analysis of power plant and grid operation to reduce GHG emissions**
  - **Technical assistance to improve feed-in of renewable energies into the grid**
  - **Technical implementation of efficiency measures for power plants**
  - **Promoting cooperation between the public and the private sector in the fields of renewable energies and energy efficiency**
  - **Supply of laboratory or measuring equipment and software to record the GHG emissions**
- .....

The goal of these activities is to reduce deficits in power generation and raise the overall power-generation capacity in a climate-friendly way. With the help of efficiency measures and a more widespread use of renewable energies, GHG emissions can be reduced. However, this is not the only positive effect. Once energy supply is secured locally, countries are less dependent on imported fossil energy sources. This leads to a decrease in production downtimes and energy cost, guarantees a sustainable economic development and generates employment and income – a considerable gain for climate protection, as well as the economy.

## LESS ENERGY – MORE GROWTH

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> **India**

The majority of India's population still earns a living from agriculture, but more and more Indians gain their income from the rapidly growing industrial production. The country has been on a path to industrialization for some time now – with all the consequences including strains on the energy sector. India is aiming at an eight percent annual economic growth rate of its gross domestic product. This implies that it must provide five to ten percent more energy per year. In order to respond to the growing demand for energy in a climate-friendly way, the country has passed an Energy Conservation Act. In cooperation with the Indo-German Energy Program financed by the Federal Ministry for Cooperation and Development (BMZ) and carried out by GTZ and KfW, India is implementing the Act on all administrative levels. Household appliances and energy-intensive industrial equipment receive energy efficiency labels. This enables users to consciously choose energy-saving devices and equipment. The program certifies energy managers and energy auditors. Stricter norms and standards for heavy industry, mapped out with help from GTZ, create the preconditions for a transition to modern, energy-efficient technologies. The program also extends to existing thermal power plants. Government efforts to improve power plant efficiency address one of the largest potentials for energy savings and consequently for the reduction of GHGs. Economic growth, a secure central energy supply, energy savings and climate protection go well together – India is an impressive example.

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# ENERGY

## OFF-GRID BUT WELL PROVIDED FOR

In many developing countries, city dwellers and the industrial sector suffer from power failures and energy shortage. However, the rural population does so even more. 2.5 billion people all over the world depend on wood and other organic materials as a principal energy supply for preparing food and heating their homes. It is easy to imagine the implications: Forests fall prey to energy demand and their CO<sub>2</sub> sink capacity dwindles. In many places, this can be stopped only if the population can find affordable alternatives or a more efficient use of biomass as an energy source.

GTZ supports partner countries in using renewable energies and energy efficient technologies in rural off-grid areas in cooperation with the World Health Organization (WHO), Partnership for Clean Indoor Air (PCIA) and the Household Energy Network (HEDON).

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**Services:**

- Supporting the implementation of renewable energy technologies, like micro-hydropower, photovoltaic, solar thermal and bio-energy
  - Developing, disseminating and marketing locally-adapted, energy-efficient household appliances and technologies, especially energy-saving stoves
  - Supporting energy-security by means of reforestation and forest management
  - Sensitizing the population on the topic of energy
  - Promoting the use of energy-efficient technologies in public institutions, as well as in small and medium-sized enterprises in rural areas
- .....

The outcomes of these activities are impressive: A single so-called 'Solar Home System' providing one family with electricity saves 1.5 tons of CO<sub>2</sub> during its 20-year lifetime. A single energy-efficient stove saves one to 1.5 tons of CO<sub>2</sub> annually. In 2006 the promoted energy-efficient stoves already saved 220,000 tons of CO<sub>2</sub>. People living in rural areas need less fuel, save money and are exposed to a lesser degree to indoor air pollution threatening their health.

### SMALL CHANGE - LARGE EFFECT

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 > **Uganda**

It used to be a green, densely-wooded country, but today hardly a tree is to be found in the populated areas of Uganda. "The reason is quite clear", explains Livingstone Ssemukasa, a stove builder trained by GTZ. "Everyone here uses wood for cooking meals." But wood is increasingly hard to find and becoming exceedingly expensive. The traditional Ugandan 'three-stone stove' consumes huge quantities of wood and generates low levels of heat. Besides, the smoke it produces is a health hazard, causing inflammations of the eyes and the respiratory tract. For this reason, GTZ has developed a new stove from local materials that needs less than half the quantity of firewood. "The new stove is great because it doesn't produce such a lot of smoke, and I need considerably less wood. My children and myself are feeling much better ever since", Harriet Kateera from the small village Ryeru cheerfully explains. Uganda's rural population thus contributes to climate protection by a substantial reduction in their demand for wood but also by reforestation measures and sustainable forest use and enjoys the social and economic advantages that come with it.

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# TRANSPORT

## MOBILIZING WITHOUT POLLUTION

Cars, trains, planes, and ships: in the context of globalization, it is impossible to imagine daily life without them. Of course, our climate does not remain unaffected by this. The transport sector is responsible for more than 13 percent of global greenhouse gas (GHG) emissions. Transport-related CO<sub>2</sub>-emissions are projected to rise by 140 percent from 2000 to 2050, with the biggest increase occurring in developing countries.

To counteract this development and mitigate the transport sector's impact on climate change, a comprehensive strategy needs to be implemented. Avoiding the need for transport and shifting towards environmentally-friendly and towards more efficient means of transport are the instruments of choice.

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**Services:**

- Support to develop and implement low-carbon transport systems
  - Advice on transport policy instruments that help reduce GHG emissions like fuel taxes, improvement of public transport systems, or vehicle inspection and maintenance schemes
  - Support to public transport operators in improving management and operation capacities
  - Trainings about the impacts of transport on climate change – including train-the-trainer approaches
  - Support to regional initiatives promoting urban emission reductions (e.g. Clean Air Initiative Asia, Association of Southeast Asian Nations (ASEAN) Secretariat)
- .....

Through training and advisory services, decision makers in the transport sector are better informed about transport emissions and their impact on our climate. This may, for example, lead to improved urban-transport systems, less traffic and more efficient operation of cars or motorized two-wheelers. The outcome is a win-win-situation at local and global levels, as transport operators and users may save on fuel hence on cost and at the same time reduce emissions. In a nutshell: smarter mobility means saving money, more fresh air and less GHGs for our climate.

### SUSTAINABLE MOBILITY

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 > **Supraregional**

Why is transport one of the most significant contributors to climate change? How can transport related CO<sub>2</sub> emissions be reduced? Which instruments are most effective in this context? Questions like these are at the center of the Sustainable Urban Transport Project that GTZ is implementing on behalf of the Federal Ministry for Economic Cooperation and Development (BMZ). Peer-to-peer training, technical and process advice on site, a continuously updated and extended compendium of manuals, and professional campaigning are the main lines of activities. The training is aimed at helping professionals in developing cities to replicate best practice examples in reducing transport GHG emissions from other municipalities and to adapt them to their local context. To date, the project has already resulted in climate-friendly changes to urban transport policy in numerous cities in Asia and Latin America.

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# BUILDINGS

## OBVIOUS BENEFITS

The buildings where we live, work and play account for eight percent of global greenhouse gas (GHG) emissions. Whether rooms need to be heated or cooled or warm water supplied, it requires energy, which is mainly derived from fossil fuels. Due to growth, especially in developing countries, the energy requirement of buildings is set to increase. On the bright side, the potential for zero-cost or even negative-cost emission reductions in buildings is estimated to be at least 29 percent.

In cooperation with ministries of construction, energy and economy in partner countries, GTZ develops concepts for emission reductions adapted to local conditions and supports their implementation.

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**Services:**

- Information campaigns for homeowners and tenants
  - Policy advice on incentive measures and standards (including surveillance)
  - Support programs implemented together with banks or other institutions
  - Promotion of energy-efficient electrical appliances, like lights or refrigerators
  - Training and advice i.e. for architects and builders
- .....

The buildings' inhabitants experience the positive effects right away: Once a block of flats is retrofitted they enjoy a higher quality of life and a decrease in their energy consumption. Thus, they can save considerable amounts of money every year. The retrofitting process provides new employment opportunities for energy advisors and handicraft businesses. Hence, local and global benefits go hand in hand: lower energy cost and reduced CO<sub>2</sub> emissions contributing to climate protection.

**TOTALLY COOL!**

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 > **Jordan**

The sun's rays burn down, scorching the earth. A day of 50 degrees Celsius is not uncommon in the dry desert climate. On the outskirts of the town, an unusual building attracts attention – a low-energy house. Its walls are oriented considering solar radiation and the building envelope is well-insulated. The house has little window area, energy-efficient lighting and solar cooling. The 420 square-meters building is a model of energy efficiency. It needs 70 percent less energy than a typical building, and during its life-time, it saves at least 630 tons of CO<sub>2</sub> emissions. This technical marvel was planned and built by Jordanian experts, supported by an EU funded program carried out by GTZ International Services. Three of the ten pilot projects supported under this program won the prestigious Energy Globe Award 2007. In addition to such demonstration buildings, the regional program also supports the creation of favorable framework conditions for replicating such examples in the region.

> **China**

A similar success story can be told about Tangshan, China. On behalf of the Federal Ministry for Economic Cooperation and Development (BMZ), together with Chinese partners, GTZ has converted old, large scale residential buildings into energy-efficient ones offering a higher quality of life. Now mayors of other cities are standing in line to visit, interested in duplicating this success story in their own municipalities.

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## COOLING WITHOUT WARMING

In addition to carbon dioxide emissions, also halogenated hydrocarbons are contributing to climate change. Their warming potential is over 12,000 times stronger than that of CO<sub>2</sub>. Furthermore, they destroy the ozone layer. These gases lurk in refrigerants, as well as in insulating foam propellants. In most air conditioners and refrigerators, they are responsible for cooling.

On behalf of the Federal Ministry for Economic Cooperation and Development (BMZ) and recently also the Federal Environment Ministry (BMU), GTZ supports developing countries through the Proklima Program in replacing halogenated hydrocarbons with ozone- and climate-neutral refrigerants and propellants. In doing so, GTZ is cooperating closely with administrations, industry and technology providers in about 40 countries.

### Services:

- Advice for the introduction of ozone- and climate-friendly alternative technologies
- Training of refrigeration engineers in professional replacement of refrigerants, as well as maintenance, servicing and the disposal of refrigerating appliances
- Assistance to industry in switching its production towards natural refrigerants and propellants and corresponding refrigerators, air conditioners and insulating foams
- Policy advice for a climate friendly implementation of the Montreal Protocol

The results speak for themselves: thanks to the activities of the project, emissions have been reduced by a total of 40 million tons of CO<sub>2</sub>-equivalents. Furthermore, the exchange of old appliances in favor of modern, energy-efficient ones is reducing energy consumption in developing countries and therefore lowering costs. The training of technicians and enterprises increases productivity and know-how thus strengthening economic development.

## USEFUL INVESTMENT

### > Brazil

Dona Esmeralda proudly shows her new refrigerator. Such a modern appliance on display in a poor hut in the middle of a favela around Salvador Bahia is a genuine surprise. 60,000 households received the appliances as a gift from Bosch und Siemens Hausgeräte (BSH) GmbH and the local electricity supplier. "GTZ experts explained to us that the refrigerants of the old refrigerators are destroying the ozone layer and are to blame for climate change. Our new ones don't do that", Dona Esmeralda says. Each new refrigerator saves up to 800 kWh electricity per year corresponding to two to three tons of CO<sub>2</sub>-equivalents in 10 years. For 60,000 households this adds up to more than 12,000 tons CO<sub>2</sub>-equivalents every year. In Brazil there are millions of outdated refrigerators. BSH wants to further expand the program and has applied for the certification of achieved emission reductions within the United Nations.

GTZ is supporting BSH with the respective certification process in the framework of the Clean Development Mechanism (CDM). BSH and GTZ cooperate in a development partnership, also known as Public Private Partnership (PPP). The CDM is beneficial for developing and industrialized countries: companies from industrialized countries receive emission certificates for emission reductions in developing countries – developing countries benefit from the technology transfer.





# INDUSTRY

## LESS IS MORE

The economies of developing and newly industrializing countries must grow in order to drive back poverty in the world. Up to now, growth has gone hand in hand with a rising consumption of resources, leading to an increase in emissions of greenhouse gases (GHG). However, a decoupling of economic growth from GHG emissions is needed to protect the climate. The magic word is resource efficiency, which means manufacturing a product of equal value while consuming less material and energy in the process. This starts with the production of raw materials and then follows the value-added chain of the product, including all waste products and emissions. The potential for efficiency gains in developing and newly industrializing countries largely still remains untapped.

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**Services:**

- Integrating resource efficiency and climate protection in industrial policy approaches
  - Introducing profitable environmental management systems that help minimize GHG emissions
  - Developing eco-industrial parks and climate-friendly management of industrial areas
  - Sensitizing stakeholders from industry and economy as well as consumers
- .....

By introducing resource efficiency, a win-win situation can be created for partner countries in many cases. If a process consumes less raw and auxiliary materials and less energy and produces less waste, the company not only emits less GHGs but can even reduce production costs. With eco-industrial parks in India, for example, GHG emission reductions of between five and 40 percent compared to normal industrial parks can be achieved. Many countries have recognized these benefits and are committing themselves more and more to increasing resource-efficiency.

### SURPRISING RESULT

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> **Argentina**

Is it possible for a small enterprise to manufacture in a more energy-efficient and climate-friendly way without high initial investments? Ten cheese manufacturers in Buenos Aires province, Argentina, dared to find the answer to the question. With the help of a working group comprised of GTZ representatives, industrial associations, the energy authority, various technology institutes and the local university, they analyzed their production and compiled their production cost. The working group recommended a cost-effective set of measures for energy savings. Once the entrepreneurs had put these measures into practice, there was a great surprise: their energy consumption had fallen by 34 percent, enabling them to save 1,800 tons of CO<sub>2</sub> per year. But it gets even better: for all of the enterprises participating in this program, recuperation of their investments occurred within only a few months. Some of them now save up to 46,000 euros every year. Definitely a win-win situation!

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# WASTE MANAGEMENT

## VALUABLE WASTE

More people, more consumption, more waste – this is the reality for many countries today. Developing and newly industrializing countries, in particular, often dispose of waste on dumpsites. The decomposition leads to the emission of methane and CO<sub>2</sub>. While both are greenhouse gases (GHGs) that contribute to global warming, the methane is of special concern since its warming effect in the atmosphere is 23 times stronger than that of CO<sub>2</sub>.

However, it does not have to be that way. The waste sector is one where emissions could easily be avoided. Technology already exists to combine state-of-the-art landfills with the collection of landfill gases that are then treated and utilized for their energy. By introducing closed-loop waste-management systems, waste can be avoided, the quantity of waste in landfills reduced and secondary resources returned to the production cycle. Indirectly, this helps avoid GHG emissions.

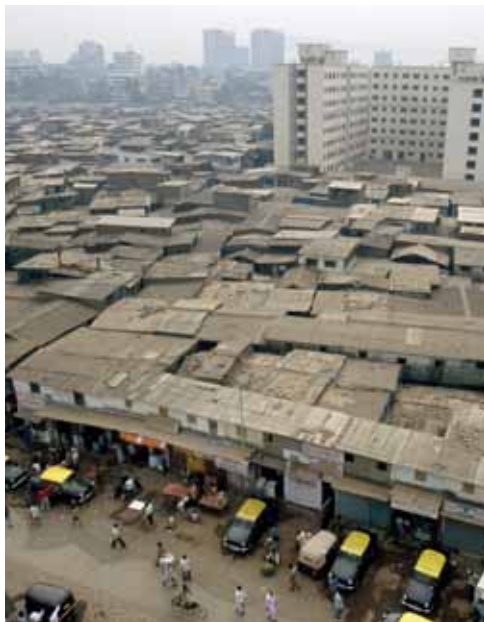
In many cases, developing and newly industrializing countries need technical and financial assistance for the implementation of climate-friendly waste management approaches. Therefore, GTZ cooperates closely with KfW to support governments and communities in their own efforts in this field.



### Services:

- Supporting creation of favorable institutional, legal and regulatory frameworks to reduce GHG emissions from the waste industry
- Advising on the integrated strategic waste management with a particular focus on the climate impacts of the related measures at national, regional and local levels
- Developing decision-making instruments to identify the most cost-efficient reduction potential of GHG emissions in the waste sector
- Trainings, workshops and dialogue events on the inter-linkages of waste and climate change
- Advice on financing schemes for a climate-friendly waste management i.e. by the use of the Clean Development Mechanism (CDM)
- Transferring know-how on adapted, climate-friendly technologies

Inhabitants at cities and communities can immediately and directly feel the effects of a well planned and implemented waste management system. Waste disappears from the streets and from nature, environmental pollution is reduced and people are able to lead healthier lives. While the benefits for the global climate cannot be immediately seen, the waste sector is able to make a significant contribution to GHG mitigation, quickly and cost-efficiently. Less methane and CO<sub>2</sub> released to the atmosphere means less global warming.



# URBAN DEVELOPMENT

## WHERE IT ALL COMES TOGETHER

When it comes to climate change, cities are culprits and victims alike. Home to half of the world's population, their high concentration of greenhouse gas (GHG) emitting industry, transport, households and waste generation makes them a major driver of climate change. At the same time, they are hit hard by its consequences. Many large cities in coastal areas, for instance, are threatened by rising sea level, an increase in storm frequency, and a reliance on vulnerable groundwater sources.

To encourage emission reductions and to increase the ability of cities to adapt to the impacts of climate change, GTZ cooperates with municipal authorities, public service providers, and private enterprises as well as in the context of the Cities Development Initiative Asia with the Asian Development Bank. GTZ's experience in all relevant emitting and particularly vulnerable sectors provides the basis for well founded advice on integrated approaches to climate change in cities.

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**Services:**

- Promoting integrated municipal adaptation and mitigation strategies that benefit local economies, citizens and the environment
  - Advice on climate change resilient and climate-friendly urban planning, building and infrastructure development and services, as well as environmental management
  - Supporting the efficient provision and use of public transport, energy, water and wastewater treatment
  - Facilitating access to the carbon market, i.e. in the areas of waste, transport and buildings
- .....

Impacts are lower GHG emissions, increased energy efficiency and economic competitiveness. In addition, the adaptive capacities of city dwellers vulnerable to extreme weather incidents are increased, while their assets are better secured. Thus, i.e. health risks in the context of floods can be reduced and municipalities and public service providers are better prepared to adapt urban infrastructure planning including for the provision of water to the slowly growing danger of sea level rise.

### INTEGRATED APPROACH

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> **Indonesia**

Indonesia is undergoing drastic development, particularly in urban areas. Traffic and industries are growing fast and with them the country's energy demand, GHG emissions and pollution. Due to their location in low-lying coastal areas, many Indonesian cities are highly vulnerable to climate change induced sea-level rise.

A new GTZ program helps Indonesian cities to systematically plan and implement strategies for effective climate protection and adaptation to climate change. In six selected cities, the program supports the industry and transport sectors to reduce emissions. Technology transfer and access to carbon trading are the key to success. Moreover, GTZ trains personnel from vulnerable Indonesian municipalities in adaptation measures, enables them to prepare for disasters and to get their cities ready for climate change's long-term consequences.

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# ECONOMIC DEVELOPMENT

## PROFITABLE BUSINESS

“Climate change is the greatest market failure the world has ever seen” – the Stern Report speaks a plain language. According to the study, continuing ‘business as usual’ will in the long-term result in climate change induced cost between five and 20 percent of global Gross Domestic Product (GDP) each year. In contrast, the cost of stringently reducing greenhouse gas (GHG) emissions can be limited to one percent of global GDP a year. Climate change influences the economic potentials and capacities of developing countries significantly. Therefore, successful economic policies must take these aspects into consideration.

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**Services:**

- Integration of climate issues into economic policy advice, for instance by supporting environmental fiscal reforms or by conducting policy-impact assessments
- Promoting climate-friendly, resource-efficient technologies in small and medium enterprises, including through technology centers and market development for energy efficiency advisors
- Developing microfinance options to promote energy efficiency and renewable energy
- Vocational training systems e.g. for power plant managers or maintenance staff

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 GTZ’s engagement contributes to raising awareness regarding climate-related economic cost, and business sector specific risk. It leads to increased resource efficiency, use of renewable energies, and substitution of outdated technologies. Sustainable economic policies, thus foster overall productivity in partner countries and strengthen their economic competitiveness.

## CHEAPER AND MORE INDEPENDENT

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 > Thailand

Tapioca is one of Thailand’s major crops. With a yearly output of 540 million euros, Thailand is the largest tapioca exporter worldwide. 675,000 farmers depend on its production. However, the tapioca industry is experiencing growing international competition. To increase the competitiveness of the Thai tapioca industry, GTZ supports the Thai Government on behalf of German Federal Ministry for Economic Cooperation and Development (BMZ) by advising stakeholders on how to optimize the use of resources, become more independent of fossil fuels and thereby reduce emissions. The aim is to decrease yearly GHG emissions in affected sectors, such as the tapioca industry, by one million tons CO<sub>2</sub>-equivalents until 2011. New industries, such as bio-fuels and renewables play a major role in this endeavor. Their share in energy generation is to grow from five to 14 percent within the next three years. GTZ uses a multi-level approach to incorporate all relevant actors into a political dialog, cooperating closely with the Thailand International Cooperation Agency, as well as with other public and private institutions. The Thai tapioca industry has enjoyed extraordinary success in raising its resource-efficiency by using biological residues, which would have otherwise been wasted, for energy generation.



# FOREST

## HABITAT IN DANGER

Forests still cover 30 percent of the land surface of our planet and provide habitat for 70 percent of all land-based animals and plants. The forests of the earth store more carbon dioxide than is contained in the atmosphere and hence are one of the most important sinks for greenhouse gases (GHGs). However, the green lung of the earth is in danger. Deforestation destroys 13 million hectares of forest annually. The destruction of mainly tropical forests causes about 17 percent of global GHG emissions. That means the forest sector is the third biggest emitting source after the energy supply and industry sectors. In only ten countries 65 percent of worldwide forest loss takes place. However, forests are endangered not only by the direct intervention of humans. Increasingly, climate change itself causes pest infestation and forest fires. The climate zones that are the natural habitat of forests and to which they are adapted are shifting towards the poles and to higher elevations.

Together with national ministries, other donors, non-governmental organizations, international initiatives like the World Bank's Forest Carbon Partnership Facility (FCPF), the Forest Stewardship Council (FSC) or the Congo Basin Initiative, GTZ is carrying out numerous projects that aim to avoid deforestation, promote sustainable forest management and reforestation.

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**Services:**

- Help partner countries prepare for participation in possible international mechanisms to avoid deforestation in the framework of a post-2012 climate regime
  - Support forest management systems adapted to climate change, for example by selecting tree species or taking measures to prevent forest fires
  - Developing methods for measuring forest carbon content and monitoring the deforestation of extended forest areas
  - Creating suitable framework conditions for conserving forests and increasing their capacity to sequester carbon (for example, through financial incentives and certification mechanisms, land titling and land-use rights, silvicultural techniques, and management of nature reserves)
- .....

All of these activities have the same goal: to bring worldwide forest loss to a standstill and to introduce a sustainable forest management system that can help sequester GHGs and reduce global warming. Where forests are intact, they conserve biodiversity, protect against soil erosion, regulate the water cycle and provide vital resources for poor populations. For example, GTZ supports the Amazon Region Protected Areas Program (ARPA) in Brazil, where, sustainably managed nature reserves have already saved 305,000 square-kilometers of forest to date. The area targeted by the program stores 4.6 billion tons of carbon. In the absence of ARPA, deforestation would cause at least 1.1 billion tons of carbon to escape into the atmosphere by 2050.



ABOUT FOSSAS AND LEMURS

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> Madagascar

Lemurs, Fossas or the feline predator Fanaloka – exotic names for exotic animals. They have only evolved on Madagascar and live nowhere else on the planet. Originally, the island was almost completely forested. Today, only four percent of these forests have been preserved. Deforestation affects the microclimate: natural disasters like cyclones during the rainy season and droughts in the dry season are becoming more frequent. During the past few years, the average temperature has risen by two degrees Celsius. Germany and Switzerland are supporting the Madagascan government in its fight against forest destruction with a program called 'Reducing Emissions from Deforestation and Forest Degradation (REDD)'. It focuses on developing methodical know how on carbon balances and monitoring systems, developing concepts for land use, and establishing programs for compensation payments in the case of avoided deforestation. The program feeds its results back into the international discussion about a global mechanism to avoid deforestation.

> Indonesia

From 2009, a comprehensive REDD program will begin in Indonesia, a country that is among the world's largest emitters of GHGs, mainly due to the destruction of its rain forests.

> Bolivia

In a different form, GTZ also contributes to one of the first REDD projects worldwide in Bolivia via the provision of integrated experts through the program Center for international Migration and Development (CIM). These experts develop methods of forest monitoring and emissions calculations. GTZ has been able to apply the experience from Bolivia in Cameroon through an international cooperation partnership.

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# AGRICULTURE

## THE DAILY BREAD

What do a sow and her piglets have in common with a German medium-sized vehicle? Over a year's time, they produce approximately the same amount of CO<sub>2</sub>-equivalents! What sounds like a joke with a surprising punch line is in fact a real life example. Contrary to common belief, agriculture contributes slightly more to global warming as the transport sector. An estimated 13.5 percent of all global greenhouse gas (GHG) emissions are caused by agricultural activities. In developing and least-developed countries, the share of total national GHG emissions stemming from the agriculture sector is particularly large.

At the same time, the agricultural sector is also severely affected by climate change. Populations in developing countries are particularly vulnerable to these changes. Severe droughts and heavy rains lead to the erosion of soil. This process is further aggravated by the overexploitation of forests and ground vegetation, monoculture production systems, and increasing population pressure. The consequences are lower crop and livestock yields and thus a decrease in food security and income sources.

In cooperation with German and international research institutes and non-governmental organizations, GTZ currently focuses on adapting agriculture to the challenges brought about by climate change. The promotion of sustainable land-use strategies, such as cultivation methods that conserve soil and water, are key. They are important to counteract erosion, to prevent the degradation of soil and to sustain its natural carbon sink function. Intercropping, as well as the promotion of plants with a higher drought tolerance are further elements of a potential mix of instruments.

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### Services:

- Funding for agricultural research focusing on climate change and its consequences
  - Advice on how to adapt major investment programs for rural development to the challenges of climate change
  - Developing weather insurance systems to protect small-scale farmers against the consequences of climate change
  - Identifying and implementing adaptation measures for small-scale farmers, e.g. in the tea and coffee sector
  - Promoting long-term access to financial and technical adaptation support for small-scale farmers
- .....

German Development Cooperation aims at strengthening the adaptive capacity of the agriculture sector in its partner countries. As a result of the support small-scale farmers are being sensitized to climate change and its impacts and able to identify and implement various ways of adaptation. With the support of agricultural experts, they develop alternative means of production and income generation to secure their harvests, earnings and food supply. In the broader sense, this contributes to an alleviation of poverty as well as to sustainable development in the agriculture sector.

A SOLID BASIS

> Africa

One thing is of particular importance to steer agricultural adaptation projects into the right direction: solid research and a well-grounded understanding of local contexts. Pro- found knowledge about natural conditions such as species, crop and cropping systems, as well as political and socio- cultural issues is key to efficiently and effectively react to climate change. The Federal Ministry for Economic Co- operation and Development (BMZ) assigned GTZ's Advisory Service on Agricultural Research (BEAF) the task of ana- lyzing the impacts of climate change at the African farm level and of developing adaptation measures. Currently, a network of international, agricultural research centers in cooperation with German research institutions is working on eight research projects. Topics range from climatology over classical agricultural disciplines to water management and policy research. One of the main issues is to involve local stakeholders to enhance their capacity and to feed their lo- cal knowledge into the research approaches. The research projects will provide regional organizations, policymakers and farmers in Sub-Saharan Africa with tools to identify and implement appropriate adaptation strategies in order to increase the resilience of agricultural systems and reduce the vulnerability of poor farming-based households to cli- mate change.

RELIABLE VALUE-CHAIN

> Supraregional

"Coffee is my life," says Eduardo Salvador from Nicaragua and adds with a smirk: "It probably also runs through my veins." As long as he can remember, his family has earned its living through growing and selling coffee beans. Recently, however, the impacts of climate change have knocked force- fully at his door. With greater frequency and severity than his ancestors had known, the dreaded El Niño effect has caused unpredictable rainfalls that have directly affected the flowering and productive capacities of his coffee plants. "(...) We had increasingly bad harvests and lost a lot of our old plants," he says, "our future and livelihood was at risk. Thanks to the joint project of GTZ and Cafédirect, I know a lot more about climate change now, and I am trying to adapt my work to it."

The Public Private Partnership Project between GTZ and the British Fairtrade company aims to support small-scale farmers in Cafédirect's supply chain to adapt to the impacts of climate change. Producer dialogues and workshops in six focus countries in Latin America and Africa, as well as comprehensive, target group focused impact studies, form the basis for the development of specific adaptation strategies, which are implemented together with producer groups. "Watch out, El Niño, I've clenched my fists!" Eduardo laughs.





# WATER

## ELEMENT OF LIFE

Floods here, droughts there, at times both occurring in the same place, melting glaciers, rising sea level – the list of extreme water-related events that are becoming more frequent due to climate change, could be extended. Today, no less than 1.7 billion people are suffering from water scarcity. If climate change continues, the figure may rise to five billion by 2025. On the other hand, for a small number of regions, growing water supply is to be expected. Therefore the management of risks and the utilization of opportunities is imperative in the water sector.

All over the world, GTZ supports countries that are worst-affected by climate change through the development of adapted, sustainable strategies for water management. To achieve this, GTZ cooperates closely with ministries of water and agriculture, as well as with water suppliers and users in partner countries.

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### Services:

- Advising governments on water sector reforms, water legislation, strategy development and planning within the scope of integrated water resources management and taking into account climate-change scenarios
  - Working towards the provision of a sustainable supply of water and sanitation in countries with extreme water scarcity or in slum areas
  - Supporting adapted and sustainable management of transboundary lakes and rivers
  - Promote the introduction of participative management structures, water-saving technologies and the use of lower-quality water for irrigation to promote the sustainable and efficient use of water in agriculture
  - Supporting the improved collection and use of hydrological and climate data providing the basis for the development of adaptation strategies
- .....

The success of these efforts already shows in many countries. In places where water used to be squandered in large amounts, today farmers manage with 60 percent less. Many water suppliers and users consider and plan more carefully how much water they have at their disposal and how they intend to use it. With this, important learning processes have been started to adapt to an increasing climate change induced water scarcity.

COOPERATION INSTEAD OF CONFLICT

WATER FOR THE FUTURE

> Peru

For the population of the Arequipa region in the south of Peru, climate change is no longer a future scenario. "More frequent and intense droughts, sudden frosts and cold spells are making our lives difficult", people in the region complain. The melting of nearby Coropuna glacier, too, increasingly alarms local and regional authorities and the inhabitants of this area. According to a study by the United Nations Environment Program (UNEP) and the Geneva University, 54 percent of the glacier has already melted. Further scientific studies do not lessen anxieties: They predict water scarcity for the region, negative effects on agricultural production and hence on food supply. On behalf of the Federal Ministry for Economic Cooperation and Development (BMZ), GTZ provided its partners in Arequipa with advice on the creation and interpretation of climate change scenarios. For stakeholders in the region it is now easier to develop adaptation strategies. Advising technicians and policy-makers in municipalities and regional governments the objective is to achieve the best possible use and an equitable allocation of water resources. At the same time, experts will check related public projects for climatic change risks. Environmental communication and training round off the advisory work. As a result, the topic of climate change is now firmly established in the public school curriculum.

> Africa

Vanishing lakes, depleted rivers and increased incidences of conflicts between neighboring countries. Scenarios like this one give rise to growing concern among decision makers in North and South. Increased water scarcity due to climate change in some African regions gives reason for the concern. This is why GTZ in cooperation with KfW, on behalf of BMZ – and since mid 2008 co-financed also by British Department for International Development (DFID) – is working already for some years to assist 14 African countries on transboundary water management. GTZ also advises the African Ministers' Council on Water (AMCOW) on the formulation of common framework conditions for water management, as well as strategies for adapting to climate change. National governments, water-user groups and river-basin organizations put these framework conditions into practice in an effort to provide fair access by all users to the valuable water resource. The networking and dialogue that happens through the joint development of water strategies not only helps to prevent conflicts but builds mutual trust, as well.





# DESERTIFICATION

## VANISHING SOILS

The face of the Earth is changing. In the colorful make-up of today's globe, its blue and green hues will increasingly be rivaled by shades of brown and yellow. To date, dry lands comprise about 40 percent of the Earth's land surface. Intensified land use and climate change are fueling this transformation. Semi-arid areas and drylands, in particular, receive less rain and experience higher temperatures, which leads to increased water stress and exacerbates desertification. More than one billion people are suffering the consequences. The loss of fertile soil endangers their livelihoods, food security, and indeed, their very survival.

In cooperation with its international partners, GTZ supports the sustainable use of natural resources in drylands in ways adapted to climate change. The GTZ Convention Project to Combat Desertification commissioned by the Federal Ministry for Economic Cooperation and Development (BMZ) is a major player in this endeavor and ensured that experiences from the field are fed back into international negotiations, i.e. in the scope of the United Nations Convention to Combat Desertification.

.....  
**Services:**

- Climate proofing of natural resources management projects in drylands
  - Advice on designs of climate resilient development approaches in drylands integrating sustainable land management and biodiversity conservation
  - Development of market-based mechanisms for climate-risk management, e.g. index-based weather insurance products
  - Capacity development for planners and practitioners of governmental and civil society institutions in the use of climate information for development planning
- .....

New approaches to combat desertification are being developed and tested in local pilot projects in Central Asia. The affected population acquires the know-how and skills to better manage increasingly scarce resources with more flexibility.

### BIODIVERSITY ENCIRCLES THE DESERT

.....  
 > Morocco

Samir's eyes grow big at the sight of the red-necked ostrich: He has never seen such a big bird in real life before. Not many people have, as the bird belongs to a nearly extinct species. At the Souss Massa National Park, visitors like Samir and his parents now have the chance to see endangered Saharan animals up close. The Park Rangers breed a variety of species to be later released into the wild of the Moroccan and Tunisian Sahara desert.

The park is one of ten national parks that the Moroccan Government has established in order to preserve regional biodiversity and to combat the consequences of desertification stemming from climate change. On behalf of BMZ, GTZ supports this proactive approach by facilitating necessary dialogue and agreements between governmental and civil society stakeholders including on sustainable management structures, with a special focus on national parks. As the significant decrease in rainfall has alarming effects on natural resources, adaptation to climate change is becoming increasingly important in management concepts. GTZ integrates climate aspects in its approach to raise awareness, secure investments against climate risks, and foster the resilience of local communities to changing environmental conditions. Ecotourism, and enhanced agro-biodiversity are further components of this work, contributing both to alternatives for local income generation and climate-friendly resource management.

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# BIODIVERSITY

## VARIETY OF LIFE

From 'A' like 'apple tree' to 'Z' like 'zebra' – the diversity of species inhabiting this planet is almost endless. The rich variety of genetic material, species and ecosystems not only makes life on Earth unique but also possible. It plays an essential role in providing us with food, clean water or bio-energy. However, nature is sensitive to changes, even more so the more damaged or the less diverse in species ecosystems are already. Climate change impacts are expected to exceed the resilience of many ecosystems with devastating consequences for nature and the livelihoods of many people – mainly the poor in developing countries.

Ecosystems also play an important role in regulating the climate system at a local, regional and global level. Protection and sustainable use of forests and other carbon-rich ecosystems, like peatlands, can contribute extensively to mitigating climate change.

To protect biodiversity through adaptation and in order to contribute to climate change mitigation GTZ follows a multi-faceted approach, partnering with institutions like the Secretariat of the Convention on Biological Diversity (CBD), the United Nation Development Program (UNDP) Equator Initiative and the network BioFrankfurt.

.....  
**Services:**

- Providing up-to date information on biodiversity and climate change
  - Mainstreaming climate change into advice on national strategies and action plans following the Convention on Biological Diversity (CBD) and incorporating biodiversity and ecosystem services in climate change policies
  - Integrating climate change into land use planning for biodiversity conservation
  - Promoting agricultural biological diversity for climate change adaptation
- .....

Thanks to GTZ's multi-level approach, including activities from the national to the grassroots level, the positive results are numerous. The BMZ-funded project in Tunisia, which is supporting partners in implementing the United Nations Convention on Climate Change, exemplifies GTZ's impacts at a national level (please see page 9). Moreover, GTZ-supported communication activities and events, such as in Vietnam in the context of the Biodiversity Day, led to increased public awareness about the links between climate change and important ecosystem services.





# DISASTER RISK MANAGEMENT, SECURITY AND HEALTH

## PREVENTION AND PREPAREDNESS

Cyclones, droughts, and flooding: many natural disasters are climate related and their recent frequency is alarming. With global warming, the intensity of weather extremes will increase further. Developing countries are most vulnerable to these climate-related hazards often resulting in food shortages, malnutrition, health risks and epidemics. Moreover, as the pressure on ecological, social and economic systems grows, crisis potentials increase and the security situation deteriorates.

To prepare for these long-term trends, provisions for climate induced risks have to be integrated in development planning. In cooperation with the German Committee for Disaster Preparedness (DKKV), the Global Facility for Disaster Reduction and Recovery (GFDRR) of the Worldbank and the UN International Strategy for Disaster Reduction (UNISDR), GTZ is actively engaged in disaster-risk management.

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**Services:**

- Systematic analysis of the links between climate change, increased disaster risks, and the potential for conflict and security risks
  - Supporting national adaptation strategies in the health sector
  - Advice on climate change adapted disaster prevention and preparedness measures
  - Support land-use and spatial planning with a focus on natural hazards caused by climate change
- .....

GTZ activities regarding disaster-risk management help people in affected areas to strengthen their adaptive capacities. Tailored 'prevention and preparedness methods' like risk assessment and the implementation of early warning systems help affected communities to prevent and prepare for disaster and crisis situations and to mitigate their susceptibility to climate change impacts.

### AN EYE ON THE RIVER

.....  
 > Mozambique

"In Mozambique, you can clearly feel the impact of climate change with all its might", says Abílio Banessene, school teacher in the Búzi region. "The population is starting to adapt to this development to be better prepared for natural disasters. Now, we always keep a watchful eye on the Búzi River and know what to do, in case its level rises." For the farmers along the river the success or failure of their crops is strongly influenced by the river's behavior.

Abílio is one of numerous volunteers active in the early-warning system that has been set up in the Búzi region by the Sofala Province Government, the National Adaptation Committee, the Natural Disaster Management Institute and GTZ. By using a locally-adapted communication system and simple precipitation measurement tools, volunteers inform control stations about water levels and the amount of precipitation. If there is a threat of flooding, the stations sound the alarm. Supported by local disaster-management committees, residents can now manage their evacuation independently.

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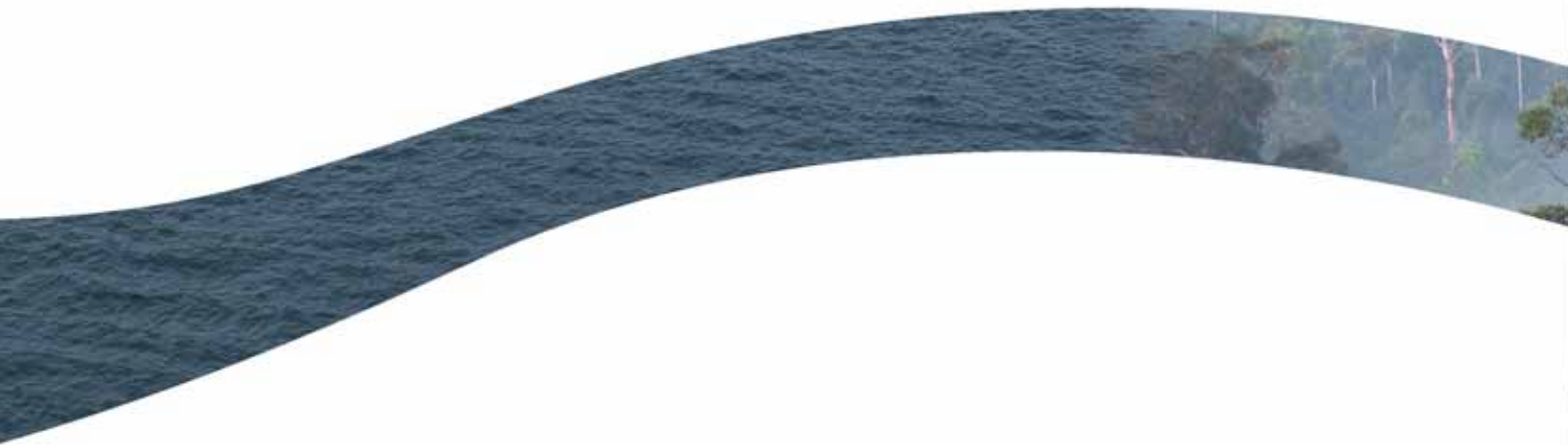
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