



Federal Ministry  
for Economic Cooperation  
and Development



# Adaptation to Climate Change

Promising Ways to Tackle Climate Risks

# Acronyms

ADB	Asian Development Bank
AFR100	Africa Forest Landscape Restoration Initiative
ARC	African Risk Capacity
ASAP	Adaptation for Smallholder Agriculture Program
BMZ	German Federal Ministry for Economic Cooperation and Development
C40	C40 Cities Climate Leadership Group
CAF	Development Bank of Central America
CFF	C40 Cities Finance Facility
COP	Conference of the Parties
DEG	German Investment Corporation
ECA	Economics of Climate Adaptation
FC	Financial Cooperation
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GPII	Global Partnership for Financial Inclusion
ICLEI	Local Governments for Sustainability
IFAD	International Fund for Agricultural Development
IIF	InsuResilience Investment Fund
IMF	International Monetary Fund
ISF	InsuResilience Solutions Fund
ITDP	Institute for Transportation & Development Policy
IUCN	International Union for Conservation of Nature
KfW	German Development Bank
MSMEs	Micro, small and medium-sized enterprises
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
NEPAD	New Economic Partnership for Africa's Development
PSACC	Private Sector Adaptation to Climate Change
RIICE	Remote Sensing-Based Information and Insurance for Crops in Emerging Economies
SDGs	Sustainable Development Goals
SlocaT	Partnership on Sustainable Low Carbon Transport
SMEs	Small and medium-sized enterprises
TUMI	Transformative Urban Mobility Initiative
USAID	American Agency for International Aid
WFP	United Nations World Food Programme
WRI	World Resources Institute
WWF	World Wide Fund for Nature

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# 1. Introduction



Climate change is real. And if the global community does not take urgent action, the world will pass decisive environmental and social tipping points. Limiting global warming to between 1.5°C and 2°C is essential if we are to thrive within our planetary boundaries and a prerequisite for sustainable development the world over.

‘We are dealing with scientific facts, not politics. And the facts are clear. Climate change is a direct threat in itself, and a multiplier of many other threats.’

UN Secretary-General António Guterres, March 2017



*In many regions of the world, climate change is already an everyday reality.*

Photo: © GIZ/Lucas Wahl

Both the Paris Agreement and the Sustainable Development Goals (SDGs) reflect this new global imperative. In the Paris Agreement, the international community committed to concerted action to limit global temperature rise, with each country making its own Nationally Determined Contribution (NDC). For most countries, these actions also involve implementing adaptation goals and measures.

The climate is already changing. The process of adjusting and responding to the impact of climate change is commonly known as adaptation. Poor people and poor regions are disproportionately exposed to increasing hazards but have limited financial, technical and social resources to tackle and adapt to climate risk. The IMF<sup>1</sup>

estimates that without efforts to reduce global emissions, rising temperatures will reduce the per capita GDP of a low-income country by 9 percent by 2100, with considerable downside risks. It is crucial to close this ‘adaptation gap’ by taking action to reduce vulnerability and strengthen resilience.

Even if ambitious climate action is taken, past emissions are such that certain adverse impacts of climate change are already ‘locked in’. More frequent and intense extreme weather events and greater risks to unique natural systems will affect the environment but also the economy. Moreover, the long-term effects are expected to be much more disruptive, including the related risks of fuelling forced migration and conflicts.



‘This is the area I once lived in. My home and those of the rest of my community have been swept away by the storm. Our farmland has been flooded by salt water. My family and I are now living in emergency shelters, and we don’t know what the future holds...’

A man who lost his house after the hurricane ‘Irma’ in Dominica in 2017.  
Photo: © Horst M. Vogel

<sup>1</sup> IMF (2017) World Economic Outlook

Climate change impacts could reduce annual global GDP by up to 3.3 percent by 2020, amplifying economic inequalities and putting achievement of the 2030 Agenda for Sustainable Development at risk.

OECD (2015) Economic Consequences of Climate Change, pp. 39, 47

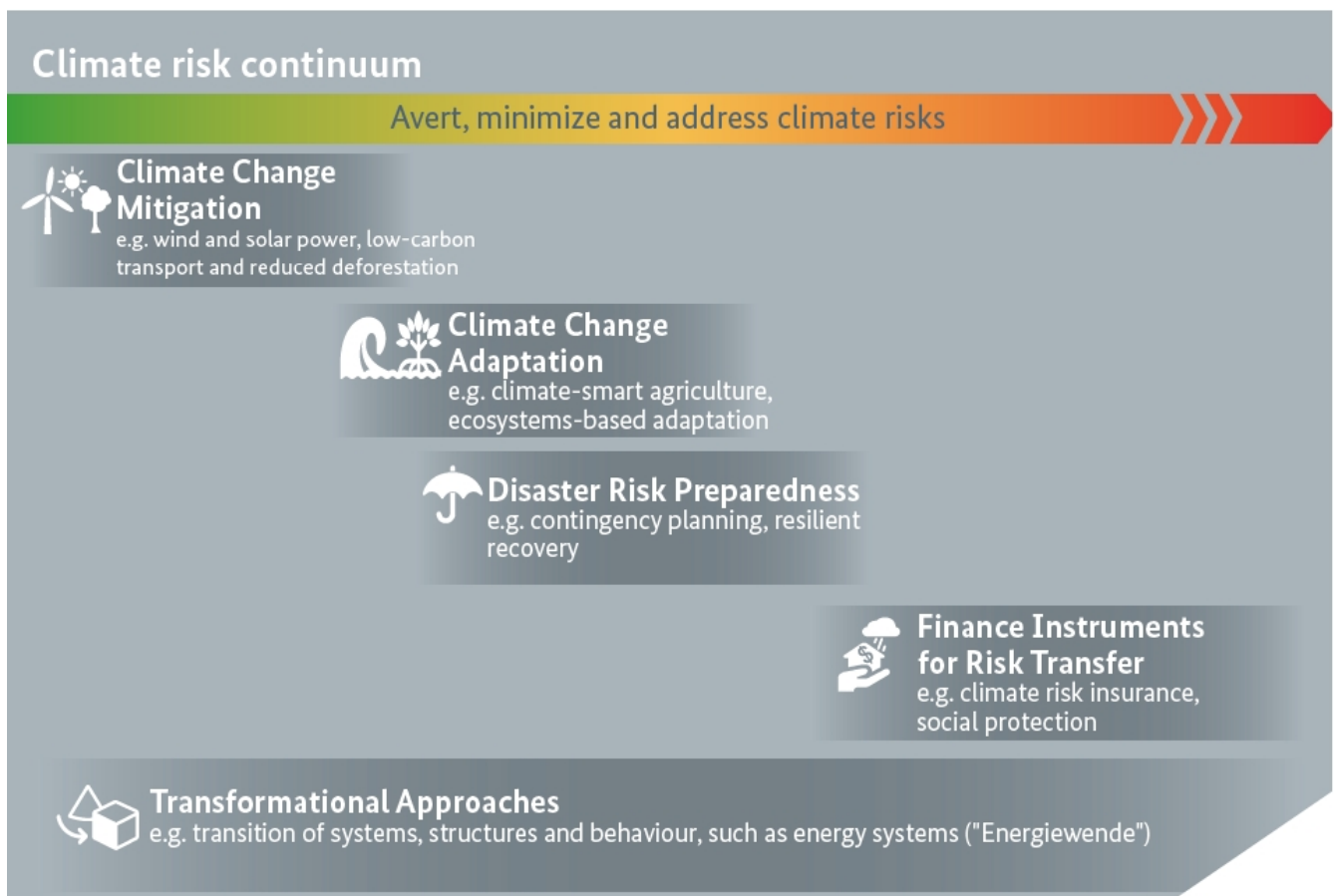
The German Federal Ministry for Economic Cooperation and Development (BMZ) supports its partner countries in managing this spectrum of climate-related risks. Actions range from averting climate change by reducing greenhouse gas emissions to minimising overall climate risk through adaptation and disaster risk preparedness as well as addressing remaining climate risks (see Figure

1) For adaptation, this means helping partner countries to craft robust processes and institutions to support climate-resilient development.

Adaptation measures take many forms. They may involve supporting smallholders in adapting their practices to the impact of climate change, modifying infrastructure to withstand more frequent flooding, or protecting water resources and coastal areas against rising sea levels. The most successful approaches are cross-sectoral, linking natural resource protection to sustainable economic use of those resources. Germany also supports the development and implementation of innovative risk-finance solutions, such as climate risk insurance instruments, to manage the remaining climate risks.

The task ahead is enormous. Successful adaptation therefore depends not only on governments but also on the active and sustained engagement of a variety of stakeholders, including national, regional and international organisations, the public and private sector, and civil society.

**FIGURE 1: THE CLIMATE RISK CONTINUUM: AVERT CLIMATE CHANGE THROUGH MITIGATION, MINIMIZE CLIMATE RISKS THROUGH ADAPTATION AND DISASTER RISK PREPAREDNESS AS WELL AS ADDRESS REMAINING CLIMATE RISKS**



Source: GIZ Global Programme on Risk Assessment and Management for Adaptation to Climate Change



## ADAPTATION STORY: NEW MEASURES AGAINST FLOODS IN MOZAMBIQUE: HOW BEIRA PROTECTS ITSELF AGAINST FLOOD WATERS FROM THE CHIVEVE RIVER

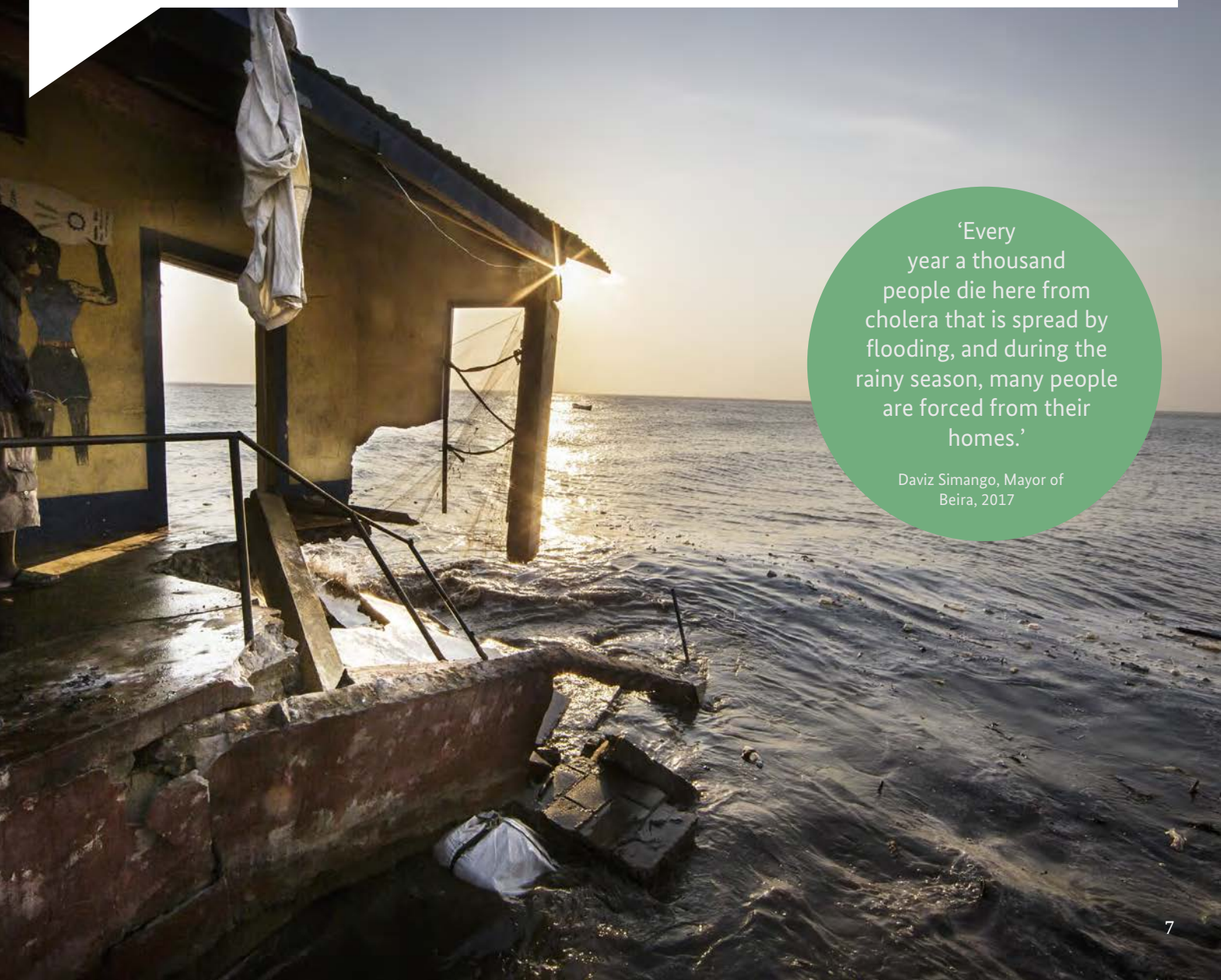
Cheizin Mussa lives in Beira, a city in Mozambique where the Pungwe River empties into the Indian Ocean. The economy of Beira is tied to the ocean, but in recent years, climate risks to the city have grown remarkably. Cheizin Mussa says that much of the shore has been consumed by the sea and that her house is in danger of collapse. Chaimel Calido, an 18-year-old welder, adds that rainfall has increased significantly in recent years: 'Now we have to wade through flood waters and mud to get to work', he says. 'Children are falling ill with diarrhoea, headaches, and malaria.' The mayor of Beira confirms this: 'every year a thousand people die here from cholera that is spread by flooding, and during the rainy season many people are forced from their homes.'

To reduce the risk of flooding in Beira, Germany has financed the rehabilitation of the Chiveve tidal river that flows from the Pungwe River through the centre of Beira. The project has removed rubbish and sediment from a 3.7 km section of the river and installed tidal gates to restore the river's access to the Indian Ocean, restoring its long-standing function as a drainage facility. Rainwater from the upper reaches of the river can now quickly reach the sea, removing the stagnant contaminated water that spreads disease.

In addition, an urban park will be established to protect the mangrove line along the river from further urbanisation. This will create additional flood retention capacity and keep human settlements away from frequently inundated areas, making people like Cheizin and Chaimel less vulnerable to extreme rainfall events. Residents will also have access to a sustainable recreational area, while biodiversity in the Chiveve River and along its banks will be protected.



[www.youtube.com/watch?v=5q4zIr6i7K0](https://www.youtube.com/watch?v=5q4zIr6i7K0)



'Every year a thousand people die here from cholera that is spread by flooding, and during the rainy season, many people are forced from their homes.'

Daviz Simango, Mayor of Beira, 2017

## 2. Overview of climate adaptation finance



Responding to climate change requires major, far-reaching investments, for example in new climate-resilient technologies and infrastructure. The Paris Agreement sends, for the first time, a very strong signal to make finance flows consistent with a climate-resilient and low-carbon development pathway. To incentivise and leverage the expertise and financial resources required for adaptation, international cooperation and public and private sector support are needed. At the climate conference in Paris, developed countries committed themselves to mobilising USD 100 billion in climate finance for developing countries each year from 2020 onwards from public and private sources. Germany is fully aware of the developed countries' responsibility and is committed to this goal.

'Germany aims to double its international climate financing by 2020 compared to 2014 figures.'

Chancellor Angela Merkel, May 2015

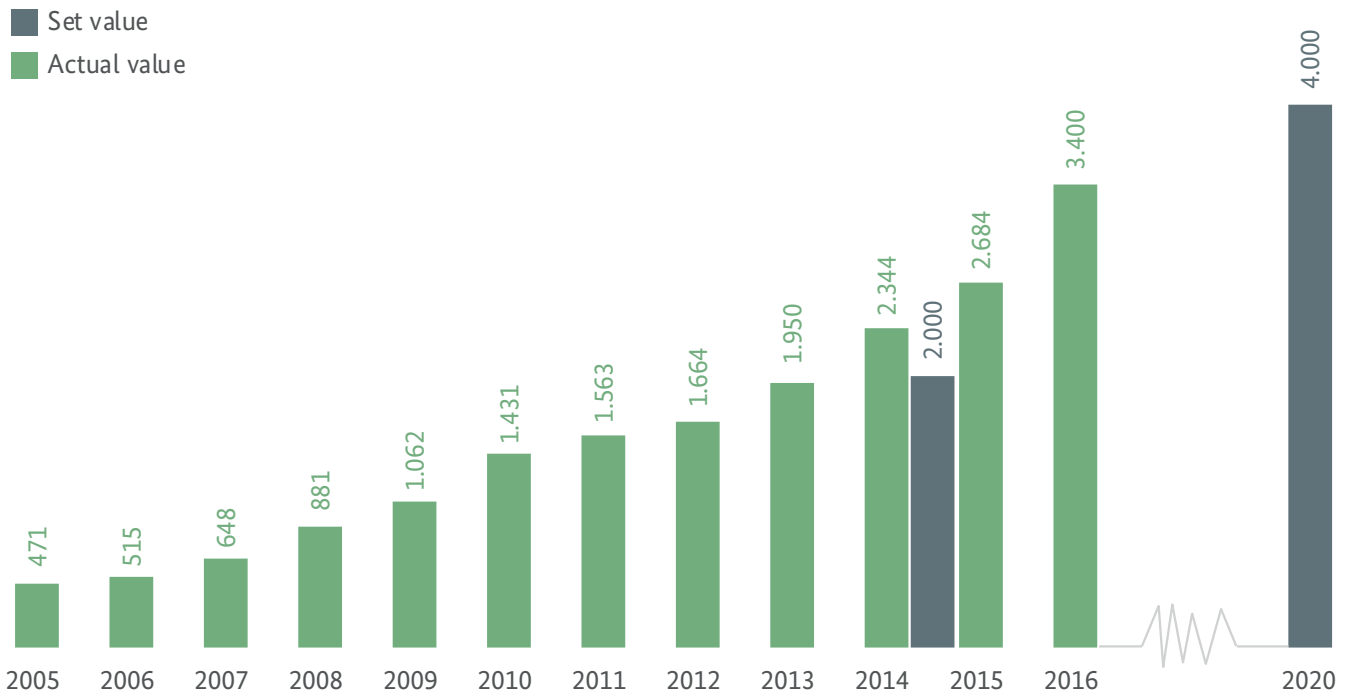


*Adoption of the Paris Agreement in Paris at the 21st Conference of Parties (COP 21) on the 12th of December, 2015. A major milestone towards a climate-resilient and low-carbon development pathway.*

*Photo: @UNclimatechange*



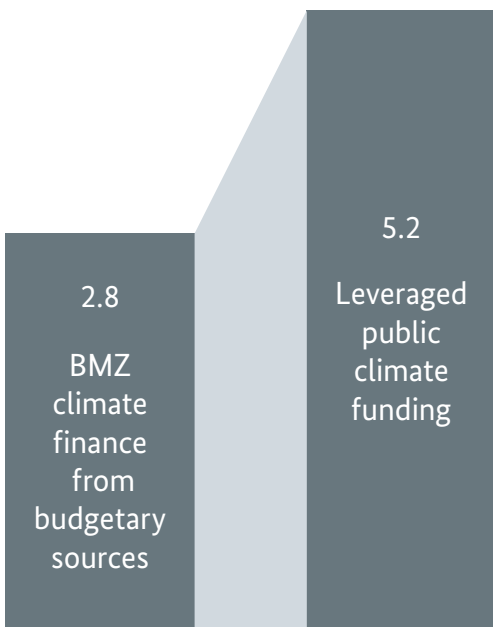
**FIGURE 2: GERMAN CLIMATE FINANCE FROM BUDGETARY SOURCES 2005 – 2020, IN MILLION EURO**



In 2014, Germany announced to provide EUR 4 billion in climate financing from budgetary sources by 2020. And it is in fact moving straight in that direction: In 2016, Germany’s contribution amounted to EUR 3.4 billion (Figure 2), more than 80 percent of which came from the BMZ budget.

German public climate finance from budgetary sources was complemented by EUR 5.2 billion of public climate funding provided through loans, both concessional and non-concessional, and around EUR 1 billion of equity mobilised by the German Development Bank KfW and the German Investment Corporation DEG (Figure 3). The numbers reveal that Germany is on track to meet its international commitments. In total, Germany’s public climate finance thus amounted to EUR 8.5 billion in 2016.

**FIGURE 3: LEVERAGED PUBLIC CLIMATE FUNDING FROM BMZ CLIMATE FINANCE FROM BUDGETARY SOURCES IN 2016, IN BILLION EUROS**



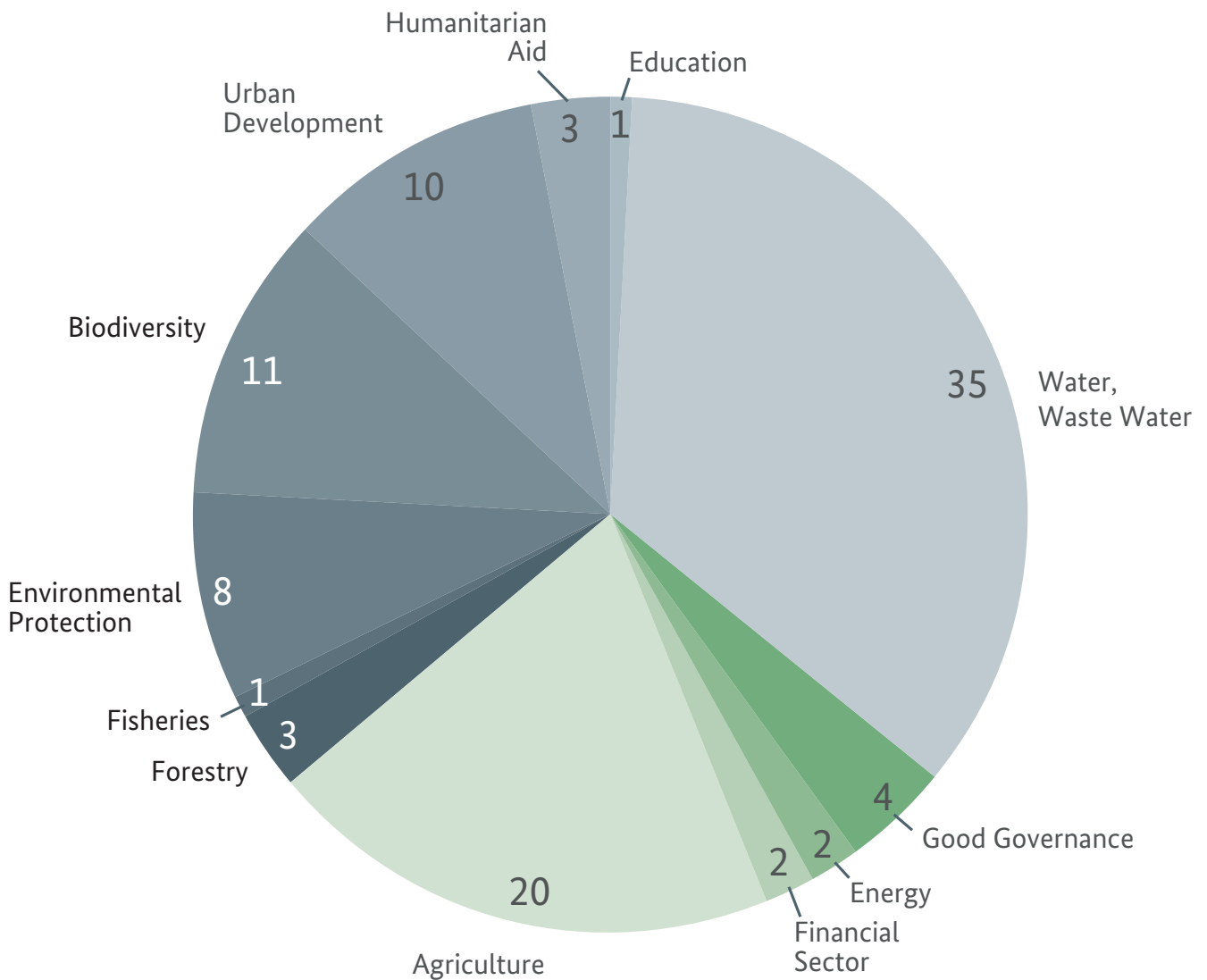
Between 2012 and 2016, bilateral public adaptation finance had doubled to more than EUR 1.1 billion. Over the same period, multilateral adaptation budgets more than quadrupled, from EUR 51 million in 2012 to approximately EUR 217 million in 2016.

In 2016 about 48 percent of BMZ’s contribution was allocated to adaptation. This proportion has been growing steadily in recent years.

Overall, BMZ adaptation financing in 2016 directly benefited around 29 million people in developing countries through measures including climate risk insurance and adaptation measures in the agricultural sector. Indirectly, around 560 million people benefited through government consultations and capacity building measures in over 16 countries.

As water and agriculture are sectors that substantially determine many people's livelihoods in developing countries but are highly vulnerable to climate change, these sectors accounted for over half of BMZ's bilateral adaptation financing in 2016, followed by biodiversity (11 percent), urban development (10 percent) and ecosystem protection (8 percent).

**FIGURE 4 : : BMZ'S BILATERAL ADAPTATION FINANCE IN 2016 BY SECTOR (% OF TOTAL)**



## ADAPTATION STORY: NEW WATER HARVESTING METHODS IN ETHIOPIA: HOW WATER-SPREADING WEIRS HELP BOOST CROP YIELDS

Abdu Mohammed, an Afar pastoralist, lives in the Awra District with his 13 children. Life is hard in the Afar and Somali Regions of Ethiopia. Increasing degradation of vegetation and soils results in lower yields. There is less pasture land for herds; some areas are no longer available for production at all. Women and children especially face malnutrition.

The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH is implementing a new approach in Ethiopia, using soil and water harvesting methods successfully tested in the Sahel. Water-spreading weirs were installed in dry river valley areas. GIZ is also cooperating with local colleges to offer masonry courses for the Afar and Somali population.


Abdu Mohammed was interested in these measures. He wanted a concrete house with firm foundations to replace his traditional Afar house, made of sticks. In 2015, he enrolled on the support programme as a trainee on a basic masonry course.

‘The course was a great opportunity for me’, says Abdu. He worked on various buildings in Awru and Teru

Districts and can now take government and private construction jobs. With his much improved financial situation, Abdu has also become a role model for young people in his area.

Other pastoralists are also benefiting from the construction of water-spreading weirs. Zehara Arba, a mother of 10 children, lives in Teaboy Kebele in the Sheqayib-iru Village of Chifra District. Her family suffered from shortages of pasture and fodder but, she says, ‘since the water-spreading weirs have been built, rainwater spreads onto the plain, allowing us to grow crops and fodder for the first time on this land. Last season, I grew maize, sorghum and mung beans on 1.5 hectares. The hay from this made enough fodder for three months.’ Her husband also earned money working on the project’s cash-for-work programme.

30-year-old Ahmed Wogeris, another resident of the village and father of six children, never produced an adequate harvest from his field. ‘At first, I did not believe that the water-spreading weirs could support my livelihood. I simply helped build them to earn a wage’, he says. ‘Now I can grow better crops and fodder.’ This season, Ahmed has grown elephant grass, mung beans and maize on his 1.5 hectares of land. He even had enough hay to sell, using the money to buy food, clothes and books for his children.



6.7 million people in the Afar and Somali region live below the poverty line. In the Somali Region, thousands of young people have therefore left to live and work in Europe.



# 3. Adaptation in practice



Cooperation and coordination are essential to the success of global climate change adaptation efforts. The Sustainable Development Goals (SDGs) and the adaptation goals set out in NDCs and National Adaptation Plans (NAPs) provide countries with frameworks to guide their transformation towards more climate-resilient, low-carbon development. Germany recognises that to effectively address cross-cutting issues, such as climate change and urban growth, public, non-state and subnational actors must unite and align their actions.



*Adaptation can take various forms. Road on a dam to protect a residential district at the port of Khulna in Bangladesh.*

*Photo: © Thomas Trutschel/  
Photothek*

To this end, Germany has launched and supported a number of major multi-stakeholder initiatives since the adoption of the Paris Agreement. These multi-stakeholder initiatives serve a dual purpose: they serve as a new implementation model to accelerate and amplify action; and they illustrate how clear targets can lead to commitments to action on a larger scale. These initiatives cover a range of key areas of activity, including food security and agriculture, the protection and management of natural resources, such as forests, water resources, oceans and coastlines, urban development, and sustainable and

affordable energy in line with needs. They therefore play an increasingly important role in meeting cross-sectoral adaptation challenges and making use of available synergies.

With the help of other partners and initiatives, such as the NAP Global Network, the NDC Partnership is supporting developing countries in implementing their NDCs and NAPs. The InsuResilience initiative improves and scales-up climate risk insurance solutions to help these countries to cope with remaining climate risks.



Dr Gerd Müller, German Federal Minister for Economic Cooperation and Development (BMZ), at the presentation of the NAP Global Network at the Climate Change Conference COP 20 in Lima on 8 December 2014. The NAP Global Network supports developing countries in developing and implementing National Adaptation Plans (NAPs). To date, the Network has enabled interactive and needs-based knowledge exchanges on NAP planning and implementation between 18 developing countries within five regional fora.

Photo: © Michael Gottschalk/photothek





# NDC PARTNERSHIP

The NDC Partnership aims to support countries in implementing the NDCs as quickly and effectively as

possible, and to set their ambitions even higher. At present, the international community's NDC commitments do not go far enough to limit global warming to well below 2°C, and only 74% of the NDCs submitted by the Parties to the Paris Agreement included an adaptation component (as of October 2017).

The Partnership was officially launched by BMZ and the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), along with Morocco and the World Resources Institute (WRI), at COP 22 in 2016. Its members include countries from all regions as well as international organisations and development banks.

The NDC Partnership supports partner countries in aligning and implementing climate and development targets by translating them into concrete policies, budgets and investment plans. Through bilateral and multilateral donor programmes, it also seeks to help

implement these targets in a systematic and coordinated way. More concretely, the NDC Partnership is engaged in improving access to technical support and financing for implementation of the NDCs; it also provides analytical and advisory tools to expand, manage and share knowledge. Successful examples include Mali, which is developing an NDC implementation plan and an investment plan, and Fiji, which is extending its NDC beyond energy to include the forestry sector.

In the context of adaptation efforts, the activities of the NDC Partnership aim to connect its activities with the NAP Global Network.



[www.youtube.com/watch?v=rA3a2O7RAFU](http://www.youtube.com/watch?v=rA3a2O7RAFU)

The NDC Partnership currently has over 70 members and continues to grow. It is open to all countries and organisations that support its principles.



National Adaptation Plans (NAPs) help to ensure sustainable development remains possible in the face of climate

risk. The NAP process aims to help countries develop their economies and societies and to foster their resilience to climate change. It does this by:

- identifying and prioritising adaptation action in all sectors;
- operationalising and implementing preventive measures; and
- planning public investments and allocating funds accordingly.

Stressing the key interaction between adaptation and development, Germany's Federal Minister for Economic Cooperation and Development Dr Gerd Müller and representatives of several developing and developed countries established the NAP Global Network at the climate conference in Lima in 2014.

The NAP Global Network aims to improve adaptation planning and implementation by enhancing coordination between all actors engaged in the NAP process at country level, including bilateral donors.

To date, the Network has enabled interactive and needs-based knowledge exchanges on NAP planning and

implementation between 18 developing countries within five regional fora.

It further provides targeted technical support to partner countries (e.g. Albania, Botswana, Jamaica, Kenya and Morocco). Because most NDCs also include adaptation goals, the NAP process can serve as the 'operational vehicle' for implementing an NDC's adaptation goals. Therefore, the NAP Global Network is already cooperating with the NDC Partnership to ensure the coherent and integrated implementation of the two processes. In addition to the NAP Global Network, BMZ finances projects to support NAP processes in partner countries at an annual average cost of EUR 59 million between 2012 and 2016.



[www.youtube.com/watch?v=IY5x6BeArc0](http://www.youtube.com/watch?v=IY5x6BeArc0)

'The networking opportunity [of the NAP Global Network] has helped us to learn a tremendous amount from what has worked in other countries as well as to share with them what has worked in Grenada.'

Aria St. Louis, Head, Environment Division, Government of Grenada





## InsuResilience

Between 1980 and 2015, more than 60 percent of those who lost their lives as a result of climate-related extreme weather events had an income of less than USD 3 a day. Meanwhile, extreme weather events force some 26 million people into poverty every year. In high-income countries, almost half of all economic losses from natural disasters are covered by insurance; in poorer countries, this figure is less than 5 percent of losses from natural disasters, with the poorest people suffering the largest protection gap.

At the Elmau summit in 2015, the G7 countries – Canada, France, Germany, Italy, Japan, the United Kingdom and the United States – therefore launched the InsuResilience Initiative for climate risk insurance. The initiative aims to ensure that by 2020, 400 million more poor and vulnerable people have access to climate risk insurance. At the climate conference in Paris in 2015, they committed to provide USD 420 million in support of InsuResilience. One year later, in Marrakesh, two new partners joined

the initiative: the European Union and the Netherlands. Together, they increased their financial commitments to USD 550 million.

Since 2015, more and more actors, including the V20, multilateral organisations, the private sector, civil society and academia, have shown interest in the initiative. This illustrates the need for even more coordinated action to enable timely and reliable post-disaster responses. In June 2017, in the G20 Hamburg Climate and Energy Action Plan for Growth, leaders therefore welcomed the development of a Global Partnership, building on InsuResilience but extending beyond its focus on climate risk insurance.

The new Global Partnership seeks to strengthen the post-disaster response to the impact of natural disasters in developing countries. Its aim is to leverage potential synergies between the diverse set of actors working together in the Partnership to close the ‘protection gap’. By sharing knowledge, catalysing innovation and providing technical and financial support, the Partnership will help countries to make use of appropriate risk finance and insurance solutions that are integrated into the broader risk management and resilience agenda.



German Federal Minister for Economic Cooperation and Development Dr Gerd Müller with Dr Ngozi Okonjo-Iweala, former Minister of Finance of Nigeria and Chair of the Advisory Board of the African Risk Capacity (ARC) in May 2015 at the G7 Stakeholder Conference on Climate Risk Insurance in Berlin.

Photo: © GIZ

‘Climate risk insurance helps – in a fast and cost-efficient manner! Together with the United Kingdom, the World Bank Group and other partners, Germany is working on creating the Global Partnership on Climate and Disaster Risk Finance and Insurance Solutions, which the G20 leaders have welcomed at the Hamburg Summit.’

German Federal Minister for Economic Cooperation and Development Dr Gerd Müller, July 2017. Photo: © GIZ/BMZ



**FIGURE 5: ADAPTATION-RELATED MULTI-STAKEHOLDER-INITIATIVES SUPPORTED BY BMZ**

### **AFRICA FOREST LANDSCAPE RESTORATION INITIATIVE (AFR100)**

**Start date:** 2015

**Partners:** So far, 24 countries have joined the initiative (as of October 2017). BMZ has engaged in the initiative in cooperation with New Economic Partnership for Africa's Development (NEPAD) and the World Resources Institute (WRI).

**Goal:** Forest Landscape Restoration (FLR) is one of the three pillars of BMZ's strategy to protect the world's forests. AFR100 intends to restore 100 million hectares of forests in Africa, thus contributing to achieving the goals of the Agenda 2030 and the Paris Agreement.

**Benefit:** Through the sustainable restoration of forests and wooded productive landscapes, AFR100 increases the resilience of ecosystems, improving the local population's ability to adapt to climate change.

→ [more information](#)

### **ONEWORLD – NO HUNGER**

**Start date:** 2014

**Partners:** BMZ cooperates with 17 partners in the field of food security and rural development.

**Goal:** 'ONE WORLD – No Hunger' increases the resilience of the rural population against climate risks through adaptation in the agricultural sector. The initiative promotes soil rehabilitation and sustainable land management, secured land rights, food and nutrition security, innovative farming practices and value chain development, agricultural finance and access to markets.

**Benefit:** By introducing climate-smart agricultural practices, crop harvests are secured and yields can be increased. Here mitigation and adaptation go hand in hand.

**Progress:** With the initiative ONEWORLD – No Hunger, BMZ reaches out to 4.5 million people to improve their food security. A dedicated programme for the rehabilitation of soils improves soil fertility for 340,000 ha. Land rights are secured for 800,000 people.

→ [more information](#)

### **TRANSFORMATIVE URBAN MOBILITY INITIATIVE (TUMI)**

**Start date:** 2016

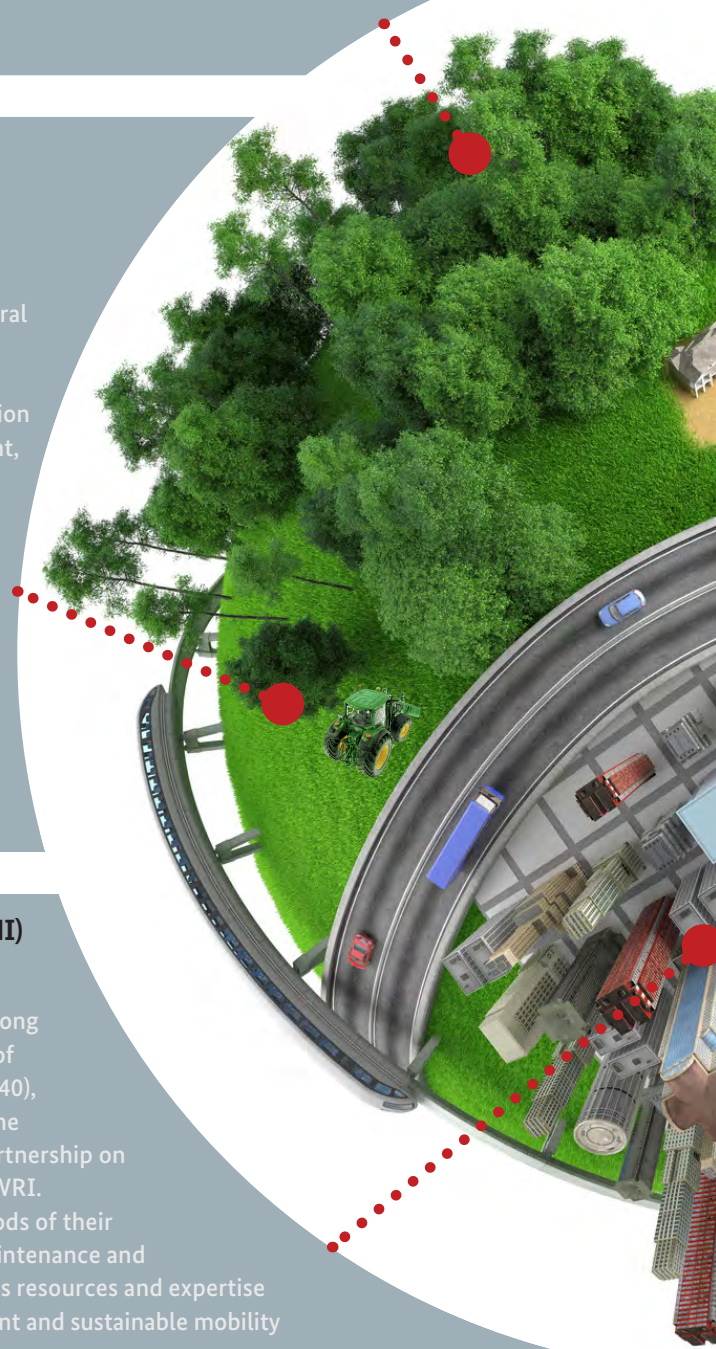
**Partners:** BMZ is one of nine founding members of the initiative, along with the Asian Development Bank (ADB), the Development Bank of Central America (CAF), the C40 Cities Climate Leadership Group (C40), the global network Local Governments for Sustainability (ICLEI), the Institute for Transportation & Development Policy (ITDP), the Partnership on Sustainable Low Carbon Transport (SlocaT), the UN-Habitat and WRI.

**Goal:** In order to adapt to climate change and protect the livelihoods of their populations, cities need to change the planning, construction, maintenance and management of their transport systems. TUMI therefore combines resources and expertise to jointly implement a shared vision of safer, more inclusive, resilient and sustainable mobility solutions in cities around the world.

**Benefit:** Mobility is a key factor in the economic development of any city, and a requirement to provide the population with access to jobs, healthcare, education and other basic needs. Well-designed mobility systems increase the resilience of cities in the face of growing urbanisation, population growth and growing climate risks.

**Progress:** The initiative is mobilizing up to EUR 1 billion per year and building on the capacity of at least 1,000 local decision makers in order to promote sustainable and resilient mobility systems.

→ [more information](#)





## THE WATER-ENERGY-FOOD (WEF) SECURITY NEXUS APPROACH

**Partners:** BMZ engages in close cooperation with the EU and other partners on strengthening the nexus between water, energy and food security.

**Goal:** Changes in the availability and quality of water are particularly evident impacts of climate change. These effects often concern agriculture, which is by far the largest consumer of water (more than 70% worldwide), as well as the production of energy, which is often equally dependent on the availability of water. Germany is therefore increasingly focusing on cross sector climate impacts and interactions or 'nexus' between the closely related sectors of water, energy and food.

**Benefit:** The aim of this approach is to use resources as economically as possible and in ways that benefit multiple sectors, with the aim to improve climate resilience through increasing access to water, food and energy. Promoting the nexus between water, energy and food thus helps minimise climate risks.

**Progress:** BMZ fosters the concept of the water-energy-food security nexus by embedding the approach in all project work and by implementing regional nexus dialogue.

→ [more information](#)

## SAVE OUR MANGROVES NOW

**Start date:** 2017

**Partners:** BMZ, the World Wide Fund for Nature (WWF) and the International Union for Conservation of Nature (IUCN) have joined forces on this new cooperation.

**Goal:** Nearly half of all mangroves have disappeared since the mid-20th century, so the initiative is intended to boost existing efforts to conserve mangroves. Up-scaling of successful protection and restoration measures underpins the objectives, while the initiative aims to enhance awareness of, commitment to and cooperation on mangrove protection among partner countries, donors and civil society.

**Benefit:** More than 100 million people depend on mangrove ecosystem services, such as providing nursery grounds for fish and crustaceans or their capacity to store carbon three to five times more effectively than terrestrial forests. Moreover, mangroves can significantly reduce the impacts of flooding in coastal areas, which are exacerbated by climate change.

→ [more information](#)





# 4. Adaptation and the private sector



Achieving the adaptation goals of the Paris Agreement and the 2030 Agenda requires substantial financial resources. That need, however, cannot be met by public sources alone. Considerable contributions from the private sector (multinationals, financial institutions, SMEs, etc.) are also necessary.

‘Investments totalling about 90 trillion US dollars will be needed in infrastructure over the next 15 years, more than is in place in our entire current stock.’

*The Sustainable Infrastructure Imperative: Financing for Better Growth and Development, New Climate Economy, 2016*

In the face of climate change it is essential and most cost-effective that new infrastructure can withstand increasing climate risks.



*NDCs and NAPs provide a credible orientation and a good base for investment planning.*

*Photo: © Thomas Trutschel/  
photothek*

While financial instruments and business models for climate change mitigation are becoming increasingly established, a greater focus is needed on adaptation and on the management of remaining climate risks. The momentum for adaptation finance is strong. This is why Germany is supporting a number of innovative finance instruments that offer the private sector attractive opportunities for participating in climate finance (grants, loans, funds, etc.). In addition, by creating favourable investment environments, the private sector can be mobilised to engage in various adaptation measures and contribute to resilience by climate-proofing its value chain. Local enterprises and SMEs are uniquely able to shape adaptation efforts by using their vital role within local communities to develop locally relevant adaptation solutions, which can increase society's resilience. These two dimensions of investment in private adaptation finance are inherently interlinked (see Figure 6).

### Creating enabling environments for private adaptation finance

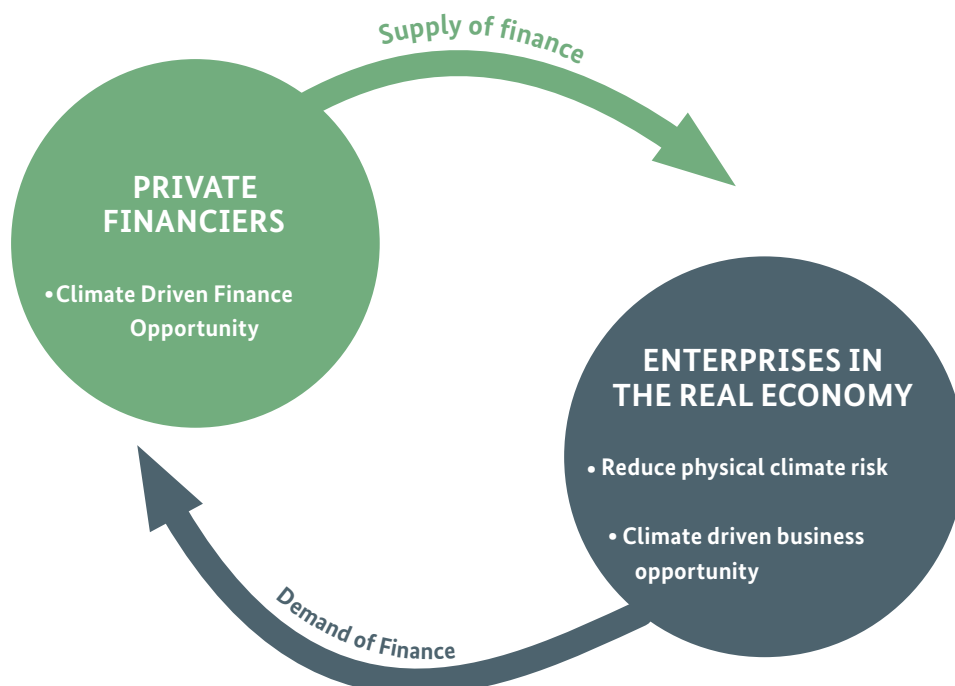
For private investors, an enabling environment with manageable risks is crucial. However, that also requires a deep understanding of climate finance in general and adaptation finance in particular. In this context, NDCs and NAPs provide credible orientation and a good basis for investment planning. Assessing and communicating the costs of adaptation and non-action can help strengthen support and attract investments. Even within the public sector, finance ministries tend to be sceptical about budgeting for measures to manage climate risk unless there are visible short- or medium-term benefits.

Germany advises partner countries with respect to incentives and regulations to enable private investment (compare Figure 7, points 1, 2, 5). BMZ supports institutions in partner countries to operationalise adaptation measures, develop bankable projects and integrate them into public budgeting processes.

Further contributions to risk reduction for private investors are achieved by cushioning currency risks or taking over risky project preparation activities, such as exploratory drilling in the case of geothermal energy projects.

Sound climate risk analyses, e. g. using the Economics of Climate Adaptation (ECA) methodology, provide a transparent and reliable base for many private investment decisions, as they contribute to delineating highly vulnerable zones, give indications on the probability and possible extent of damages, and help to quantify the costs and benefits of adaptation alternatives.

**FIGURE 6: THE TWO DIMENSIONS OF INVESTMENT IN PRIVATE ADAPTATION MEASURES**





## ADAPTATION STORY: NEW AGRICULTURAL FINANCING SCHEMES FOR PERU: HOW AGROBANCO IS BECOMING A GREEN BANK

Farmers in Peru are severely affected by climate change. A major proportion of the country's greenhouse gas emissions derive from the agricultural sector, and from forestry and land-use change. In this context, Agrobanco – a state-run agricultural bank – has made sustainability its main goal and, since 2014, has become a green bank.

Peru was one of the first countries to sign the Paris Agreement. Agrobanco, whose main customers are farmers, is committed to protecting the climate. The bank is developing new strategies and innovative products for its clients. 'We concentrate on small and medium-sized farms and want to support the development of eco-friendly agriculture', says Richard Hale, President of Agrobanco.

BMZ supports Agrobanco via the Climate Finance Readiness Programme, which is being implemented in Peru with financial support from the American Agency for International Aid (USAID). A consultant

will help develop financial products for agro-forestry systems and forestry plantations.

This has led to trees now being planted instead of agricultural products such as coffee or cocoa. The trees provide shade, their roots help prevent erosion, they regulate the humidity and chemical composition of the soil, and they store carbon, thus helping to reduce climate change. Farmers need less water and less insect repellent, resulting in fewer costs. The trees also help to reduce the impact of heatwaves. And when they sell the timber some years later, farmers also have an additional income – a kind of natural savings account. Agrobanco gives special loans to promote such schemes.

Agrobanco has also implemented environmental and social risk management measures to ensure it does not invest in activities with adverse side effects. Agrobanco employees are trained to protect natural resources, such as paper and water. And Agrobanco is expanding its portfolio to include more green products, including agro-forestry systems. In July 2017 – after over a year of preparations – Agrobanco began issuing agro-forestry loans, with the first benefiting 24 farmers in Tamshiyacu, a small community near the Amazon River.

'We will continuously expand our green portfolio for agro-forestry systems, biological products and irrigation systems'

Carlos Ginocchio, Agrobanco's Managing Director, 2017





## Supporting enterprises in the real economy

Working directly with private companies to promote existing voluntary, industry-led and self-reinforcing dynamics is crucial for mainstreaming adaptation. Companies are starting to realise the value of managing environmental and social risks, either within their own operations or by providing finance for sustainable development, as illustrated below in the case study of the Moroccan fishing company AVEIRO.

While larger corporations have started to integrate climate change impacts into their risk management approaches and strategies and their value chain, smaller companies often lack the resources to consider climate change strategically. Their ability to assess their own vulnerability or develop adaptation measures to increase their resilience is limited, while access to finance is generally challenging for SMEs worldwide.

Particularly in developing countries and emerging economies, SMEs are the backbone of local economies and important actors for employment and for providing products and services. Increasing their resilience is therefore crucial to ensure overall societal resilience.

BMZ helps SMEs to be aware of and analyse relevant climate risks with the guidance of the 'Climate Expert' approach. It also mobilises companies to implement adaptation strategies.

One example is the project Private Sector Adaptation to Climate Change (PSACC) implemented by GIZ. It builds on strong private sector multipliers and facilitates exchanges between financial institutions and SMEs on the financing products required. PSACC has also supported the Costa Rican development fund FUNDECOOPERACIÓN in setting up a credit line for SMEs to finance adaptation measures. As a pre-condition for accessing credit and getting approval for adaptation measures, SMEs have to undertake a climate risk assessment.

FIGURE 7: BMZ'S READY FOR CLIMATE FINANCE APPROACH



Source: GIZ Climate Finance Readiness Programme



## ADAPTATION STORY: NEW MODES OF TACKLING THE EFFECTS OF CLIMATE CHANGE IN MOROCCO: HOW THE FISHING COMPANY AVEIRO IS CHANGING PRODUCTION METHODS

AVEIRO is a fish processing company that was set up in 1946 in an industrial region of Morocco approximately 20 kilometres inland from the Atlantic coast. Today it employs 300 full-time and 700 part-time workers in one of Morocco's most important industries. Morocco has a long coastline with large extensive fish resources, and about 70% percent of the fish that are caught in Morocco are processed in-country and exported throughout around the world. Fish products make up 50% percent of Morocco's food exports and 12% percent of its total exports.

AVEIRO, like the rest of the fishing industry in Morocco, is now facing the increasing challenge of dealing with climate change. Climate impacts pose serious problems to companies that process agricultural goods, including fish. Extreme heatwaves, drought, heavy rains, flooding and rising temperatures that affect sea level all have an adverse impact on the industry. Fish stocks are dwin-

ding, and the fish that survive often migrate to cooler waters. Increases in jellyfish and algae and strong ocean currents all result in deteriorating fishing conditions.

In an effort to combat these problems AVEIRO gets assistance from the PSACC through 'Climate Expert', helping small and medium sized businesses to analyse their climate risks. By applying the 'Climate Expert', the company realised that it must take precautions against the flooding of production and storage facilities, the breakdown of electrical power supplies, and the overheating of appliances and freezers during periods of extreme heat. It also needs to find additional fresh water sources to clean fish and equipment when traditional sources of water are diminished by drought and falling groundwater levels.

As a consequence, AVEIRO has invested in a water purification system to recycle water instead of discarding it. The company intends to use this system to make it more independent of the freshwater supply while conserving both water and energy. The company is also considering options to expand its range of products to include other foods, such as vegetables. In all of these efforts, AVEIRO is working closely with scientists and policymakers not only to strengthen the company, but also to find solutions for the future protection of coasts, oceans, and fish stocks.



## Promoting opportunities for private financiers

Germany supports a number of major global adaptation financing initiatives, platforms and funds that seek to engage with private sector actors. These aim both to leverage public investments and to re-direct and mobilise private capital for adaptation. Key players in this respect are the Adaptation Fund and the Green Climate Fund, to which Germany has pledged significant amounts of funding, and initiatives that are part of Germany's wider international engagement, such as the World Bank-administered private sector set-aside scheme, which forms part of its Pilot Programme for Climate Resilience.

Furthermore, BMZ promotes new investment opportunities by supporting dedicated new funds or investment programmes seeking to direct capital flows to the most vulnerable, including smallholders, SMEs and municipalities to increase their resilience to climate risks. The International Fund for Agricultural Development (IFAD), for example, has set up the Adaptation for Smallholder Agriculture Programme (ASAP), which channels finance to smallholders to enable them to access information, tools and technologies that will help them become more resilient to climate change. Alongside introducing new instruments, BMZ pools its financial resources by providing EUR 13 million to the ASAP investment programme.

To strengthen and replicate successful practices, and to include private actors, BMZ is promoting a series of multi-stakeholder dialogues that promote exchange between public and private sector actors. Examples are the GreenInvest and the Global Partnership for Financial Inclusion (GPII) dialogue platforms initiated under the G20 with and for developing countries. The aim of GreenInvest is to

The Adaptation for Smallholder Agriculture Programme (ASAP) has become the largest global financing source dedicated to supporting the adaptation of poor smallholder farmers to climate change (eight million beneficiaries as at September 2017).

mobilise and mainstream green finance, while GPII carries forward work on financial inclusion, including improving SME access to finance in the poorest countries.

## Engaging non-state actors

At the same time, BMZ supports non-state actors to undertake voluntary and autonomous action to mobilise adaptation finance. One example is the C40 Cities Finance Facility (CFF), which provides technical assistance to cities in order to access sustainable financing for infrastructure projects. CFF crowds in the private sector by employing new forms of investment, such as crowdlending, green bonds or Corporate Social Responsibility (CSR) finance.

Another example is the Blue Action Fund which was set up by BMZ in 2016. The Blue Action Fund supports and crowds-in national and international NGOs that can apply for finance (capital stock of EUR 29 million). It has provided grants to conservation projects in the world's most sensitive coastal waters to enhance food security as well as to protect and raise awareness for marine biodiversity.



Women washing and processing fish in Kenya. BMZ aims to support, with the Blue Action Fund, sustainable and equitable use of marine resources and has drawn up a Ten-point Plan of Action for marine conservation and sustainable fisheries in 2016.

Photo: © GIZ/Dirk Ostermeier



# 5. Adaptation and innovative climate risk finance solutions



Adaptation efforts can significantly reduce but not entirely avert the negative impact of extreme weather events, such as droughts, floods and tropical cyclones. Innovative risk transfer solutions, such as climate risk insurance, can address the consequences of extreme weather events. Risks are spread widely even before potential damage occurs. In case of disaster, insured individuals receive payments rapidly, which can help to save lives, protect livelihoods and assets, allow for rapid emergency assistance and reconstruction, and thereby safeguard development gains.

‘With climate posing an ever-greater risk, we can use insurance and risk financing solutions to strengthen developing countries’ financial resilience to a wide range of threats. By using well-designed financial instruments, we can ease the impact of disasters on the most vulnerable societies, reducing the cost and damage to development progress.’

Joaquim Levy, the World Bank Group’s  
Managing Director and CFO,  
July 2017



*Losses after hurricane ‘Irma’ in 2017: damaged road in Dominica.*

*Photo: © Thomas Imo/  
photothek.net*



Farmer collecting data on the rice harvest with a satellite in South East Asia.

Photo: © GIZ

Climate risk insurance is most effective when embedded in a comprehensive risk management strategy. Together, they can create incentives for adaptation and risk-mitigating behaviour. Insurance schemes are based on the assessment of potential economic losses, which can help to identify adaptation priorities and the opportunity costs of non-action within national policy development (e.g. NDC and NAP implementation). Climate risk insurance further provides incentives for risk reduction by rewarding preventive measures with lower insurance premiums, which in turn reduces overall exposure and/or vulnerability. It can also provide a form of risk assurance for private and public investment affected by changes in weather patterns, easing disaster-related poverty and spurring economic growth and development.

As a committed InsuResilience partner (see chapter 3), Germany has supported the development of insurance markets and the up-scaling of innovative risk pools and business models to support climate risk management along the entire risk continuum (see Figure 1).

### Supporting preparedness, new business models and insurance market development

With support from Germany, recommendations are being drawn up as part of the InsuResilience initiative to advise policymakers on how to design the insurance market in developing countries. Private enterprises are important partners in this regard, not only because they are able to provide risk capital but also because they can provide knowledge, data and innovative technologies. BMZ is striving to reduce insurance market barriers to private sector engagement, for example by increasing access to meteorological data or creating incentives for private companies to engage in climate risk insurance markets.

- Remote Sensing-Based Information and Insurance for Crops in Emerging Economies (RIICE):** The rice crop monitoring and insurance initiative RIICE has been helping governments and farmers in Asia to better forecast and estimate harvests in view of more frequent weather events. The partnership between GIZ, the International Rice Research Institute (IRRI), the software company Sarmap SA, the Swiss Agency for Development and Cooperation (SDC) and Swiss Re supports satellite-based data collection for land under rice cultivation in Cambodia, India, Thailand and Vietnam. Real-time monitoring and forecasting enables government authorities to better understand when, where and how much rice is growing. This information ensures that emergency measures are implemented ad-hoc. The data is also used by insurers in India to make crop insurance more efficient and payouts more transparent.

To support the development of innovative climate risk insurance products, KfW Development Bank established the InsuResilience Solutions Fund on behalf of BMZ:

- Promoting new insurance products with the InsuResilience Solutions Fund (ISF):** the ISF supports establishing financially sustainable climate risk products in developing countries and emerging economies. It provides partial grant funding and advice on the development and up-scaling of direct and indirect climate risk insurance products. The ISF approach is unique: it catalyses partnerships between public entities (e.g. national or regional government bodies), NGOs, humanitarian organisations and private companies in the insurance sector to ensure demand for and sustainability of products and to leverage private sector expertise as well as risk-taking capacities. This moves climate risk insurance from concept to implementation stage, ready for market placement.

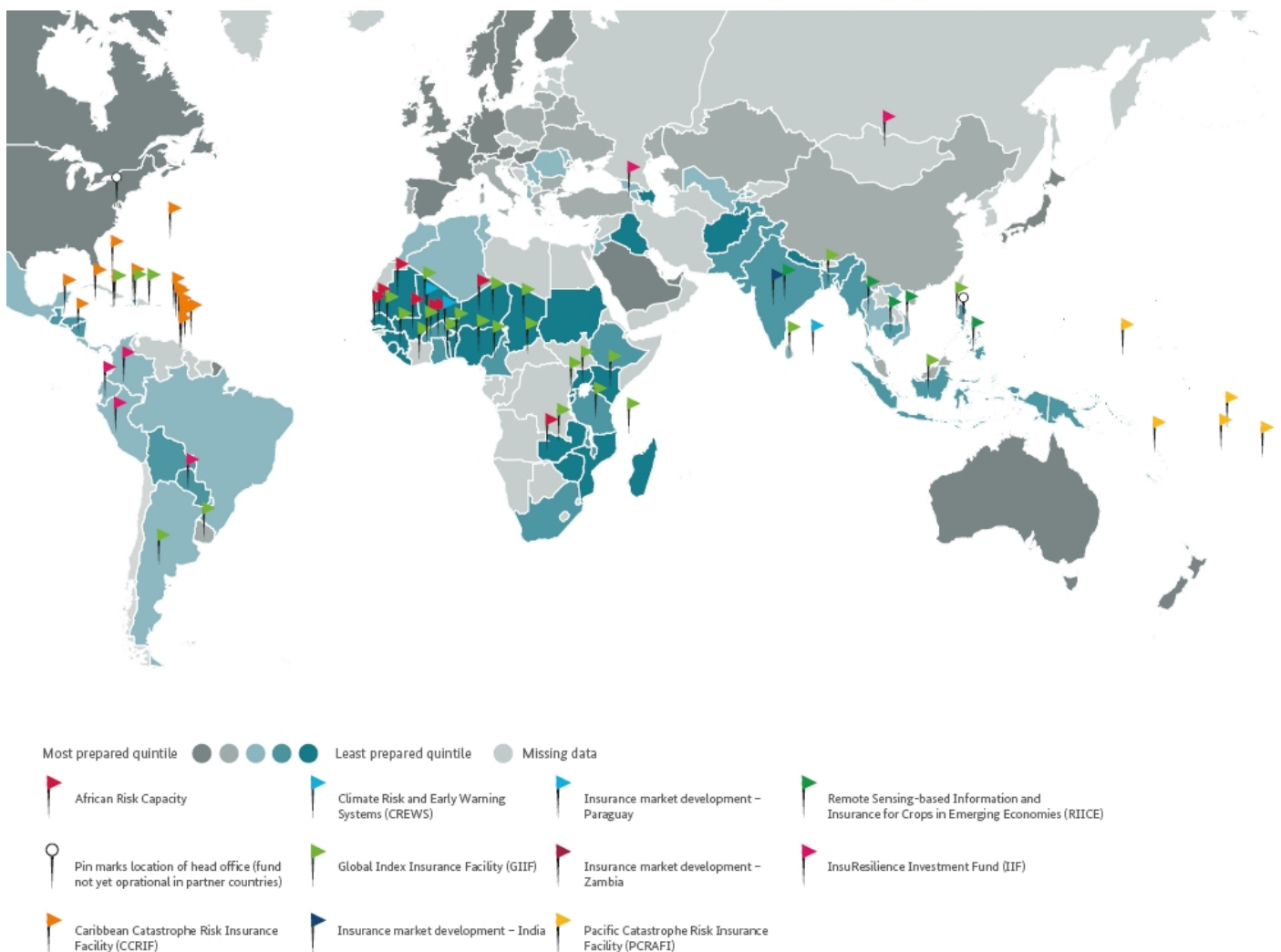
## Expanding risk coverage for poor and vulnerable people

- **Direct insurance schemes** at micro-level insure individuals or small businesses against risks such as harvest loss, providing them with immediate assistance when needed. When disaster hits, pay-outs are used directly by the policy holder for a range of purposes, e.g. purchasing food to compensate for harvest losses or continuing payment of school fees.

- **Indirect insurance schemes** can be implemented at macro-level, insuring national or local governments, and/or at meso-level, insuring cooperatives, micro-finance institutions, credit unions and NGOs. In contrast to direct insurance schemes, pay-outs to those affected by extreme weather events are channelled through the policy holders. The final target group thus benefits indirectly, e.g. from food distribution financed by insurance pay-outs following a drought, or from the prompt reconstruction of infrastructure in affected regions.



FIGURE 8: RISK PREPARATION AND RISK COVERAGE THROUGH INSUREILIENCE



Source: Foa, Roberto (2013) for the World Development Report 2014



## Micro-level

- **Contract-farming insurance scheme in Zambia:** in many countries, smallholder farmers struggle to survive. They do not usually have savings to carry them through droughts, floods or other income hazards. BMZ has supported the development of an agricultural insurance product bundled with life insurance and farming inputs. The contract farming operator, NWK Agri-Services in Zambia, offers weather and funeral expense insurance to smallholders. The contract farming operator pre-finances 100% of the premium upfront and recovers this amount from the farmers at the end of the season. In 2016, more than 23,000 smallholder farmers received pay-outs after the great drought, totalling over USD 200,000. This insurance model for contract cultivation has been replicated in other parts of Zambia and in Zimbabwe and can be copied by agricultural companies all around the world.

## Meso-level

- **Improving access to and the use of climate risk insurance in developing countries:** this is the objective of the [InsuResilience Investment Fund \(IIF\)](#). To this effect, the IIF invests in partner countries' insurance providers and aggregators. One investee is the microfinance institution Caja Sullana in Peru: supported by the IIF, it offers insurance against flood and drought to small farmers and micro-, small and medium-sized enterprises (MSMEs). Between 2016 and mid-2017, two floods and one drought occurred, triggering pay-outs of over USD 630,000 to almost 500 farmers and MSMEs. The pay-outs compensated farmers and entrepreneurs for their financial losses and enabled them to rebuild their destroyed assets.

## Macro-level

- BMZ supports [African Risk Capacity \(ARC\)](#), an indirect insurance facility **providing drought insurance to African states**. A special feature of ARC is that each government prepares a contingency plan to define in advance how insurance payments will be deployed in the event of a disaster, creating incentives to reduce and manage climate risks via adaptation actions. This makes it possible to provide rapid, targeted assistance to survivors. With support from InsuResilience, new insurance products providing cover against floods and heavy winds are currently being developed. Since the inception of ARC, eight countries (Burkina Faso, Gambia, Kenya, Malawi, Mali, Mauritania, Niger and Senegal) have purchased insurance against drought and received USD 400 million in insurance coverage. Four countries have received USD 34.4 million in pay-outs following a significant rainfall deficit. This money was used to support more than two million poor and vulnerable people and 500,000 animals were rescued. The ARC is planning to cover additional countries and perils (floods and cyclones).
- **Replicating insurance coverage with ARC Replica Coverage:** under InsuResilience, BMZ also supports humanitarian organisations, such as the United Nations World Food Programme (WFP) and the Start Network, so that they can take out insurance from the African Risk Capacity (ARC) and receive additional resources in an emergency. This model is called ARC Replica Coverage. In this way, climate risk insurance can become an important way of advancing the humanitarian system by addressing risks ex ante and effectively.



**InsuResilience**

'I support this bold initiative and hope the public and private actors rally behind it to spread proactive resilience globally'.

Dolika Banda, CEO of African Risk Capacity Insurance Company Limited (ARC Ltd.)  
Photo: © GIZ

# 6. Outlook



The Paris Agreement and the Agenda 2030 set a new political framework for global action and redefine development policy as ‘sustainable development policy’. These two political documents state clearly that climate change is a threat to development, and that the time for sustainable and cost-effective solutions is limited. However, tackling climate change is a complex endeavour because it crosses not only borders but also sectors, including energy, health, water and agriculture, and policy fields, like development cooperation, humanitarian aid and trade policy. In addition, climate change may exacerbate other challenges, such as migration, mobility issues or urbanisation, which in turn have a crucial role to play in combating climate change and cushioning its negative impacts.



*First steps towards a climate resilient development pathway have been taken. However, there are still numerous challenges on the way and time is a valuable good in this context.*

*Photo: © GIZ/Ursula Meissner*

Given its multi-faceted nature, the problem requires action at various levels encompassing subnational, national and international cooperation. It also requires work across sectors and with a whole range of actors, including civil society and the private sector. And it is necessary to pool synergies and move from single projects to initiatives – from small-scale, fragmented bilateral adaptation and purely climate-related projects towards larger scale initiatives that are broader in scope and scale. These are three important ways forward.

All of this is already reflected in the BMZ portfolio. To cope with multi-level challenges, new cooperation models like multilateral partnerships, networks and initiatives are increasingly being used. They enable collective action by various actors ranging from subnational provinces to nation states and international organisations, while also including non-state actors like NGOs. New global initiatives, such as the NDC Partnership or the NAP Global Network, assist countries in implementing their NDCs and the NAP processes. However, more needs to be done.

Well-coordinated approaches will help to combine adapting to climate change with protecting natural resources, promoting sustainable social and economic development and food security, increasing stability and reducing poverty in different regions of the world. One example is the development of a InsuResilience Global Partnership for Climate and Disaster Risk Finance and Insurance Solutions, which builds on the previous G7 InsuResilience Initiative but broadens its focus beyond climate risk insurance towards the resilience agenda and involves a wider range of partners.

Last but not least, strengthening the role of the private sector in adaptation issues will be extremely important in the future. Cooperation with the private sector and other non-state actors is the only way to tackle the transformation necessary to mitigate climate change and effectively combat climate risks. In order to get the private sector on board, innovative financing instruments and attractive investment environments can shape a rethinking of traditional business models towards redirecting the global finance flows to achieve the goals of the Paris Agreement and the 2030 Agenda.





## ADAPTATION STORY: NEW HOPE FOR CLIMATE-INDUCED MIGRANTS IN BANGLADESH (URBAN DEVELOPMENT): HOW ROKEYA AKTER AND OTHERS HAVE IMPROVED THEIR LIVES IN KHULNA

Bangladesh is hit particularly hard by climate change. Vast parts of the country lie within the Ganges-Brahmaputra Delta, the largest river delta in the world. Given the constant rise in sea level, up to one fifth of the entire country surface is at risk of permanent flooding in the future. Bangladesh is already the most densely populated country in the world, but the melting of Himalayan glaciers, increasing monsoon rainfalls, more frequent cyclones, rising sea levels and the intensifying erosion of rivers are destroying the living space of millions of people.

The poor are suffering most from the consequences of global warming, as they often have no other option than to live in particularly dangerous sites along riverbanks and coastlines – as is the case for Najma and Qulsum. Increasing river erosion has destroyed Qulsum's family's entire arable land and forced her to seek shelter in the bigger city nearby. Najma had to leave her hometown, too, after a cyclone destroyed her house and the few belongings she owned. As she had no money, she moved to a windowless shack dwelling in an urban slum in Khulna city.

Qulsum and Najma are now working as domestic maids for very low wages that barely cover their living expenses. However, the majority of the inhabitants in Khulna's informal settlements, such as 18-year-old Rokeya Akter, are unemployed. About 70% of these slum dwellers moved there after losing everything in tragic climate-related incidents. The city itself, however, lies only two to four metres above sea level.

BMZ supports Khulna in integrating and assisting climate-induced migrants. In cooperation with small and medium-sized enterprises, education and training is being provided for the local population and water, sanitation and energy infrastructure is being enhanced in cooperation with the local residents. Fixing streets, improving road dams, and installing water drainage systems helps to improve urban neighbourhoods so they are no longer entirely under water for weeks. This is improving living conditions in the informal settlements while at the same time boosting economic activities and creating jobs.

Rokeya Akter is very excited. After receiving training, she hopes to find a job more easily and earn some money. As the situation in her neighbourhood is improving, so are her prospects.



## ADAPTATION STORY: NEW PLANNING SCHEMES FOR MORE CLIMATE RESILIENCE: HOW BANGLADESH IS ALTERING ITS PLANNING PROCESSES FOR INFRASTRUCTURE

Since the 1960s, the government of Bangladesh has invested more than USD 10 billion to protect human life from disasters by building public infrastructure like cyclone shelters, floodwater catchment areas and early warning systems. Nonetheless, many regions still lack climate-resilient roads, bridges and safe buildings. The reason for that is that climate risk, such as higher temperatures or more frequent extreme weather events, have so far not been factored into the planning of infrastructure.

With the project 'Climate Resilient Infrastructure Mainstreaming' in Bangladesh, KfW Development Bank is working on behalf of the Green Climate Fund (GCF) and the BMZ to systematically incorporate climate change and its risks into planning, construction and maintenance of public infrastructure. The Project partner is the national Local Government Engineering Department (LGED) that is responsible for more than 15 percent of all public investment in the entire country (roads, public buildings and drainage systems). To strengthen the LGED's institutional capacity, a Centre of Excellence will be set up: an internal think-tank that embeds climate resilience as an interdisciplinary issue in all activities of the department and triggers an institutional learning process.

The project has a total volume of USD 80 million. Financing comes from the Green Climate Fund (40 million), from the German Federal Government (15 million) as well as from the government of Bangladesh (25 million). It finances several pilot constructions in three of the poorest and most vulnerable coastal regions. In the districts of Bhola, Barguna and Satkhira, 45 new buildings will be constructed and 20 shelters will be fixed to protect against cyclones while 80 kilometres of new and safer roads will be built – providing life-saving access to the shelters in emergencies. The shelters are also multi-functional: they are used as primary schools during the year.

The new infrastructure in the three districts makes it easier to adapt to climate change for more than 134,000 people, nearly 7 percent of the total population will indirectly benefit from the new Centre of Excellence. The project has important co-benefits, such as the creation of more than 1,700 full-time jobs and support for the education of more than 18,000 children. The roads, which can be used all year around, increase safety in emergencies and make travel on foot or by bike faster.



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