

BMZ



Federal Ministry
for Economic Cooperation
and Development



Climate action in practice

The contribution of
German development policy



Climate change is already happening. Disastrous floods, droughts and water scarcity have long since become reality, and it is people

Dear readers,

in developing countries who are hardest hit. For small island states in the Pacific, the Caribbean and the Indian Ocean, this is quite literally a question of survival. But it is not only they who are struggling with the impact of climate change. On all continents, people are faced more and more frequently with the consequences of climate change. The latest status report of the Intergovernmental Panel on Climate Change (IPCC) provides dramatic illustration of this.

Climate change is threatening to undo development achievements and is posing a threat to the outlook for many countries. That is why the Federal Ministry for Economic Cooperation and Development (BMZ) has made international climate action one of its top priorities. We all, industrialised and developing countries and emerging economies alike, need to take action immediately and with determination in order to limit global warming to less than two degrees. Everyone has to play their part – people in politics, in the business community, and in civil society.

An important year lies ahead of us. In the second half of 2015, the international community wants to adopt new development goals for the period up to 2030. This new agenda also needs to address all aspects related to climate

change, because in the long run, we can only reduce poverty and ensure food security if we take climate change into account – from local communities all the way to international politics. At the climate conference in Paris, we want to adopt a new comprehensive and binding climate agreement to succeed the Kyoto Protocol. This is only logical, because climate action is absolutely crucial for the survival of humankind.

“Climate action is absolutely crucial for the survival of humankind.”

Germany is taking its international responsibility very seriously. Under the Kyoto Protocol, we had made a commitment to reduce our emissions by 21 per cent below 1990 levels by 2012. We have actually exceeded that target, having reduced our emissions by 23.6 per cent. With the German *Energiewende*, the transformation of our energy system that we are currently pursuing, we aim to lower greenhouse gas emissions by 40 per cent by 2020. Simultaneously, we want to continuously increase the share of renewable energy, reaching a minimum of 80 per cent by 2050.

We are not letting up in our international efforts, either. We are already one of the world's largest donors of climate finance. Over the past ten years, the BMZ has quadrupled its relevant spending, reaching 1.75 billion euros in 2013. We are also making significant contributions to multilateral institutions. The BMZ's most recent commitment was a pledge of 750 million euros for the Green Climate Fund.

On the following pages, you can gain some insights into our multifaceted international activities.

Dr Gerd Müller

Member of the German Parliament
Federal Minister for Economic Cooperation and Development

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CLIMATE FOR SUSTAINABLE DEVELOPMENT

UN Secretary-General Ban Ki-moon has stated that climate change is the greatest challenge in the history of mankind: at the UN Climate Summit in New York in September 2014 he declared that the world must stand together and act together – now.

*Time to act –
together*

Back in 2006 Sir Nicholas Stern, previous Chief Economist at the World Bank, calculated that the human, economic and ecological costs of failing to act would be higher than the costs of taking timely, resolute and targeted action. He demonstrated that rising tempera-

tures would cost the world a minimum of five per cent of global GDP year after year. The Intergovernmental Panel on Climate Change (IPCC) recently confirmed this view in its Fifth Assessment Report: every delay in acting to save the climate limits subsequent options for action and will push up costs significantly.



The analysis is clear and now generally accepted: climate change is largely anthropogenic in nature. It can only be kept within manageable limits if we consistently reduce emissions of greenhouse gases. The IPCC still believes that we can limit the global temperature rise to two degrees, but if we are to do so we will need a radical technological, economic and institutional – a transformational change.

The two-degree target

The consequences will otherwise be disastrous. Depending on the scenario, sea levels could rise by up to one metre by the end of the century, vast swathes of land could become so arid that they will be unusable and food production could plummet. And even if we manage to keep temperature rise down to two degrees above pre-industrial levels, the world will still look different. Numerous regions will continue suffering from water shortages, while others will be plagued by flooding.

This is especially true of many developing countries and emerging economies, which are

thought to be worst hit by global warming. Hard-won economic and social progress is likely to be negated, achievements in the struggle against poverty, hunger and disease are jeopardised, as are gains in the fight to improve education. Climate policy is thus development policy in all fields.

That is why determined and resolute action is needed – first and foremost the transition towards a low-carbon economy. This targets primarily the energy sector, which is responsible for a good third (35 per cent) of global greenhouse gas emissions. According to IPCC figures the energy sector is followed by the agriculture and forestry sector, which accounts for about a quarter of total emissions (24 per cent). Since these sectors combined cause more than half of emissions, one of the key elements of international climate change mitigation efforts, and thus also of German policies, is to reduce emissions of greenhouse gases here.

Decarbonising the economy

Specifically, this will mean gradually shifting the way we generate power towards renewable sources, like solar and wind power, and stepping up efforts to enhance energy efficiency. Climate-smart urban development and innovative infrastructure planning in urban centres can prevent additional emissions. At the same time forests must be systematically preserved to retain their role as carbon sinks. And all this must be achieved under the premises of a growing world population, with about one person in seven still struggling to eke out an existence on less than 1.25 US dollars a day – in spite of international efforts to rectify this state of affairs. Any future agenda for sustainable development must incorporate both climate policy and the other important development issues such as economic growth, poverty reduction and food security, and must implement these together.

As well as reducing emissions of greenhouse gases, any comprehensive climate policy must also take into account the consequences of climate change.

Countering the consequences

These are unavoidable and often hit least developed countries hardest. That is why the Federal Ministry

for Economic Cooperation and Development (*Bundesministerium für Wirtschaftliche Zusammenarbeit und Entwicklung*, BMZ) is focusing support in the field of adaptation to climate change on particularly vulnerable and poor states.

Firstly, adaptation to climate change embraces what are termed 'no regret' measures. These are activities that would make sense even if climate change does not in fact occur on the scale we fear. They include improving cropping and irrigation methods in agriculture, to give one example. Secondly, adaptation involves activities that specifically target individual aspects of climate change, such as establishing systems to monitor climate data and water levels.

Finally, decision-makers must be informed of specific knowledge if they are to be enabled to analyse climate risks and assess how and where to invest in adaptation measures. The BMZ offers partner countries extensive support, in the form of advisory services, training, and research and development, or in the form of actual investment.

In general, the development of capacities to deal with climate change in partner countries is a matter of high priority for the BMZ.

Building structures

Political changes will only be sustainable in the long term if they are fully integrated into appropriate political and legal structures, and if strong institutions can be created that are capable of advancing innovative ideas and approaches.

Within each country, regulation, planning and budgeting at national, regional and local level must interlock, if the country is to mitigate greenhouse gas emissions and effectively counter the impacts of climate change. German development cooperation advises and supports partner countries in their efforts to achieve this integration. In various countries, the BMZ is supporting National Adaptation Plan (NAP) processes or Low-Emission Development Strategies (LEDS): a vital precondition for systematically mainstreaming adaptation to climate change and decarbonisation of the economy within its policies, and for addressing these as elements of sustainable development.



Climate change does not stop at national borders. Neither are its impacts limited to individual policy fields, branches of industry or social groups. The fight against climate change too must keep in mind the interdependencies between different areas.

Thinking out of the box

Agriculture, for instance, is an important source of income for a great many people in developing countries. The agricultural sector is coming increasingly under pressure because of the consequences of climate change – as rainfall becomes scarcer or rainfall patterns

less regular. Yet, agriculture itself is a major contributory factor to climate change, as forests are cleared and livestock farming continues to generate massive emissions of methane gas. Divergent interests need to be reconciled, incentives for low-carbon practices put in place and options for adaptation made accessible.

Germany has significantly raised its spending on international climate protection and adaptation in recent years. Germany's development cooperation is increasingly taking

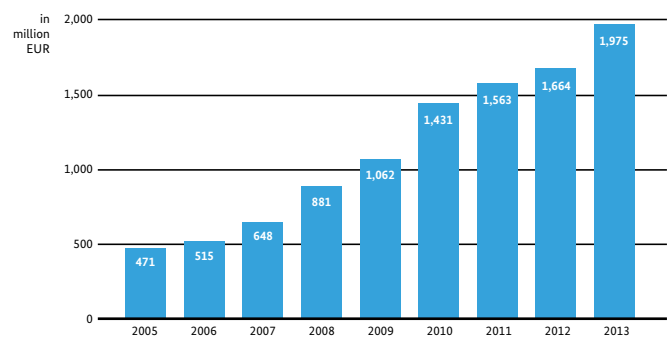
Financing climate action

systematic account of the impacts of climate change in its activities, as well as possible ways of countering these impacts. The number of projects focusing specifically on mitigation or adaptation is rising, as

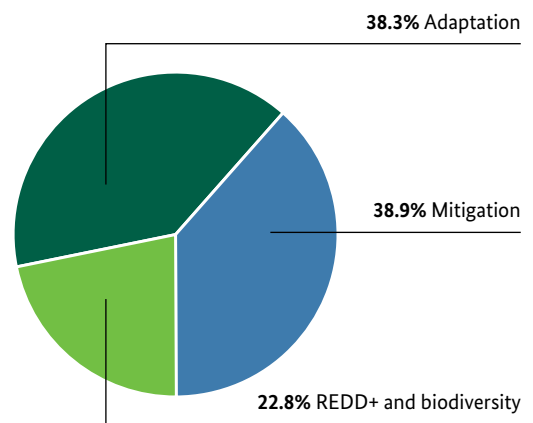
is the level of funding. In 2013 the German government pledged a total of almost two billion euros to finance international climate action; about 90 per cent of this sum came from the BMZ's budget. Within the space of only a few years Germany has thus more than quadrupled its pledges from 471 million euros in 2005 and is one of the largest donors in the field of mitigation and adaptation, according to figures published by the Organisation for Economic Co-operation and Development's Development Assistance Committee (OECD/DAC).

In view of the sheer scale of the task facing us, strong commitment on the part of the private sector is called for, alongside public funding. The BMZ uses a number of instruments to mobilise private sector funding beyond its own budget, such as climate-specific credit lines in partner countries, but also seeks to foster enabling environments for private investment. These approaches are intended to help overcome obstacles such as high capital costs and high risks, poorly developed markets and the lack of technical expertise. Within the scope of development partnerships, private businesses are also increasingly contributing

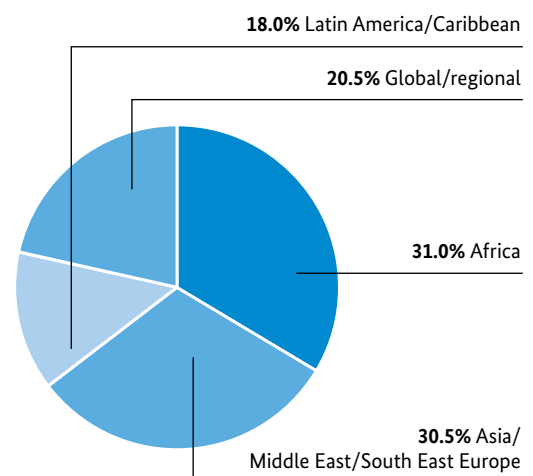
German international climate finance since 2005



German bilateral climate finance by area (2013)



German bilateral climate finance by region (2013)



funding and experience to efforts to reduce greenhouse gas emissions or to adapt to climate change.

Multilateral organisations are important partners to upscale change: in developing countries and emerging economies they implement programmes of great scope, and their political neutrality and broad membership lend them a special legitimacy to

Multilateral engagement

coordinate the inputs of diverse donors. This is a huge opportunity, particularly in the face of global challenges like climate change,

which is why the BMZ is engaged intensively in multilateral cooperation in addition to its bilateral commitments. As an active partner it brings the approaches and values of Germany's development cooperation to bear in international institutions.

The BMZ is working with the multilateral development banks to help put in place an enabling environment for effective climate policies. Part of this involves development banks taking climate change into account in their work in all sectors. The BMZ has, for instance, campaigned successfully to have the International Development Association mainstream climate change mitigation and adaptation in its core business. Over and above this, Germany's development policy makes significant contributions to multilateral climate financing. The BMZ is one of the largest donors to both the Climate Investment Funds (CIFs) and the Global Environment Facility (GEF).

The Green Climate Fund (GCF) will be the key instrument in future multilateral climate finance, and the BMZ is actively involved in establishing the Fund in terms of conceptual guidance, funding and human resources. The GCF aims to forge ahead with a paradigm shift towards low-emission and climate-resilient development. To this end, it will focus on programmes supporting low-carbon eco-

nomie development and making a substantial contribution to adapting to climate change. Furthermore, the GCF is to mobilise additional private-sector funding for mitigation and adaptation activities. Germany has pledged an initial funding of 750 million euros for the GCF.



The funding available for adaptation to climate change and reducing greenhouse gas emissions is increasing. Yet many developing countries still find it difficult to access international climate finance or to make effective use of the funding granted. The gulf that stands between available funds and potential recipients is bridged by the BMZ's Climate Finance Readiness Programme, which strives to build institutional and administrative capacities and develop strategies, enabling partner countries to effectively access international funding.

Putting climate finance to work

The next few pages take examples from selected sectors to illustrate the international commitment by the BMZ to climate protection and adaptation to climate change.

ENERGY AND CLIMATE

From a German point of view the FIFA World Cup in Brazil was a resounding success – and not only because Germany brought home the World Cup. Anyone who took the trouble to turn their gaze above the level of

the goalposts would have seen huge rooftop solar power facilities on several of the stadiums. In Belo Horizonte, for example, where the German team celebrated its 7:1 victory over the home team in

the semi-finals, the solar plant on top of the stadium generates 2,000 MWh electricity per annum. It was built with German assistance and is one of the flagship projects in Brazil's efforts to modernise its energy supply.

Thus far, this vast South American state has depended mainly upon hydropower. While indeed climate-friendly, it often requires massive dams which also impact on the natural environment and are not without social implications as communities may have to be resettled. During long dry periods power shortages can also occur. In 2001, for instance, the dramatically low water levels in Brazil's reservoirs resulted in an acute power crisis, which is still engraved in the memory of Brazilians because of the economic melt-down that followed. Since then, the country has been trying to diversify its power base, developing other forms of renewable energy.

*Crucial to
climate
protection*



The potential is vast, especially, but not solely, in terms of solar power. Average solar radiation values are about twice as high as those recorded in Germany. Even the sites with the lowest potential in Brazil enjoy a lot more sun than Freiburg, Germany's sunniest city. If this potential could be systematically harnessed, thus meeting part of Brazil's rising demand for power on a sustainable basis, it would be an important contribution to mitigating climate change. The present installed capacity throughout Brazil, however, is only about 40 MW, compared with over 30,000 MW in Germany.

*Vast
potential*

The BMZ is promoting a number of different renewable energy projects in Brazil. They include a pilot solar plant at the headquarters of the Brazilian power utility Eletrosul and a planned solar thermal power plant, which will be the largest of its kind in the country. The pilot plant in the state of Pernambuco is to further disseminate the innovative technology, which albeit fully developed, still needs to get a foothold in Brazil.



Geothermal power in EAST AFRICA

Green energy from inside the Earth

The future of electricity in East Africa lies buried deep below the surface. Currently less than 20 per cent of the population have access to electricity, although the potential for generating power from geothermal sources along the East African Rift Valley is enormous – about three times the present capacity of all East African power plants combined. To date only Kenya and Ethiopia use geothermal resources to generate electricity. The cost of drilling test boreholes is often prohibitive, and the risk of failing to find a suitable resource is high. Many investors thus shy away from geothermal power, although it offers a constant, low-cost source of energy once the plant is installed. Germany's development cooperation has developed the Geothermal Risk Mitigation Facility (GRMF), which now also receives financial support from the EU. This fund finances the geological analyses of a geothermal field along with exploratory drilling, thus reducing the financial risk to investors. Public and private geothermal power developers from eleven East African countries are eligible to apply for GRMF financing. Demand is strong: during an initial application round, four projects in Kenya and Ethiopia were selected to receive assistance. A second round, with applications from five countries, is currently ongoing.



Germany's development cooperation is also involved in introducing what is termed 'net metering', allowing Brazilian households to feed the electricity generated by their own photovoltaic systems, bioenergy facilities or small-scale wind turbines into the national grid and then deduct this from their own electricity consumption. This creates incentives for private investment, promotes decentralised, low-carbon, secure power generation, and will save households cash in the medium and long term.



Brazil is only one example of Germany's firm commitment in the energy sector. The German government is currently promoting energy projects in over 50 countries. In 24 of them energy is a priority area of cooperation. In 2012 alone, the BMZ pledged 536 million euros from its budget. Including loans leveraged with budget funds, promotion totalled some 1.9 billion euros, making energy the largest single focus of Germany's development cooperation in terms of funding levels. And it is becoming increasingly important, with plans for further increases in future.

Energy – the largest sector

There are very good reasons for this trend. To date the lion's share of harmful greenhouse gases is generated by the combustion of fossil fuels; in transport, power generation or to provide industrial and domestic heating. In the long term, only a shift to low-carbon energy systems worldwide can slow global warming caused by climate change.

At the moment, however, we are still seeing the opposite trend; to fuel their economic progress, developing countries and emerging economies in particular are witnessing a significantly higher demand for energy. The International Energy Agency expects demand to rise by more than one third by 2035.

Anyone taking a night flight across Africa can cover huge distances without seeing a single electric light. More than three out of four of the continent's inhabitants still have no access to modern energy; about 1.2 billion people worldwide are in this position. They cook on wood fires or use animal dung as fuel; they light a candle at nightfall. They have no machinery to harvest or dry their crops, let alone to market them profitably.

Not less energy – different energy

Without energy nothing will change for these people. Energy drives development, it is indispensable for greater prosperity and making inroads into poverty. Limiting energy consumption across the board is not, then, an option. That would simply stall progress in many countries. What needs reduction is the use of the fossil fuels that damage the global climate.

This is why the BMZ is working on three levels. It is fostering access to energy, pushing ahead with the development of renewable energy facilities, and advocating economical and more effective uses of energy. Many of the projects and programmes by Germany's development cooperation target several levels simultaneously: access, for instance, involves not only connecting further households to a grid, but ideally feeding this new grid with power from renewable sources, and transporting the power efficiently, using modern transmission lines. The isolated West Nile Region of Uganda is a case in point: 60,000 people and 40 industrial areas are now served by two small-scale hydro plants. A new stand-alone grid has been put in place, which uses prepaid meters. This benefits the inhabitants and allows local

Access to energy WORLDWIDE Energy for millions

Some 1.2 billion people around the world still dream of being able to switch on the light to read in the evening, of not having to feel their way in the dark at night and of keeping abreast of developments thanks to radio and television. About 2.6 billion people would love to be able to cook on a clean, energy-efficient stove. The Energising Development (EnDev) Programme, which is jointly funded by Germany, the Netherlands, Norway, Australia, the United Kingdom and Switzerland, aims to give millions of people access to modern energy. In 24 countries, EnDev is currently supporting market penetration of electricity generated using photovoltaic arrays, small-scale hydropower plants and biogas facilities. Private households and social facilities, including schools and hospitals, are being fitted out with modern power, as are small and medium-sized businesses. Compared to an open fire an efficient stove alone can reduce

the average wood fuel needed by one third, thus saving half a tonne of carbon dioxide emissions every year. An electric light can save 0.15 tonnes of CO₂. By the end of 2013, more than 12 million people had gained access to electricity or efficient cook stoves, and 44,000 social facilities and small and medium-sized businesses had been connected up to modern energy supplies. The 1.8 million energy-saving stoves distributed or sold alone will save about 55,200 hectares of forest every year, thus preventing emissions of one million tonnes of CO₂. Kenyan farmer, Lydia Wangui Kimani, who was barely able to eke out an existence until 2009, now earns such good money installing stoves that she can afford to feed her children and send them to school. 'There is even some money left to repair my house,' she says.

industry to develop without harming the climate.

Germany's policy ties in with UN Secretary-General Ban Ki-moon's Sustainable Energy for All initiative. It aims, by 2030, to give people everywhere access to sustainable energy and to double the percentage of the global energy mix accounted for by renewables from 18 to 36 per cent, as well as doubling the rate of improvement in energy efficiency.

Sustainable energy for all

In effect, this amounts to bringing about a global energy transformation, which is why the BMZ is supporting partner countries to reconfigure their energy systems and put them on a more sustainable footing. Firstly, this entails developing renewable energy capacities: new solar power plants, wind farms and geothermal facilities. In the Moroccan city of Ouazarzate, one of the world's largest solar parks is taking shape. On completion, it will supply 1.3 million people with green electricity. Germany has provided a low-interest loan of approximately 770 million euros, making it the single largest supporter of the project, which is also benefiting from funding from the Clean Technology Fund (CTF), the African Development Bank and other donors.

Germany's development cooperation is also working with partners to create enabling environments, thus helping to establish the political preconditions for transformation and open the market for renewable energy products and energy efficiency; this involves new legislation, modified tax rates, different subsidisation policies, new energy agencies and education campaigns.

Paving the way for transformation

In Central America, for instance, the BMZ is assisting Honduras, El Salvador and Costa Rica to tap their vast renewable energy potential. German advisory services are providing assistance not only to modify the statutory aspect of the energy market; various pilot plants are



also being developed, in some cases in conjunction with the private sector, in order to encourage further investment. A prime example is the cooperation arrangement with El Salvador's largest supermarket chain Súper Selectos, which has now installed photovoltaic plants to meet its own power needs. Similar activities are planned in Guatemala, Panama and Nicaragua.

To kick start the market for sustainable energy, the BMZ is providing not only expertise but also capital in a great many countries. In most countries credit lines for climate-friendly products have been set up via national development banks. These are being used to promote the use of energy-efficient household appliances in Mexico, and to build low-energy buildings in India and various Eastern European countries. Since banks in many countries are still reluctant to lend money for renewable energy projects or measures to raise energy efficiency, credit lines of this sort can provide a crucial incentive.

In the effort to bring the era of climate-damaging energy consumption to a close, Germany can draw on its own experience of the transformation towards a more sustainable energy supply – the German *Energiewende*. Which technologies proved valuable in which context? What legal provisions are helpful? Which factors lead to success? And which do not? This experience is valuable in other countries as well. For this reason alone Germany will remain a committed and reliable partner in the field of sustainable energy.



A photograph of a man in a dark shirt and brown trousers standing by the open door of a bus at night. He is wearing white earbuds and has a bag slung over his shoulder. The background is a blurred city street with other people and signs, including one that says "HABLA NAVEGA Y MENSAJE SIN LIMITE".

CITIES AND CLIMATE

In the mid-1990s only one person in three lived in a town or a city. Today urban centres are home to half of the world's population, and by 2050 more than two-thirds of humanity are expected to live in an urban setting. Even in Africa, the majority of people will be town- and city-dwellers. There can be no doubt that this is the age of the city.

*The age
of the city*

But towns and cities drive global warming. At present they are already responsible for about 70 per cent of energy consumption and CO₂ emissions; without a radical change of course, these figures are set to rise further. Apart from the increase in population numbers alone, the reasons can be seen in the greater concentration of activities in towns and cities; heavy traffic, building construction, high energy needs and huge quantities of solid waste and sewage – all these factors converge in urban centres.

However, this very concentration is what makes towns and cities an ideal starting point in the struggle against climate change. Urban centres can save resources on a huge scale and can be living examples of sustainability, by introducing low-emission transport systems, energy-efficient buildings and regulated waste disposal systems. Effective climate protection

Green housing in MEXICO

Living better and saving energy

In Mexico half a million new housing units are built every year; eight per cent of the Mexican population already work in the construction industry. Energy



consumption too is rising unchecked; private households account for about 17 per cent of the total. This makes energy-efficient housing construction absolutely vital, and the government has pledged its support. The Mexican state development bank Sociedad Hipotecaria Federal has launched the EcoCasa Programme, which

it is implementing with the Inter-American Development Bank and Germany's development cooperation. For the first time a variety of international funds are putting up funding in a combined approach, including the CTF and the European Commission's Latin American Investment Facility; Germany is providing a low-interest loan and investment subsidies. The programme has a seven-year term and is intended to mobilise about half a billion US dollars of private investment, to be used to build more than 38,000 energy-efficient houses and 600 passive houses. These 'eco homes' use on average about 20 per cent less energy than conventional buildings. EcoCasa is thus not only saving about one million tonnes of CO₂ emissions over the entire lifecycle of the houses. It is also improving the lives of many Mexicans who can now enjoy higher quality housing. The programme specifically targets poor families.

is only possible with the active involvement of towns and cities. It is imperative to ensure that the rapid urbanisation we are witnessing today evolves in a climate-friendly way.

For the BMZ, climate-smart urban development means first and foremost adopting systemic approaches. Germany's development cooperation supports moves to devise appropriate strategies, policies and targets at national and municipal level, as well as building and strengthening relevant institutions, and providing low-interest loans – in Indonesia, for example, one of the world's largest emitters of greenhouse gases, but also a country that has set itself ambitious climate targets. By 2020 Indonesia aims to cut emissions by 26 per cent on its own initiative.

*Comprehensive
approaches*

To specifically reduce CO₂ emissions and climate-related risks, Germany's development cooperation is advising Indonesian cities on the preparation of climate action plans. Achievements in reducing emissions of greenhouse gases – for instance by setting up low-carbon waste management systems, making street lighting energy efficient, or extending the local public transport network in individual towns – are to be replicated with the help of such action plans.

In the city of Malang in Eastern Java, for example, a pilot road has been built with new street lighting, which uses 60 per cent less energy than the system formerly in place. This initiative, which involves the lighting company OSRAM, also demonstrates how development partnerships with the private sector can work. In addition, the BMZ is supporting a programme to introduce a low-carbon solid waste management system in Indonesia. Most of the country's 400 landfill sites have hitherto been uncontrolled, with the concomitant impact upon the climate. The construction of sanitary landfills, sorting plants and composting facilities can reduce waste-related emissions by some 50 per cent. The Indonesian example demonstrates how important it is to adopt comprehensive climate protection and climate change adaptation strategies.



WATER AND CLIMATE

Water is essential for human life – and in many places it remains a scarce and valuable resource. Jordan is one such place. Every Jordanian has access to less than 120 cubic metres of water per annum. A region is said to suffer ‘water stress’ when annual water supplies drop below 1,700 cubic metres per person per year. When supplies fall below 1,000 cubic metres per person per year we speak of ‘water scarcity’, and ‘absolute water scarcity’ is when supplies drop below 500 cubic metres a year. Today about 700 million people in 43 countries already face water scarcity.

Climate change makes for extremes

But water is not only of elementary importance for life itself. It is also essential for every aspect of economic development: agriculture in particular depends on water. This sector currently accounts for about 70 per cent of the water used worldwide. Thus, in order to feed a growing number of people, even more water will be needed in future, and water will have to be used much more efficiently.

Drought and flooding

Whilst Jordan struggles with a lack of water, India and the Philippines find themselves having to cope with flooding on a regular basis, and parts of Central America and Asia are facing severe precipitation. Even Central Europe, which is generally a temperate zone, has had to cope with several floods recently as rivers burst their banks. Drought and flooding – these two extremes are already a dire affliction for many parts of the Earth, and they are set to become more frequent in future.

Climate change is reflected primarily in extremes of water: water falls as torrential rain or unaccustomed aridity occurs. Swelling rivers flood or groundwater levels sink. These phenomena hit the poor worst of all. They often live in high-risk locations, on steep slopes, along river banks or in areas vulnerable to drought. Melting glaciers also have radical impacts. In Asia and Latin America water supplies could be jeopardised in the long term. The dwindling glaciers in the Himalayas, for instance, will reduce harvests in South Asia by ten per cent by 2030.

All in all, according to UN figures, by 2025 about 1.8 billion people will live in countries facing absolute water scarcity, with all this entails for their lives, for agriculture and for world food supply.

Even with changed climatic conditions people everywhere ought to continue to benefit sustainably from a good water supply and sanitation, and water resources should be managed sustainably. That is one of the top concerns of the German government. One precondition is that people adapt to the impacts of climate change, i.e. that they learn to cope better with floods and droughts. Another precondition is to steer infrastructure from the outset to future climatic conditions.

Pivotal to Germany's development policy

African Water Stewardship INITIATIVE

Acting together to reduce water risks

Water is the basis of human and natural life; scarcely any business can operate without water. The BMZ is thus working with the United Kingdom to promote the African Water Stewardship Initiative. Currently, Uganda, South Africa, Kenya, Tanzania and Zambia are involved in the programme, which intends to mitigate water risks against the backdrop of climate change. To reconcile divergent interests before conflicts arise or water reserves are over-exploited, the Initiative brings together different groups. Alongside state agencies they include representatives of civil society and private businesses. Together stakeholders identify existing and future water risks, develop strategies to tackle these risks and implement appropriate measures. The Initiative acts as a sort of 'honest broker' between stakeholder groups. This generates trust among all participants and improves the prospects of successful cooperation.

A total of 23 public institutions, 22 private businesses, seven NGOs and various municipal groups are already involved in this constructive system of problem-solving. The private sector is also financially contributing to the implementation of projects. The Coca-Cola Company, for instance, is financing measures in Tanzania and Uganda whose aim is to better protect the Mlalakua and Rwizi rivers from the consequences of climate change. The measures elaborated within the scope of the Initiative include the establishment and protection of water conservation zones, the restoration of wetlands and connecting communities at risk from drought to a regulated water supply system. The BMZ is contributing about six million euros to the Initiative, which will benefit more than one million people directly by 2018, and another six million indirectly.

Germany is one of the largest bilateral donors in the water sector: in fact, in Africa it ranks as number one among them. Every year the BMZ supports projects and programmes with an average volume of 350 million euros in total. In 22 of our partner countries water is a priority area of cooperation.

The annual costs of adaptation to climate change are estimated at about 170 billion US dollars. This presupposes, however, that global warming can be kept down to 2°C. Otherwise the costs will escalate. Around 70 per cent of this investment relates to water: dykes and retention basins that will have to be built to protect communities from flooding, wells, desalination plants, water channels and pipelines for water supply and sanitation. The challenges in the water sector are so immense that public funds alone are not sufficient. This is why the German government is also counting on cooperation with the private sector, in part as a way of mobilising higher sums for investment.

Germany has long followed the guiding vision of Integrated Water Resources Management, which takes into account the various

Integrated Water Resources Management

dimensions and vested interests involved in water use. The rights and interests of riparian communities are taken into account, as are the concerns of the

local private sector, while ecological considerations are obviously not forgotten.

In itself though, this is not enough to protect against the negative impacts of climate change. How far will the groundwater levels drop? Is the water tank the right size? Is the bridge high enough? In such cases, the BMZ promotes what are termed 'no regret' measures. These are measures that will be of benefit irrespective of climate change, making more efficient use of water in general, for instance.

The BMZ also supports partner countries specifically in establishing information and analysis systems and elaborating water management plans which take into account climate change. This is true of the Arab League states, Burundi, Uganda and Zambia, all of which can expect to face radically changed rainfall patterns and temperatures.



Demand for food, water and energy is set to increase sharply over the coming decades, worsening pressure on ecosystems. The main causal factors are the rising global population, changing living standards and climate change. Against this backdrop, Germany's development policy is increasingly taking into account mutual dependencies and interaction, the nexus as it is known, of the closely linked water, energy and agriculture sectors. Without water there can be no agriculture and no energy; without energy there will be no groundwater pumps and harvest yields will diminish. The aim is to make as efficient use as possible of resources, and to ensure that they benefit several areas simultaneously, so that people everywhere have access to water, food and energy. If, for instance, treated wastewater is reused in agriculture, the pressure on freshwater resources eases; the same applies to the use of appropriate irrigation systems, such as drip irrigation. The result is better adaptation to climate change.

The Water, Energy and Food Security Nexus

Water issues in JORDAN

The nexus in practice – tapping alternatives, boosting efficiency

Rapid economic growth and swiftly expanding populations over recent decades have had a negative impact on water resources in the states of North Africa and the Middle East. The problems are particularly acute in Jordan, one of the world's most arid countries. Massive influxes of refugees as well as climate change have dramatically worsened pressure on water resources. Well over half of water consumption is accounted for by the agriculture sector; every drop of water that can be saved in this sector would become available to the populace. This is why Germany's development cooperation is advising Jordan on how to reduce water losses and tap alternative water resources for use in agriculture. One option is to use treated wastewater. Today Jordan's farmers use treated wastewater to meet more than one fifth of their needs – and the trend continues to rise. Jordan aims to double the reuse of wastewater in agriculture over the next few years. This will ease some of the pressure on the country's over-exploited freshwater reserves and improve water supplies for almost 700,000 people. Another option is to make more efficient use of valuable water resources. To this end, the BMZ is encouraging the establishment of water user groups in the Jordan Valley, whose members – local farmers – regulate the distribution of water within their areas, working together. As a result, more than two thirds of the farmland in the Jordan Valley is more efficiency managed today, and here, too, progress continues. Finally, Germany is supporting Jordan to raise energy efficiency in the water sector. Jordan's water sector is the largest single power user in the country, accounting for about 15 per cent of total electricity consumption. This is not only costly, but also generates greenhouse gases, because practically all electricity is generated from fossil fuels. In modernised pumping stations electricity consumption has been cut by a third. This concept, implemented by Germany's development cooperation in conjunction with international businesses, once again demonstrates how the energy and water sectors can influence one another in a positive manner if they are considered and tackled as a nexus.





AGRI- CULTURE AND CLIMATE

Agriculture and climate change are connected in two ways. Firstly, rural areas are particularly susceptible to climate change: when water becomes scarce, devastating rainfalls occur or crops fail to flourish in changing climatic conditions, harvests and yields are directly impacted. Secondly, agriculture contributes to greenhouse gas emissions, partly by clearing forests for cropland, thus releasing CO₂ and other greenhouse gases. More forest is cleared for conversion to farmland than for any other reason. In addition, cattle farming and certain production methods including paddy cultivation release the greenhouse gas methane. Excessive use of mineral fertilisers, invasive soil tillage methods, or the conversion of grassland into cropland are also detrimental to the climate. Agriculture is thus affected by climate change, while in many cases being a driver of such change itself.

*Direct
interplay*

At the same time the world's population continues to grow: according to estimates of the Food and Agriculture Organization of the United Nations from 7.2 billion today to 9.6 billion in 2050. Most of this growth will be seen

in developing countries and emerging economies, which are expected to be home to 87 per cent of humanity by the end of the century. It will be a huge challenge to feed them all. Even today about 805 million people go hungry. At least another billion people suffer chronic malnutrition or ‘hidden hunger’. Although they are supplied with enough calories, they do not get the nutrients they need. If the world is to be able to feed between 9 and 10 billion people by the middle of the century, today’s food production will have to rise by about 60 per cent around the globe.



This makes it all the more important to reconcile climate-policy goals with the goal of ‘One world, no hunger’. The BMZ is supporting the application of forward-looking cropping

Raising harvest yields while mitigating climate change

techniques to secure and indeed raise harvest yields on a sustainable basis, taking into account the imperatives of adapting to climate change, while simultaneously reducing greenhouse gas emissions from agriculture.

The term ‘climate-smart agriculture’ is used in this context. Specifically this means raising productivity, for instance by selecting appropriate crops and varieties that can cope with climate change, as well as using efficient irrigation methods, without requiring additional land or clearing forests.

Africa in particular offers a great deal of scope for action, since yields in this part of the world are far lower than elsewhere, leaving

room for significant increases. On average, African farmers harvest between 0.5 and 1.5 tonnes of grain per hectare. In Central Europe harvests are between 3 and 5 times as high. African harvest yields could be raised considerably with simple measures.

To raise harvest yields and increase income in an environmentally sustainable and climate-smart manner, agriculture will have to be intensified in many African countries, taking into account climate change and also incorporating traditional knowledge. The aim, however, is not to industrialise agriculture. Germany’s development cooperation focuses on small- and medium-sized family farms, which together account for up to 85 per cent of agriculture in developing countries.

To achieve this, the BMZ targets several levels in its cooperation – among them, research and education.

Here Germany cooperates, for instance, with international agricultural research facilities including the Consultative Group on International Agricultural Research (CGIAR) to examine the impacts that climate change will have on agriculture on the African continent. It is further hoped that research will generate findings on cropping techniques and methods appropriate for the smallholder structure found in many developing countries.

Research into climate change and Africa’s agriculture

Furthermore, Germany’s development cooperation is supporting policy-makers to take into account in their planning and steering the impacts of climate change in rural areas. In India, for instance, a total of 18 federal states are receiving advisory services to draw up and implement State Action Plans on Climate Change.

Germany’s development cooperation is also involved in efforts to underpin and increase harvests on a sustainable basis.

In Ethiopia, where the agricultural sector generates half of the country's GDP, many farmers still use inefficient cropping practices.

Living with climate change

In addition to several Ethiopian-German projects, the World Bank is promoting a successful sustainable farming programme in Ethiopia with funds from GEF and the financial support of the BMZ.

Erosion control, changed crop rotation and more efficient water use have already made it possible to reclaim more than 200,000 hectares of land that was previously degraded to such an extent that it could no longer be used. The programme is raising farmers' production, securing harvests even in dry years and raising incomes. All in all, it is making rural households more resilient to the impacts of climate change.

A similar goal is being pursued by a project in Mali, where small-scale dams are being employed to make better use of the rainfall that has become so unpredictable. Small farmers are now able to produce several harvests a year in spite of sporadic rainfall, and thus withstand climate change. The long-standing experience of Germany's development cooperation has recently been incorporated in a national small-scale irrigation programme on which the government and several financing bodies are cooperating, using the same methods.

Finally, Germany is also working to better market agricultural produce, partly through cooperatives and partly by connecting isolated farming areas to the road network and local and regional markets. New transport routes allow farmers to bring their rice and vegetables to the closest market more easily. This not only generates additional income, but also gives them access to a better and more varied diet. All told, the BMZ seeks to achieve comprehensive, climate-smart development of smallholder farming – from the field to the plate.

Adaptation in BOLIVIA

Improved irrigation

Bolivia is one of the poorest countries in South America, and the people living in rural areas are among the most poverty-stricken. Most earn their living from agriculture. It is the availability of water that determines how much they can grow and thus how much they can sell. The typical pattern is that after five months of rain, not a drop is to be seen for the subsequent seven months. There are no sophisticated irrigation systems to take the little water remaining in the dry season to the fields and use it as effectively as possible. Climate change is further aggravating the problems because a further decline in the available water can be expected, along with shorter growing seasons. These factors do not make the life of Bolivian farmers any easier. For these reasons the government is intervening with various national programmes on irrigation, watershed management, and improved agricultural production. The BMZ is investing 55 million euros to equip Bolivia's agricultural sector to cope with climate change. This includes advisory services on all aspects of the national irrigation plan along with new irrigation plants, rainwater tanks and the introduction of water-saving techniques in agriculture. A total of 13,000 hectares of land have been placed under irrigation, benefiting 10,000 farmers. Another 800 or so small-scale irrigation plants have given some 1,700 families a chance to boost production with more efficient water use. Joint marketing of surpluses is also chalking up tangible successes. In Chaco, the arid and traditionally impoverished savannah region in the south

east of the country, a number of cooperatives are now marketing their products jointly – with the support of Germany's development cooperation. This has increased their income by an average of 300 per cent.

FORESTS AND CLIMATE



No climate protection without sustainable forest management

Forests are the true treasure-troves of the natural world. They provide food, water, construction and raw materials, fuel, medicinal plants and a habitat for millions of people. They are also home to about 75 per cent of known animal and plant species. The 'lungs of the world', as forests are sometimes known, produce oxygen and function as carbon sinks binding carbon dioxide, and thus have a critical influence on the global climate. They store water and help regulate temperature and rainfall. Put in a nutshell, forests are indispensable for the survival of the human race.

Every year, about 13 million hectares of forest are lost – mainly in tropical areas. That is an area equivalent to the entire land surface of Nicaragua. While the rate of forest loss has slowed since the 1990s thanks to massive international efforts, this figure is still far too high given the importance of forests for the environment and the climate.

According to figures issued by the IPCC, about 12 per cent of greenhouse gas emissions are caused by forest loss alone. Climate protection is thus unthinkable without forest conservation. The two-degree target can only be achieved if we manage to stop forest loss.

Already at an early stage the BMZ declared its support for international forest protection and conservation and is one of the world's largest donors in this field. The Ministry supports primarily concepts that combine forest conservation and sustainable forest use. Generally, economic reasons are the motivating factor for logging and the over-exploitation of natural

Forest loss is slowing, but still too fast



REDD Early Movers in BRAZIL

Reward for pioneers

The Brazilian state of Acre is leading the pack and is today an Early Mover in the REDD+ Programme, the international forest conservation concept launched in 2005. The state government of Acre has steadily developed institutions and instruments to protect its forests and to implement REDD+, and has anchored these in state-level legislation.



And its efforts have paid off: since 2006 the rate of deforestation has been declining. Acre has in fact reduced the rate of deforestation by 60 per cent, and in 2011 the state was the site of only about 4 per cent of the logging in the entire Amazon region. The 'REDD Early Movers' programme pays pioneers like Acre for proven emission reductions. The German government is providing 25 million euros from its Energy and Climate Fund (Energie- und Klimafonds, EKF) for this purpose. Achievements in terms of preventing deforestation are recorded and remunerated in line with a detailed accounting system. The lion's share of the cash goes directly to small farmers, local forest communities and indigenous peoples; the rest is invested in government forest conservation and deforestation prevention activities. Thus the local population also profits from this special form of benefit sharing.

resources. In the long term it will be impossible to preserve forests unless other forms of forest use are developed and appropriate alternative sources of income identified for the rural population. Conservation can only work in the long term when both local people and the natural environment benefit.



For some years now the international community has pursued what is known as the REDD+ approach (Reducing Emissions from Deforestation and Forest Degradation), which incorporates the climate protection dimension

Reward for proven forest conservation

to activities to preserve forests and biodiversity. The basic idea behind REDD+ is to reward governments and the local population for not felling forests and for verifiably reducing emissions. Afforestation and improved forest management are also rewarded, since these activities allow forests to act more effectively as carbon sinks and reduce emissions. The spectrum of activities which Germany promotes ranges from small-scale stand-alone projects to full-blown national programmes.

Under REDD+ schemes, cash is disbursed only in return for specific counterpart contributions – in the form of verifiably lower emissions. This requires some sort of monitoring and accounting system; Germany is supporting many countries to introduce schemes of this sort, in some cases through the

multilateral Forest Carbon Partnership Facility (FCPF). BMZ is the second largest donor to the FCPF, which is supporting almost 50 countries in their efforts to put in place the preconditions for REDD+. In as many as 25 per cent of these countries the BMZ will disburse cash for proven emissions reduction for the first time through the respective Carbon Fund. The Facility operates firstly as a learning platform and pioneer in the field of global quality standards, and secondly prepares the ground for possible REDD+ financing from the GCF.

Overall, the German government is one of the most important donors worldwide in the field of REDD+, and has already invested half a million euros. Currently, it is supporting bilateral projects and programmes to protect forests while ensuring sustainable forest management in over 30 countries and 10 regions including such densely forested states as Brazil, Indonesia and Cameroon. But German development cooperation is also actively involved in states like Viet Nam, where farmers who use forests sustainably or re-afforest land are paid 250 US dollars per hectare into what is termed a 'green savings account'. More than 100,000 families are involved in the programme; several hundred thousand hectares of land have been re-afforested since it was launched.

Encouraging pioneers

The BMZ has in fact refined and upgraded its REDD+ support for pioneering countries. Under the banner 'REDD Early Movers' (REM), it is encouraging states which act as trailblazers and are serious about sustainable forest conservation. The programme supports REDD+ pioneers who have already made financial and political efforts to bring together the imperatives of forest conservation and climate change mitigation. REM thus closes a financing gap in the REDD+ process, where there are a great many preparatory activities but few financial incentives. The successful programme is to be extended to cover a larger number of countries in Latin America and Asia in future.

Forest conservation in INDONESIA

Promoting understanding of 'green' forestry

Indonesia is home to some of the world's most extensive rainforests, but more than one million hectares are lost every year, victims of expanding mining operations, oil palm and acacia plantations; greenhouse gas emissions are rising. The FORCLIME ('Forests and Climate Change') Programme, which is being implemented jointly by Germany's development cooperation, Indonesia's Ministry of Forestry and Indonesia's Ministry of Environment, intends to lay the political and institutional foundations for a process of rethinking policy. Alongside training for the forestry authorities, the programme provides for the establishment of forest offices like those in Germany. These are responsible for monitoring a certain area of forest as well as involving the local people in the sustainable management of that forest. Private forestry enterprises also receive promotion, enabling them to certify forests. FORCLIME aims to promote an understanding of the role forests play in a green economy. The programme is operating on a large scale. In the Indonesian province of Kalimantan, the forest authorities in three districts are now planning with the local population ways of using some 380,000 hectares of forest in line with REDD+ standards so as to mitigate climate change. The procedures which Indonesia has established in this context can also be used in the long term in order to channel funds from national level to the municipalities – for future REDD+ payments or other compensatory payment systems, and for national forest conservation programmes.



CLIMATE RISK MANAGEMENT

Extreme weather events are responsible for immense damage, and this is a problem that is becoming increasingly acute as a result of climate change. A quick glance at the recent

Identifying, mitigating and managing risks

past is enough to give an indication of the scale of damage we can expect to see. The IPCC quotes estimates that global loss and damage caused by extreme weather events including

hurricanes and flooding have been of the order of up to 200 billion US dollars a year since 1980. This figure does not include the loss of human lives and cultural assets, which are not directly measurable.

Even more serious, and very difficult to gauge, are the long-term consequences of climate change, including damage to ecosystems, rising sea levels and acidification of the oceans. Valuable habitats and the cropland that is so urgently needed to feed the world's growing population are at risk. The scale of damage is likely to be far greater in the long term, given the fact that the global temperature has up to now risen by 'only' a moderate 0.85°C from the pre-industrial level; we still face a further increase.



In view of the billions of euros of damages that can be expected, it is important to identify risks at as early a stage as possible, to minimise these risks, and to respond swiftly and effectively to disasters when they occur. Germany's development cooperation has long been actively involved in promoting disaster risk management around the world, aiming to reduce risks as far as possible. In an effort to counter the worsening impacts of climate change, the BMZ advocates comprehensive climate risk management, which takes into account not only natural disasters but also gradual changes such as rising sea levels.

Comprehensive system – the goal



Disaster risk management in **BANGLADESH** Shelter from the storm

Few countries are so threatened by the consequences of climate change as Bangladesh.

The coastal regions are particularly vulnerable. In the first instance, they suffer as a result of gradual changes, including rising sea levels and the concomitant worsening salinization of farmland. Secondly, they are hit regularly by tropical storms and cyclones;



in 2007, for example, Cyclone Sidr destroyed the harvests, livelihoods and vital infrastructure of more than two million families. The multilateral Pilot Program for Climate Resilience (PPCR), which is financially supported by the BMZ, is undertaking extensive precautionary measures to better protect coastal areas and their inhabitants from extreme weather events. A total of 25 storm-proof shelters are being built or renovated to bring them up to a standard that will allow them to cope with the impacts of climate change; dedicated shelters offer space for domestic animals at risk. More than 500 km of roads are being upgraded so that they are still passable when storms and floods hit. At the same time the programme is training people on the ground to plan, build and maintain infrastructure independently, so that it can cope with changing climatic conditions and extreme weather conditions.

Insurance for AFRICA

Policies to cover drought

The first step is a detailed risk analysis, which must be conducted by every country, every region, every municipality and also by the private sector. What will differ for us as a result of climate change? Where is important infrastructure at risk? Where are harvests or entire value chains jeopardised? These and other pertinent questions must be answered swiftly. Because developing countries often lack the expertise and the budget for this sort of analysis, the BMZ is lending support to a number of countries.

The next step is to take preventive action to at least reduce and ideally eliminate the risks identified. This can take the form of new area development plans and appropriate land-use systems. It can entail revising building regulations, making infrastructure climate-resilient or – to go one stage further – introducing early warning systems and emergency plans. This is another field in which Germany's development cooperation has long-standing experience. It is especially important to ensure that both the people at risk and their institutions are trained, to enable them to undertake effective climate risk management.

Nevertheless, in many cases the consequences of extreme weather events cannot be completely avoided, even with good preventive measures – and in the worst case scenario the affected population cannot carry the costs alone. Comprehensive climate

Analysis, prevention and insurance

risk management thus includes risk transfer mechanisms – like insurance schemes – which cover the remaining risk to those affected.

The German government is working at every level of risk management, from analysis to preventive measures and risk transfer schemes. And it is developing and testing various new approaches with a view to limiting loss and damage caused by climate change.

The next drought will inevitably happen – and what then? African states are particularly hard hit by droughts, which are set to worsen in the wake of climate change. To date there have been no approaches to mitigate the economic impacts or provide a safety net. But change is underway. The ARC Insurance Company Ltd. (ARC IC), founded with German support, is insuring African states. In the worst case scenario, ARC IC will finance a drought emergency programme agreed in advance with the concerned country and reviewed by a panel of experts. The insurance policy is designed in such a way that it also provides incentives to increase drought resilience, reducing future risks. The BMZ has pledged 50 million euros to develop the insurance scheme. ARC IC has about 100 million US dollars capital. All member states of the African Union can take out insurance from this recently established company: Kenya, Mauritania, Mozambique, Niger, and Senegal have already acquired policies. In the

medium term, about 20 countries will take out protection against drought-related risks. Other insurance products, including coverage against flooding, are to follow. These will help the states to respond swiftly to climate-related extreme weather events. Small farmers will benefit in particular, since the loss of a harvest can quickly become a matter of survival for this group.

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