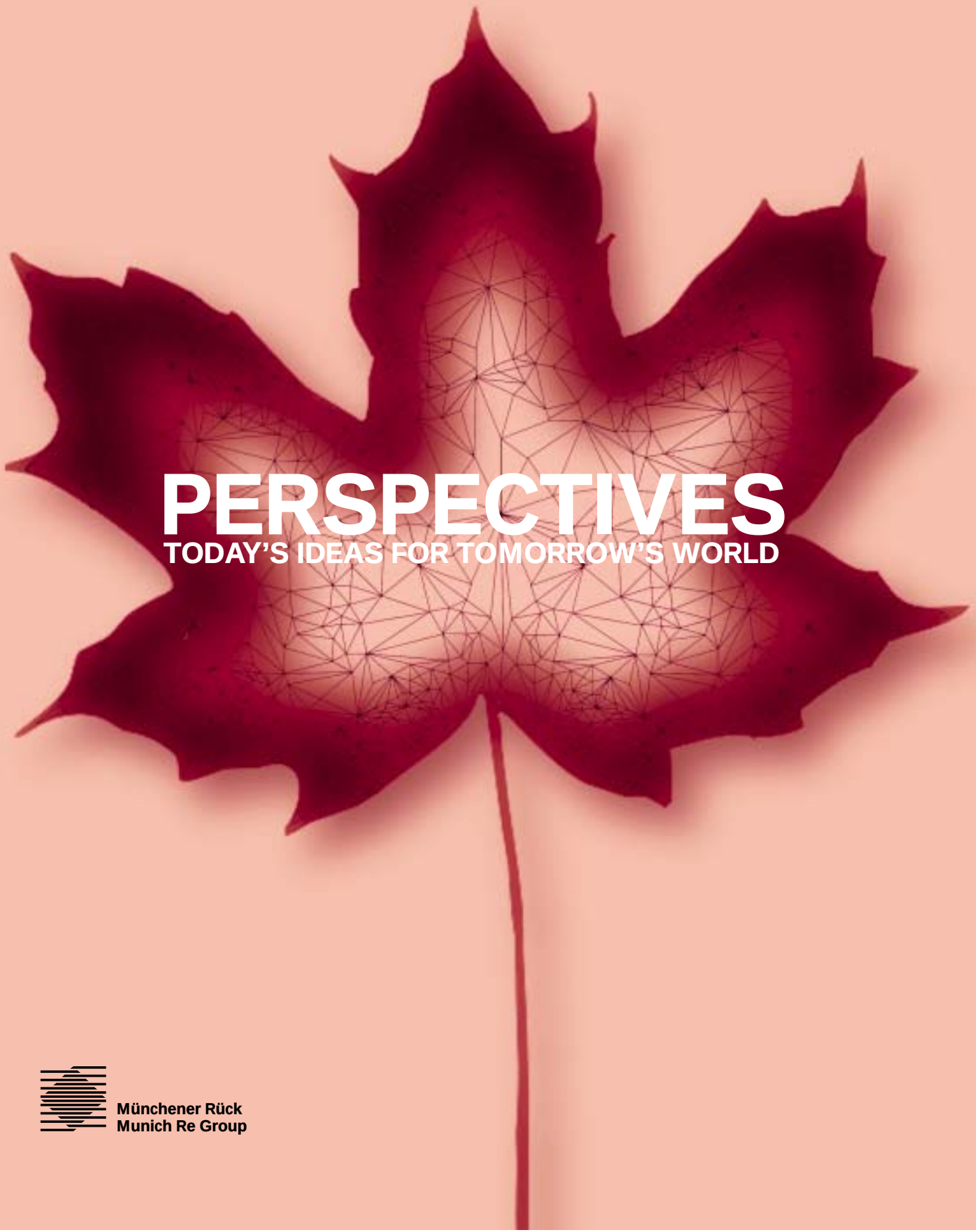
Munich Re's environmental magazine 2001



PERSPECTIVES

TODAY'S IDEAS FOR TOMORROW'S WORLD

Münchener Rück
Munich Re Group

01

CHRISTIAN KLUGE
Member of the Board of Management responsible for environmental issues

DR. DIRK JOHANNSEN
Environmental Officer

Dear Reader,

We are very pleased to present Munich Re's second environmental report. The positive reaction to the first issue of Perspectives, especially from our clients, and the capital market's recognition of our commitment – as reflected in Munich Re's inclusion in the Dow Jones Sustainability Global Index and the FTSE4Good Index – strengthen and motivate us in our endeavours to further integrate the aspects of sustainable development successively in our business activities.

This is something that has not become any easier over the past year. Environmental protection and sustainable development have still not gained the acknowledgement they deserve on the market as outstanding hallmarks of quality for risk protection. What is more, the discussion has been overshadowed by 11th September 2001 and its effects. But this event has sharpened our awareness of how necessary it is to pay more attention to long-term developments.

It has thus become more essential than ever for all stakeholders to share in a positive dialogue on the opportunities and risks presented by global developments. We will continue to use our strong and trusting partnership with clients, shareholders, and the public as a platform for discussing the great challenges of the future. This discussion will focus particularly on subjects that are gaining in significance throughout the world, subjects that are becoming increasingly controversial above all in connection with population development, globalization and world trade, and the global networking of the markets and their vulnerability. We cite water as just one example – on the one hand as a vital resource that is becoming scarcer and on the other hand, with its catastrophe potential, as an upshot of climate change. Viable perspectives are only possible if we ensure that the availability of natural resources is maintained in the long term and that the world community is allowed to develop in an environment of peace. We will continue to work towards these ends at a national and international level.

This publication, like last year's report, also contains topical articles from the world of reinsurance and investment. Its aim is to suggest options for action, provide momentum, and act as a stimulus for a constructive dialogue in the meaning of sustainable development.

Munich, May 2002

Christian Kluge
Board member
responsible for environmental issues

Dr. Dirk Johannsen
Environmental Officer

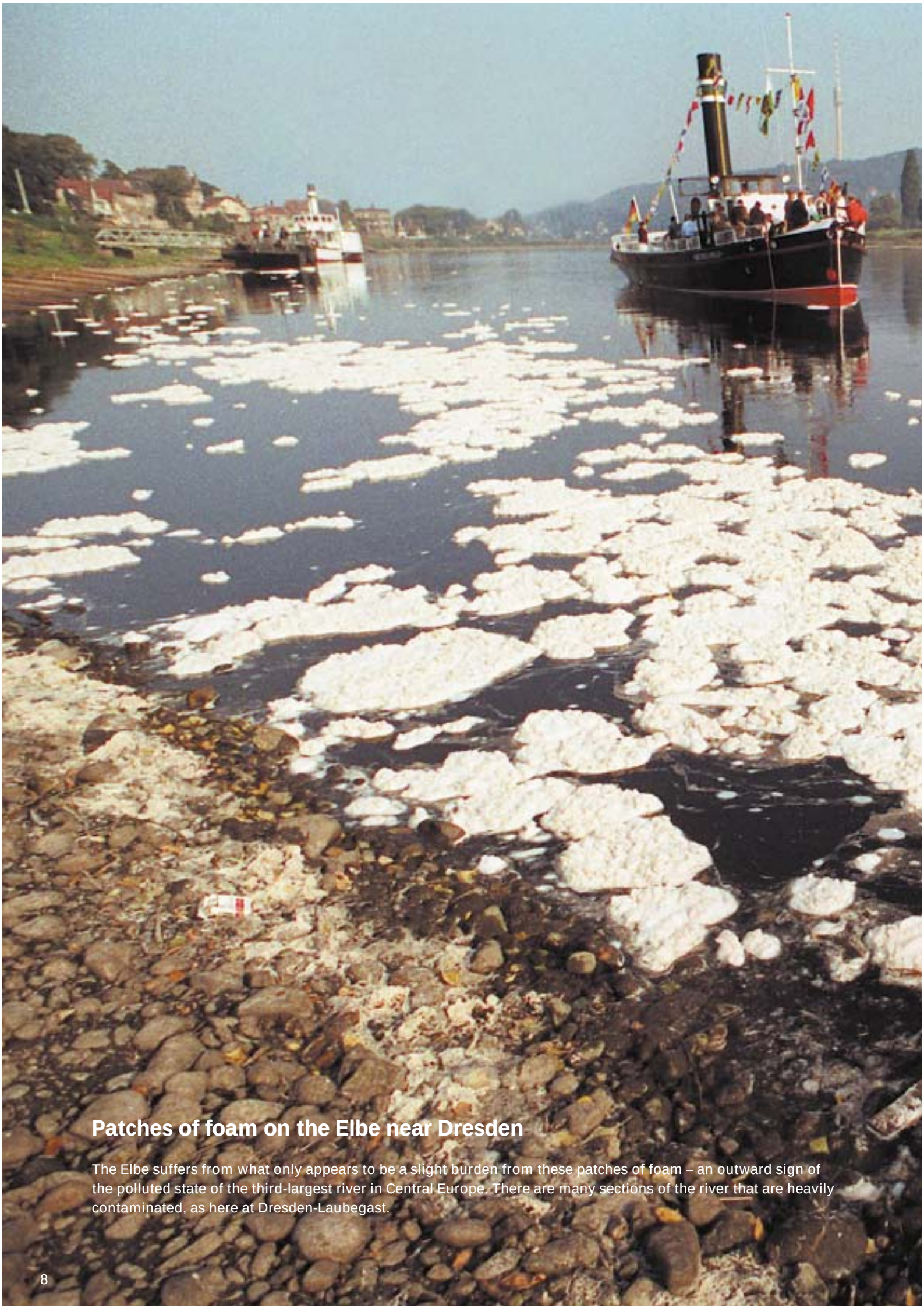
The ENVIRONMENTAL STATEMENT will put you in the picture as to what Munich Re achieved in terms of environmental protection and sustainable development in 2001.

Land under

A view of flooded fields in Dörpstedt-Bünge (in the district of Schleswig-Flensburg) on 30th October 1998. Several hundred hectares were swamped when the dykes on the River Treene burst. Footpaths and roads are submerged and no longer passable. After days of rainfall the flood situation remains tense in the affected regions of Germany. In spite of the water levels falling slightly in many places, the helpers and civil defence teams were kept on the alert. (Risk management: When farmers' wisdom fails)

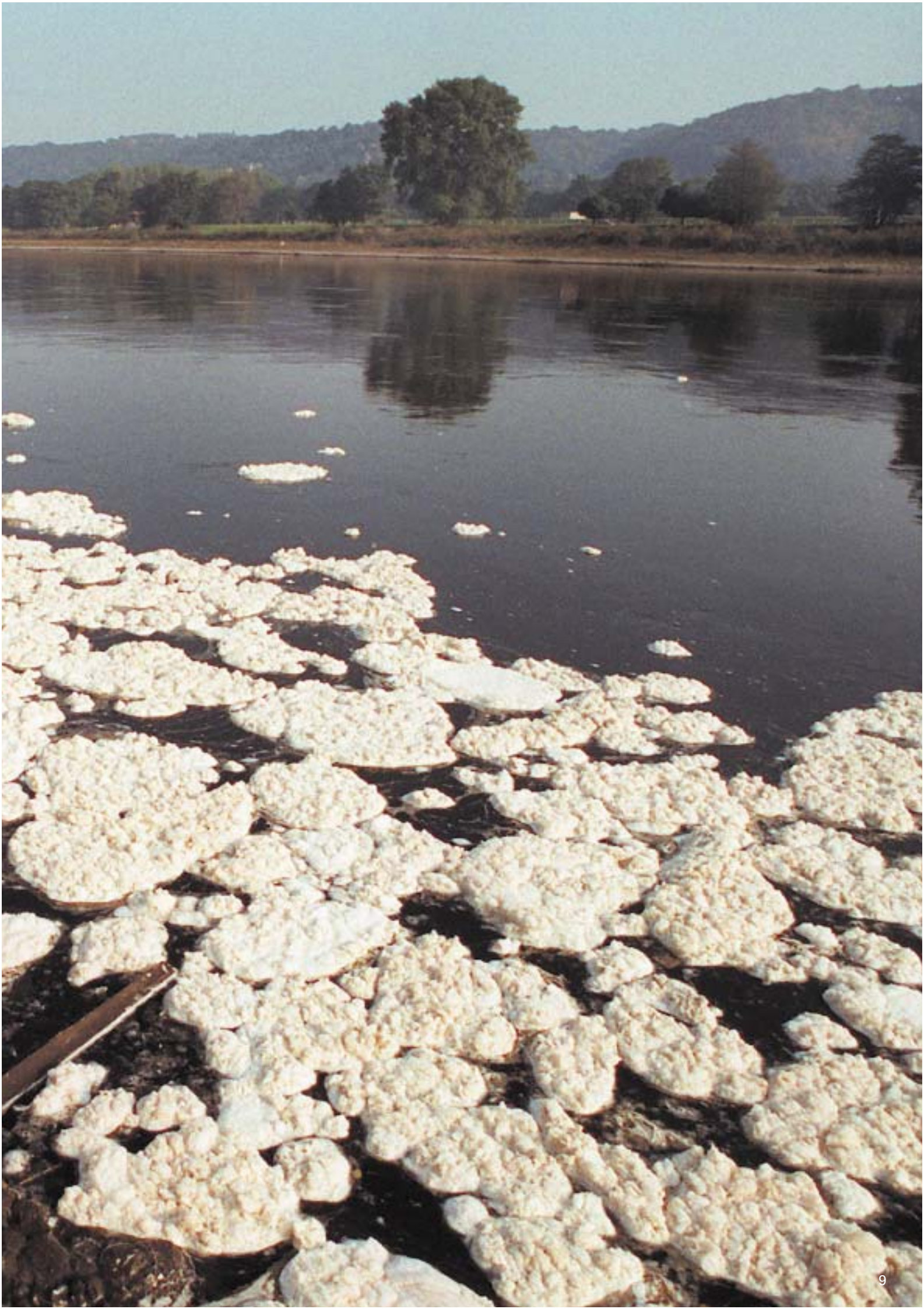
Drought in India

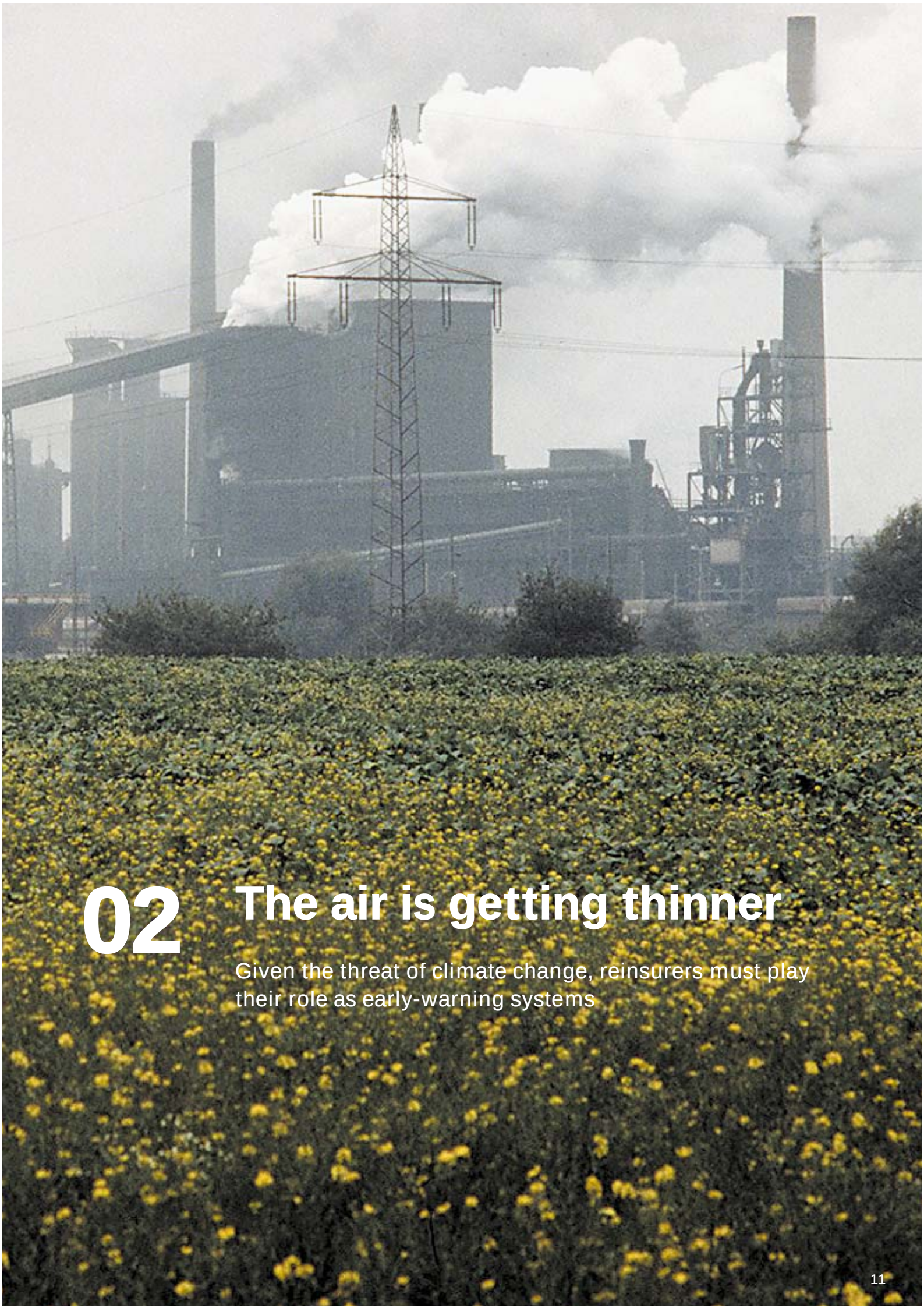
Women with pots on their heads looking for water in the desiccated landscape. This picture was taken on 26th August1987. The unremitting drought caused many wells to dry up and destroyed cultivated areas.



Patches of foam on the Elbe near Dresden

The Elbe suffers from what only appears to be a slight burden from these patches of foam – an outward sign of the polluted state of the third-largest river in Central Europe. There are many sections of the river that are heavily contaminated, as here at Dresden-Laubegast.





02 The air is getting thinner

Given the threat of climate change, reinsurers must play their role as early-warning systems

For the people of central Europe the change in the world's climate is something which is happening far beyond their own individual life's interest. Yet the greenhouse effect and the depletion of the protective layer of ozone around the earth are threatening the very balance of our climate system. After remaining largely constant for many millennia, the concentration of carbon dioxide in the atmosphere has increased by about 30% since the beginning of industrialization. This is due above all to the waste gases produced in the combustion of coal, gas, and oil. Furthermore, it is an established scientific fact that one effect of a further rise in the concentration of carbon dioxide and other greenhouse gases will be a further sharp increase in global warming.

Is there a causal connection between climate change and natural catastrophes? A number of investigations have been published which testify that with a very high degree of probability climate change is influenced by human activity. This "probability bordering on certainty" is not absolute scientific certainty. But it must be enough for us to take action. Because if we do not act now, the risk is that many a question will have been answered by the time we think we understand it sufficiently. Measures designed to combat global warming take a long time to work. And so scepticism that leads to passivity could mean that we will soon have no measures to choose from and only the effects to cope with.

What damage has already been done, what is likely to happen in the future? The data gathered on natural catastrophes in the past show that the number of loss events that have occurred in the last ten years is three times higher than in the 1960s. Only two of the 34 gigantic catastrophes that have occurred since 1983 with insured losses exceeding US$ 1bn were caused by earthquakes. All the other 32 events were weather-related catastrophes. This means that as far as nature's threat to mankind is concerned, our Achilles heel is the air above and around us. After taking inflation into account, economic losses caused by major natural catastrophes were three times higher in the 1980s than in the 1960s, and insured losses were four times higher. In the 1990s economic losses were eight times higher than in the 1960s, and insured losses fifteen times higher. This trend will probably continue at the same speed in this decade. In just a few years the annual loss burden will be in the region of US$ 100bn. This is because we have to reckon with further climate change. The third report of the Intergovernmental Panel on Climate Change (IPCC), a research committee set up by the United Nations, forecasts that the global temperature will increase by a maximum of 6°C by the end of this century. An increase of around 3°C is considered most probable. As the average temperature increases, so too does the probability of temperature maximums occurring much more frequently. An increase of 1.6°C in the average summer temperature in central England, for example, which is expected by around 2050, will mean that hot summers like in 1995 will occur on average every three years – compared with every 75 years up to now. That summer in England cost insurers hundreds of millions of pounds because the clay soil dried out and subsided, resulting in cracks in buildings.

FOR THE MAJORITY OF US CLIMATE CHANGE IS SOMETHING THAT MIGHT RESULT IN A NUMBER OF ISLANDS SINKING SOMEWHERE IN THE PACIFIC OCEAN. WE ARE PROBABLY LESS AWARE OF HOW MANY PEOPLE WILL FALL VICTIM TO CLIMATE CHANGE, HOW MANY POLITICAL ALTERCATIONS IT WILL CAUSE, AND HOW MANY CATASTROPHIC DROUGHTS IT WILL BRING. THERE WILL BE TORRENTIAL RAIN AND CONSEQUENTLY CATASTROPHIC FLOODS AND LANDSLIDES. WINDSTORM CATASTROPHES WILL BE GREATER AND MORE FREQUENT – AND THAT APPLIES TO CENTRAL EUROPE TOO.

Insurers under pressure to act

The way insurance companies react to climate change is not governed by insurance association resolutions or cartel-like arrangements. Each company must find its own way and decide for itself how it should contribute to the well-being of the community at large. Nevertheless, there are three guiding principles for the measures that are required:

The insurance industry sees no indication that the depicted loss trend could weaken in the foreseeable future. On the contrary, urbanization is growing, and economic interests are shifting into areas which are exposed to more natural hazards than traditional economic centres, into climatically sensitive regions, for example, and especially into coastal areas. Furthermore, the vulnerability of modern industrial societies continues to increase.

Insurers and reinsurers are already so severely affected by these developments that waiting for further clarification is no longer an option. They have every reason to stand on the side of those who regard it to be a fact that climate change is caused by mankind. And they have to witness that the classical loss prevention measures geared to individual risk objects can only make a limited contribution to controlling these loss developments. The insurance industry must therefore support climate protection initiatives and climate change strategy projects that attack the evil at its roots – not least because, whatever is said to the contrary, insurers do not live on hazards that cannot be avoided.

If insurance companies fail to calculate their risk costs in accordance with the exposure involved, and if they only charge flat rates, the result will be – sooner or later – negative repercussions in the non-financial sector. We

need only think of the many second homes on coasts or in mountain regions that are often heavily exposed to hazards. If insurance companies assume this kind of risk at cheap rates, who under their own volition will reinforce their foundations and roofs in such a way that losses from natural hazard events are ruled out from the very beginning?

Measures for the coming years

Given this situation, the insurance industry would be well advised to give concrete thought to the question of how to contend with the developments that are to be expected.

Firstly, insurers must charge prospective trend-based loadings in future. Calculating prices by looking at losses that have occurred in the past is a method that only works if the level of risk remains constant and any deviations in the annual results are primarily caused by chance. Climate change goes hand in hand with systematically increasing burdens and ever-diminishing intervals between record losses. In recent years the natural hazard premiums were well below break-even throughout the world. This leads to losses that cannot be earned back post festum.

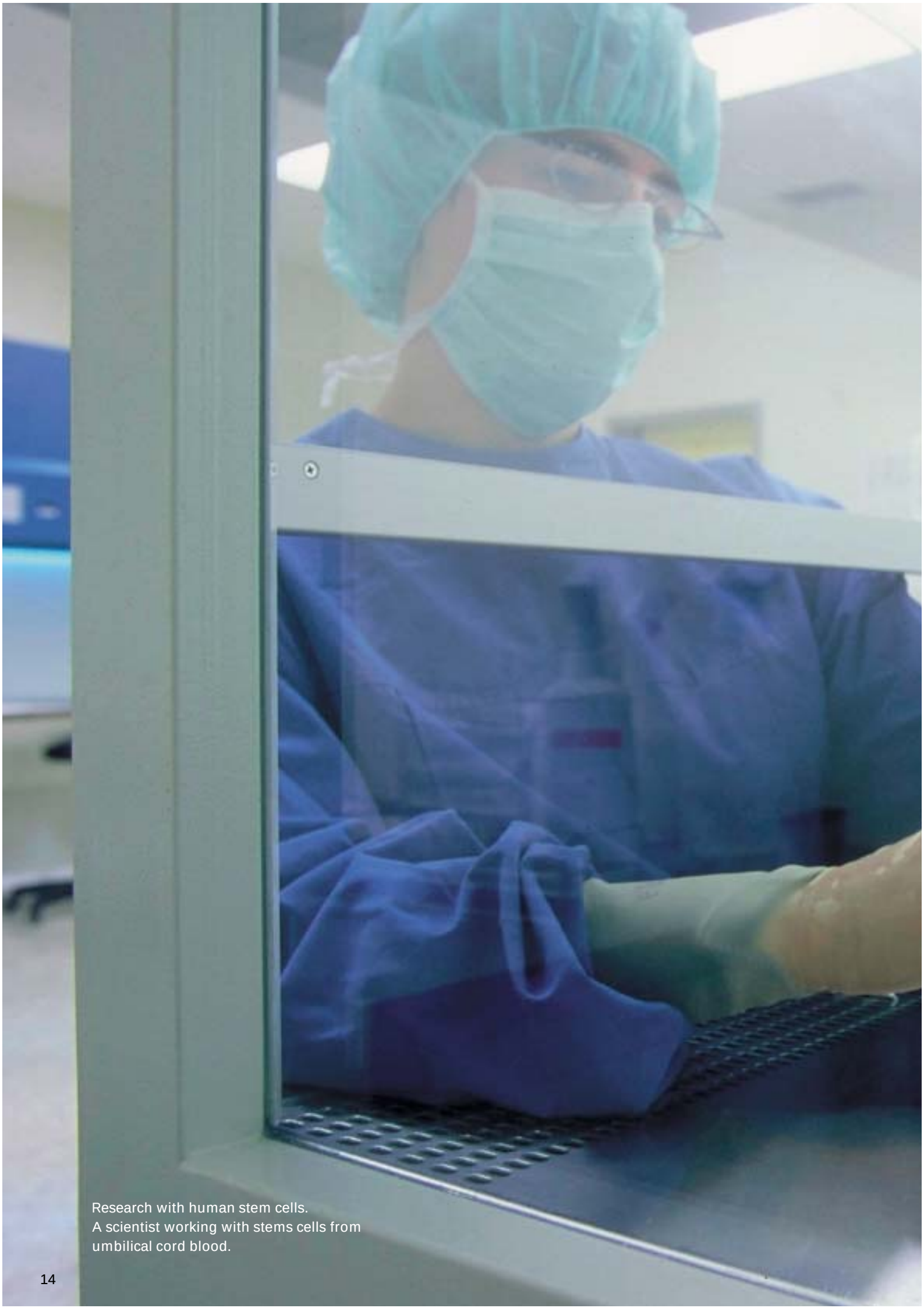
Secondly, insurers must concentrate on those areas in which it really is necessary to cover risks. In temperate zones with a relatively moderate tendency towards natural hazards, for example, the huge number of small and even petty insured losses use up accumulation capacity that is not needed either by individuals or by the economy as a whole. In such areas, the insureds' interest in preventing losses must be built up by reasonable sliding-scale deductibles.

Thirdly, it is necessary to develop and implement ecological rating components, such as encouraging climate-friendly insurance products. Reducing motor insurance premiums for occasional drivers is one example, excluding foreseeable loss or damage in the normal course of operations under public liability insurance is another. Particular attention must be given to emissions from coal-fired power stations and waste incineration plants. Environmental audits may provide support in the assessment of environmental liability insurance risks.

Fourthly, insurers can take advantage of many additional possibilities as investors on the capital market. Risk financing and investment yield are of course linked, combining two business activities which support each other mutually. Insurers will not go out with a watering can and pour financial donations over climate protection projects for charitable or philanthropic reasons. But they may systematically consider an investment's ecological quality besides its profitability and security as a criterion for making an investment decision. There is now sufficient evidence to show that economy and ecology do not have to be opposites, even if suitable placement opportunities are still often lacking.

Fifthly, there is the question of education and public relations. Hardly anyone can relieve reinsurers of their function as early-warning systems in connection with natural hazards. Munich Re's Geo Risks Research Dept. offers advisory services for our clients, e.g. on rating, product development, accumulation control, hazard zoning, or risk assessment. We are becoming more and more active in the public eye, making our analyses and professional competence available to the world of science, drawing the attention of politicians and the authorities to the latest developments, committing ourselves to the cause of prevention. This is something we do not only for the sake of others. Because, of course, we are among those most severely affected, at least in financial terms. But it is also a service in the general interest when we take up the cause of protection for and from a world of nature which – even if it does not have a voice of its own – is at least no longer willing to patiently accept everything we throw at it.

DR. HANS-JÜRGEN SCHINZLER
Chairman of the Board of Management



Research with human stem cells.
A scientist working with stems cells from umbilical cord blood.

03 Is genetic research sustainable health research?

Medical progress, increased health awareness, demographic development, and the explosion of costs make radical changes necessary in the health care sector. Genetic technology will play an increasingly important role in this.

How to lead a healthy life? How to lead a sustainable life? These questions affect us all and are accordingly discussed with much gusto. Strangely enough, however, the combination of sustainability and health has been rather neglected in this discussion. Sustainability in the healthcare system and in health research presupposes an integrated health policy which is geared to a responsible handling of the limited resource "health" in both the individual and the collective sense and gives rise to a transdisciplinary approach to the prevention and alleviation of disease.

How can genetic research, i.e. the investigation of human hereditary factors, contribute to sustainable health research? What are the opportunities it presents and what are the risks? Genetic technology is spreading to more and more areas of medicine at such speed that it would appear advisable for the purposes of this article to concentrate on just three important areas of application that relate to sustainable health research and a viable healthcare system for the future: genetic diagnostics, pharmacogenetics, and drug development.

GENETIC DIAGNOSTICS

In the past there were many cases in the field of clinical medicine where therapeutic action could not be taken until the first symptoms of a disease became manifest. Genetic tests, however, are capable of identifying the predisposition to a particular disease years before it breaks out – if not with absolute certainty then at least with varying degrees of probability. In the future, with the aid of genetic diagnostics, it will even be possible to take preventive measures for many diseases by changing the patient's lifestyle or prescribing a different drug.

PHARMACOGENETICS

A patient has a common disease, there is a good drug for it – but the patient does not respond to that drug. Why is that? Up until now drugs have been designed for "average patients", and there has been no possibility to consider an individual's genetic make-up in their development. So doctors treating patients with high blood pressure, for example, often have to try at least three or four different drugs before they find one that works satisfactorily. And patients with breast cancer undergo a course of chemotherapy with major side effects as a safeguard against relapse, and yet many patients do not respond to that therapy. And then there are the 100,000 patients or so that die every year in the United States alone from the adverse side effects of drugs.

The reason for all this is that minute differences in individual genes decide on how well or how badly a drug is absorbed, distributed, and then metabolized in the body. Researchers are tracing these variations in the genetic material in order to develop milder therapies geared to individual patients. This relatively new branch of research, which aims to make therapies more effective and more reliable, is called pharmacogenetics. It could also shorten the development and approval phases of drugs substantially. Some pharmaceutical companies have announced that within a matter of years they will be introducing drugs which will require a genetic test before being taken.

DRUG DEVELOPMENT

Since the very beginnings of the pharmaceutical industry, chemists have identified only 500 molecular targets, around which they have developed the entire spectrum of drugs. This spectrum is now considered to be more or less exhausted. On the basis of the human genome project, genetic research will provide thousands of new targets, which will in turn reveal the principles of how new drugs work and will thus point the way to new opportunities for recovery from disease. Of the US$ 40bn that is spent on drug research throughout the world each year, US$ 10bn already goes into genetic technology – and its share is rising.

These are three of the areas of application from which decisive impulses for sustainable health research are to be expected. A further area is the development of vaccines. Genetic technology could help to repress such infectious diseases as malaria or tuberculosis, which have hardly been touched by vaccines up to now. Gene therapy, on the other hand, is a completely new method of treatment, involving the introduction of "healthy genes" that are supposed to attack diseases at their molecular roots. In the 1990s, however, a whole series of clinical gene therapy tests were a major disappointment. The much discussed stem cell therapy initially presupposes that the ethical issues will be straightened out. Its potential for the future lies in the induction of regeneration processes in organs with a chronic impairment, the generation of replacement organs and tissue, the gaining of insight into the origins of diseases (e.g. cancer), and the avoidance of animal testing in that new drugs can be tested on stem cell lines rather than on animals.

Genetic research will make an increasing contribution to medical progress. In order to show what that will mean to health research and finally to insurance companies, we shall look at four aspects: the perception of the patient and the role of the physician, the meaning of the term "health", preventive medicine, and cost development in the healthcare system.

A CHANGE IN THE PERCEPTION OF THE PATIENT AND THE ROLE OF THE PHYSICIAN

Genetic research will change the way patients see themselves. It will reveal individual predispositions and show patients where and how their health is threatened. Genetic research will also make it possible to individualize the type of treatment adopted. Both will give patients more responsibility for themselves. However better informed and more educated patients have become as a result of new information technologies like the Internet, they will still need competent counselling on health matters. And this will lead to a change in the role of the physician. Doctors will increasingly have to assume the role of mediator and counsellor between genetic technology, data interpretation, and health science.

A CHANGE IN THE CONCEPT OF HEALTH

Genetic research will make a decisive contribution towards our healthcare system shifting its orientation from treating disease to preserving health. The greater the number of molecular mechanisms we understand, the more obscure the boundaries between "healthy" and "sick" will become. The identification of a predisposition to certain diseases at an early stage will show "not-yet" patients ways in which they can prevent or at least delay their development. It must be remembered, however, that human beings also have the right not to know what their predispositions are. Preventive medicine should not be forced through by any kind of coercion, which includes any kind of social coercion that could be generated, for instance, by the pressure of costs. It is also important to prevent arbitrary offers of mass genetic testing by, for instance, profit-oriented firms on the Internet.

A PARADIGM SHIFT IN THE DIRECTION OF PREVENTIVE MEDICINE

Even if healthcare management is already widely practised, health insurance systems have mainly focused on the reimbursement of costs for treatment. Health education and disease prevention have not been extensively developed. The medicine of the 21st century, on the other hand, will focus on the prevention of diseases. Genetic technology can play a decisive role in this. There will be a transformation in the idea of what disease really is, for instance. The tongue-in-cheek saying that health is only a "badly performed medical examination" will acquire new meaning, since even today geneticists presume there to be dozens of more or less pathogenic mutations in each and every individual's genetic make-up.

COST DEVELOPMENT IN THE HEALTHCARE SECTOR

Medical progress (particularly in the area of genetic technology), the ageing of the population, and growing health awareness are leading to costs increasing steeply in the healthcare sector. In the future we will also have to expect additional expenses for preventive measures emerging as a result of genetic research. The state's ability to finance all this is limited, so that we must expect to see an increasing share being carried by patients making their own provisions and by covers provided by private insurance companies. Whether rigorous and wide-ranging preventive medicine will help to relieve the healthcare budget in the long run remains to be seen.

MUNICH RE'S ROLE

These examples show that our healthcare system is due for far-reaching changes in the medium term, changes which will require new approaches and new solutions (e.g. structural improvements) and new insurance and financing concepts. Particular attention will have to be paid to a responsible and sustainable handling of each person's limited health resources and each national healthcare system's limited financial resources. Sustainable approaches will only be found in the dialogue between the users of genetic technology, the risk carriers, and the insureds. They will also depend on an ethical discussion and social acceptance. This will require giving earnest thought to the problem areas of genetic research. Progress in the life sciences is accelerating, with the result that specialist knowledge will become a more significant competitive factor for insurers too. Munich Re has responded to this development by founding a centre of competence for the life sciences. Supported by numerous sources of information, this unit critically monitors the progress of research in the field of genetic technology and examines it in terms of its significance for insurance companies. Munich Re is thus implementing one of the aspects of its guiding principles in this area too: to further develop our competence with regard to the issues affecting society now and in the future and to develop our own position.

DR. ACHIM REGENAUER is Chief Medical Director of Munich Re and the head of the Centre Of Competence for the Life Sciences.

04 Nature in court:

On the debate concerning liability for ecological damage.

We have only been waiting for it for 14 years – and at last it is here: the EU Commission's draft directive on the restoration of and liability for environmental damage, issued in January 2002. It addresses the question of how environmental damage should be remedied and who should carry the cost. It is not intended to be the final draft of a law but only a definition of objectives. How these objectives are to be achieved is up to the member states themselves. The repercussions of the EU Commission's proposal are now being investigated in the member states. It specifies among other things liability – within narrow limits – for biodiversity damage, i.e. liability in situations in which the variability of plant and animal species is impaired. This is likely to revive the highly complex debate on liability for "purely ecological" damage, which revolves around the issue of the value liability law attaches to ecological resources that have no market value. How, for instance, should the damage be calculated in situations like the one in Andalusia in 1998 when the retention basin of an international mining company burst and one of Europe's most significant nature reserves, the Coto Doñana on the edge of the Guadalquivir Delta, was contaminated with toxics?

Liability law is one instrument of environmental policy. Liability in connection with environmental damage serves to control behaviour indirectly. It is intended to make sure that activities which constitute a risk for the environment either do not take place at all or they take place at a price. This kind of liability is covered in various classes of insurance. Motor and marine insurance, for example, include liability for the transportation of hazardous waste and aviation insurance the liability of airport operators. But the most important form of cover is provided by industrial liability insurance, which insures installations and products that constitute a hazard to the environment. Thus the debate on liability for ecological damage affects insurers too. In their own interest they should strive for transparency, performing more empirical research, for example, on the causes and costs of the environmental liability losses they insure.

The debate on the new environmental liability law is marked by the fact that some fundamental terms are still too ambiguous. The following considerations are intended to contribute to the discussion and bring some clarification.

THE AMBIGUOUS TERM "ENVIRONMENT":

This is primarily understood to mean the ecological environment: soil, water, air, flora, fauna. But in Europe it is almost impossible to find an "untouched wilderness". Natural landscapes are largely cultured landscapes. This applies not only to well-known examples like Alpine pastures, the Rhine Valley, the threatened rice fields in Lombardy, but to almost all landscapes. In other words, the ecological environment always involves cultural aspects too. And this leads to interdependencies and conflicts of interest when it comes to the rehabilitation, restoration, or development of old industrial sites, for instance. Environmentalists may have their reasons for not wanting to have an historical monument restored, while those in favour of monument protection may produce arguments for preventing soil remediation.

THE AMBIGUOUS TERM "ENVIRONMENTAL DAMAGE":

Civil liability for environmental damage is primarily understood to mean the liability for damage to persons or property caused by pollution of the air, water, or soil, i.e. damage to health or damage to property, as in the case of damage to the paint on cars (certainly nothing of much ecological value) or damage to a piece of property which may at the same time be of ecological significance. These "traditional" types of environmental liability are no longer addressed explicitly by the EU Commission's draft. Behind this is the realization that each country, within the framework of its own traditional tort and property law in interaction with public law, already permits the establishment of far-reaching environmental liability norms which, for example, protect the soil. Different approaches often lead to the same end and each legal system is an organic system of channels that communicate differently. But where does traditional environmental liability end and where does this "new" environmental liability begin? That will vary from one legal system to the next. To stay with the example of the soil, the groundwater counts as property in some countries, like Austria, whereas in others, like Germany, it does not. This means that the action required in the individual EU countries as far as new types of liability are concerned will vary.

THE DIFFUSE ALLOCATION OF LIABILITY:

It is often difficult to identify the ways in which a large number of pollution factors contribute to environmental damage. In such cases liability is an inadequate instrument, as the EU Commission's draft expressly states. Health impairment due to poor air quality, for example, can seldom be allocated to the various emitters. This may well be a matter for health insurance, which has never been accustomed to investigating causes – although one could at least ask whether, in accordance with the principle of economy anchored in the German Social Security Code, health insurers

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should not pursue their rights of recourse vis-à-vis identifiable polluters more rigorously than in the past. Allocation of cause is also difficult in connection with property damage, such as forest damage, and in connection with purely economic losses, when, for instance, tourism suffers as a result of deteriorating environmental conditions, and finally in connection with ecological or biodiversity damage as a result of a multiplicity of causes involving general developments in traffic, infrastructure, industry, and agriculture.

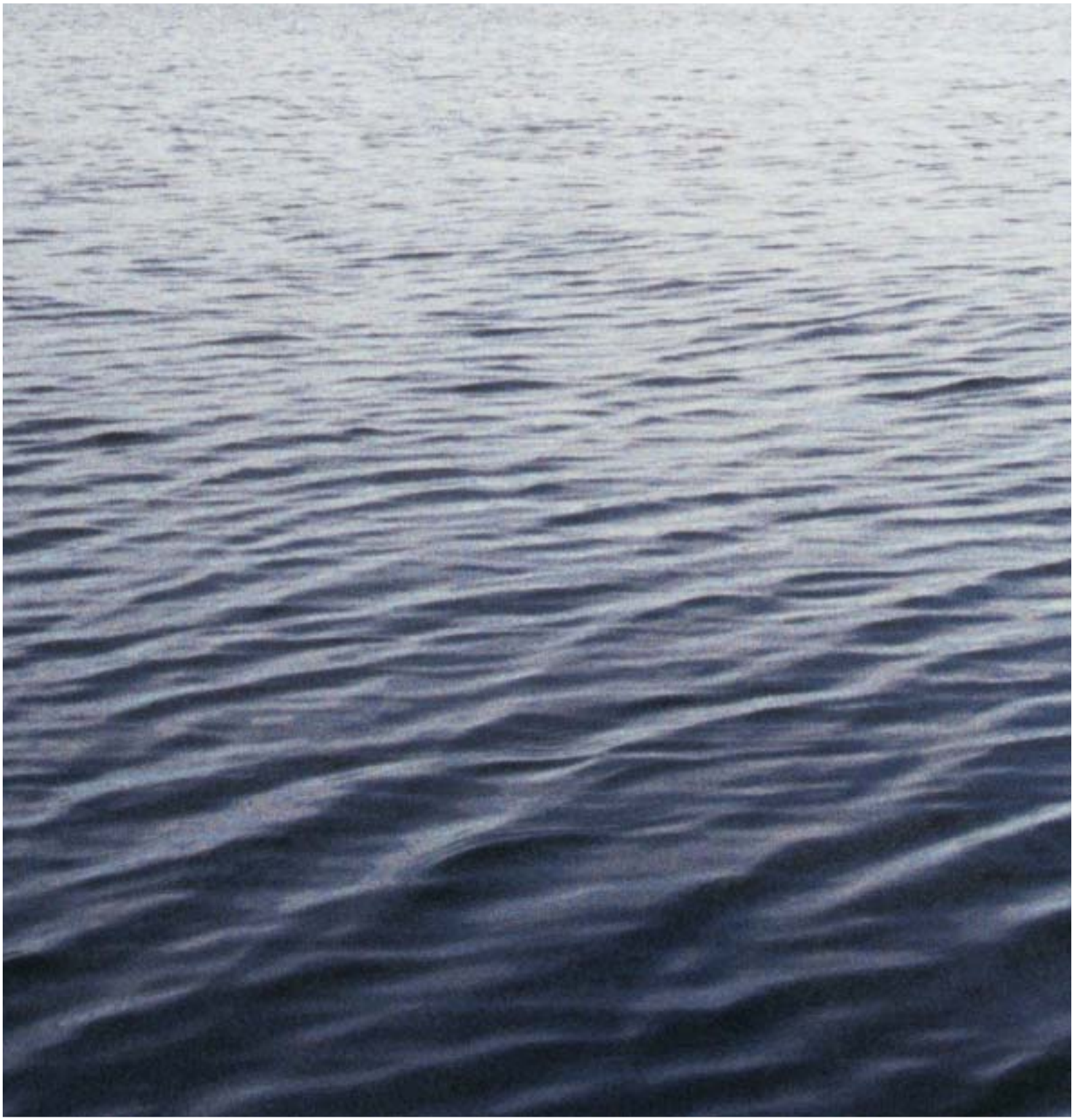
THE ALLOCATION OF ECOLOGICAL DAMAGE UNDER PLANNING LAW:

The planning of infrastructural projects like major highways, railways, or embankment dams does include an assessment of the ecological effects. German environmental protection law provides for a whole range of compensation and replacement measures. There actually is an allocation of biodiversity losses to polluters – albeit prospectively at the planning stage and not retrospectively in the context of liability law.

The elements of ecological damage are therefore to some degree – insofar as they are relevant to property – already considered in traditional liability and insurance practice, although sometimes there may be problems involving the evaluation and assessment of what is “reasonable“ effort. An allocation of ecological damage to specific causes is largely impossible, so that such damage is not a matter for liability or for insurance.

HOW WILL INSURERS BENEFIT FROM THE DRAFT DIRECTIVE?

The significance of ecological aspects in the adjustment of losses is increasing – and in some countries this may be enhanced by an EU directive. Traditional liability cases involving biodiversity damage are still quite possible – witness Coto Doñana. In such cases, the liable party and the liability insurer will have less opportunity to withdraw behind the limits of traditional law, which are defined in different ways from country to country anyway. What is needed now is an array of constructive solutions for liability practice regarding ecological damage, and liability insurers would be wise to develop these solutions themselves.
It would only be a contribution to a side issue in the biodiversity debate – but that, along with the climate debate, is without doubt the most important subject in the current global environment discussion.



05 Stress with water

Nothing can replace water. It is likely to be the raw material of the 21st century. The insurance industry must – not least in its own interest – show a high level of far-sightedness and risk management in problematic fields.

The earth's limited water supplies are being used with increasing intensity – the world's growing population is in the most literal sense of the word thirsty. Water scarcity is a growing problem for food production, a threat to biodiversity, a trigger for political tension, and the cause of environmental refugees. Technologies for making drinking water are becoming a significant economic factor. Global risks and changes are on the horizon. Munich Re has a long tradition of identifying such important topics at a very early stage and of quickly building up the competence that is needed to deal with the associated questions for the insurance industry. It was thirty years ago, for example, that the company began investigating the possible effects of climate change. Water is another topic in which Munich Re has been following the developments for a long time. The conclusion it has drawn is that although there is in principle enough water to go round, guaranteeing a sufficient supply of water is becoming one of the most urgent problems in many regions of the world on account of population growth, climate change, and deteriorating water quality. The growing pressure of costs and not least the harsher political situation and tighter water laws will force water companies and potential water polluters to search for additional risk transfer solutions especially in the liability sector – a particular challenge for the insurance industry.

At the same time, the rising demand for water technology and flood prevention measures offers new fields of economic activity, which could also be of significance for large institutional investors like Munich Re.

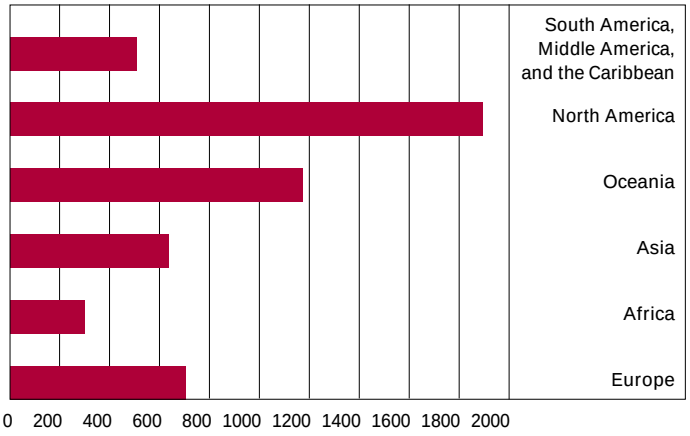
At the end of 2000 Munich Re marked out its course for dealing with the topic of water and incorporated this in a strategy paper. It embraces the following fields of activity:

– Knowledge and education
– Science and research
– Disaster prevention and environmental protection
– Public health

The facts

Water covers more than 70% of our planet's surface. Of the water that is available on earth less than 3% is fresh water. 95% of this is trapped as ice in polar caps, glaciers, the atmosphere, and the ground (permafrost) and is not available for drinking. Altogether much less than 1% of the world's water can be used as drinking water.

Fig.1: Annual per capita consumption (m^3)



The volume of water consumed throughout the world varies widely.
Source: World Resources Institute

As might be expected, consumption is highest in those continents where the countries tend to have reached a higher level of industrialization. Per capita consumption in North America, for instance, is more than four times as high as in Africa and more than twice as high as in Europe. Water is frequently wasted, however, or is lost because of dilapidated pipelines. Losses of 20% to 30% are not unusual. Water charges based on gauged consumption is often still a foreign concept. In many places, a flat rate is charged or consumption is only estimated.

At the beginning of the third millennium the earth already has more than six billion people – more than twice as many as in 1960. Moderate estimates by the United Nations expect the nine-billion mark to be reached between 2040 and 2045. The largest increases will be in Africa and Asia.

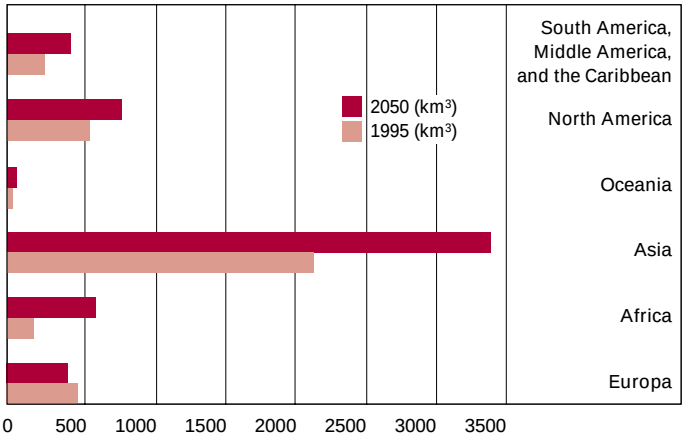
The World Resources Institute has calculated that more than 40% of the world's population live in areas with water stress, i.e. areas in which there is less than 1,700 m^3 of annual renewable water resources per capita. This may be observed in numerous conurbations even today. Almost 20% of the world's population must make do with less than a per-capita volume of 500 m^3 a year – too little to assure an adequate supply of food in addition to the supply of water.

Combining population development figures with water consumption per capita produces the following picture (Fig. 2):

On the basis of an optimistic assumption that per-capita consumption will remain stable, global water consumption will double by 2050. The World Bank believes that consumption may even double within the next 30 years. From about 2025 half of the world's population is likely to be living in regions with water stress.

In global terms agriculture is the sector that uses the most water, but in the industrial countries it is industry with a share of 65%. In Europe industry's share has dropped in recent years, but the statistics show that in countries with a higher per-capita income industry accounts for a higher share of water consumption. For this reason it must be assumed that the increasing industrialization of developing countries will accelerate the increase in water consumption. Water also plays an increasing role as a supplier of energy. In the second half of the 20th century about 40,000 large dams were built throughout the world (with a height of more

Fig. 2: Possible effect of population increase on consumption development up to 2050



than 5 metres and a volume of more than 3 million cubic metres). This involved relocating millions of people. About one-fifth of the world's electricity requirement is now covered by water power. In countries like Brazil and Norway, up to 90% of the electricity is supplied by water power. Half of today's 45,000 dams are in China.

Besides the increase in water consumption, the decrease in the quality of water gives grounds for concern. The World Health Organization (WHO) assumes that 1.1 billion people are without clean water; 2.4 billion people have no access to adequate sanitary installations. The Water Supply and Sanitation Collaborative Council (WSSCC) estimates that 6,000 children die every day from illnesses due to poor-quality water and inadequate hygienic conditions.

Besides population growth it will be above all climate change that will have an effect on the regional availability of drinking water. The warmer atmosphere will be able to absorb more water vapour, so that the number of extreme precipitation events will rise in some regions, whereas in others the volumes of rain will decrease. For this reason Munich Re continually draws attention to the fact that windstorms and flood events on the one hand and heat waves and droughts on the other will lead to increasing losses for insurers.

The higher frequency of "wet" storms and the associated flood events will hit a few countries with large populations particularly hard. This is clearly illustrated by the example of Bangladesh, which, in spite of its comparatively high economic growth, continues to be one of the poorest countries in the world. Bangladesh is only about 40% the size of Germany but has a population of about 130 million. In the event of an extreme flood it can happen that up to 80% of the country is inundated. Such floods claim the lives of innumerable victims again and again, millions of people are made homeless. A higher frequency of such extreme events will make this situation even worse.

In spite of the flood problem, the southwest of Bangladesh is regularly hit by drought in the dry period, when the Ganges, which carries very little water at the best of times, is diverted shortly before the border by the Farakka dam in India. Only small amounts of water reach Bangladesh – which makes it an issue of political controversy. The effects on agriculture and biodiversity are severe. Bangladesh is therefore in the absurd situation that some areas dry up completely while other are literally swamped.

The example of Bangladesh highlights another aspect: water as a source of potential conflict. In the late 1980s and the early 1990s the Worldwatch Institute and the Center for Strategic and International Studies were already of the opinion that water would take over from crude oil as the basis of conflict in the future. The quotas for extracting water from cross-border rivers and lakes are repeatedly the cause of serious disputes. Additional quarrels and even armed conflicts may have far-reaching effects – with the obvious negative impact on the world's economy and the capital markets.

It is becoming clear that action is urgently required in many areas. Great efforts are necessary if appropriate measures are to be taken to deal with the problems. The financing of international initiatives and measures designed to improve the water supply will be of major significance in the future. Close cooperation between governments, the economy, and non-governmental organizations will be essential.

And what is Munich Re doing?
Munich Re has a long tradition of dealing with global risks and changes. We are following the problems involving water with great attention, analysing the risks, and developing measures aimed at prevention and response.

Our current focus is on the following areas:

– Research, knowledge, and education
– Environmental protection and climate protection projects and local preventive measures
– Practical implementation of research findings, e.g. the improvement of water treatment and purification
– Improvement of access to information and management of information
– Scientific and technical development
– Public health through the improvement of the water infrastructure – in terms of water quality and the efficiency of water use

We will not restrict ourselves to supporting third-party projects financially. On the contrary, we are convinced that we can deploy our knowledge and our competence best in projects of our own. We will supplement this with a network of competent external scientists and leading personalities in order to build up a reliable and proficient starting point for ourselves.

DIRK REINHARD has a degree in Industrial Engineering and Management. He is a member of Munich Re's environmental unit and a specialist on questions of sustainability in the field of investments and asset management.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06 Sustainable growth of our assets

The classical investment triangle has been extended. A challenge to asset management.

When a son leaves home to see the world, his father gives him some money and a good piece of advice: "Make your money multiply as best you can. Don't waste it. Make sure it is there whenever you need it. And do good with it." This may sound like an echo from the distant past – but it is still a neat and fitting picture of the principles of modern asset management.

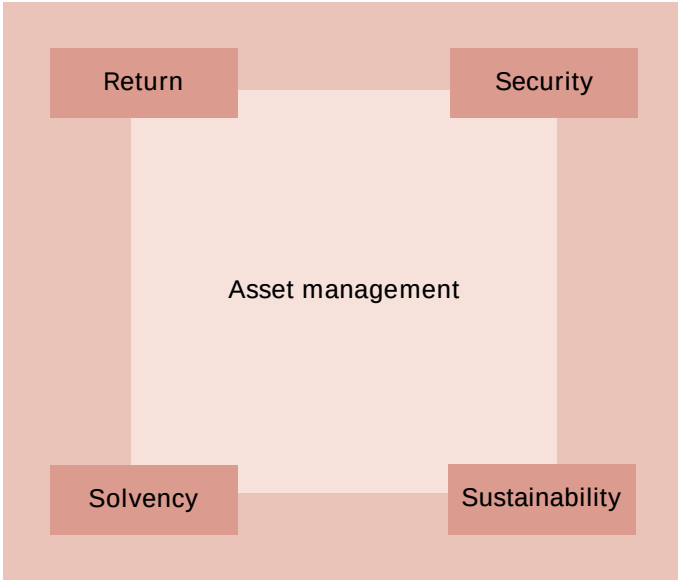
That money should do good is a call that is increasingly being heard, especially in the discussion of sustainability. For some years now the capital market has concerned itself more intensively with sustainable investment alternatives. The criterion of sustainability has also gained in significance for international investors and not only since the 1992 climate summit in Rio. Even at that time, particular importance was attached to the finance sector in spreading the principles of sustainable development. The general public became familiar with this issue later through the launching of the Dow Jones Sustainability Group Index, which has listed sustainable joint-stock companies since 1999.

The subject of sustainable investments is nothing new to the Munich Re Group. After all, the purpose of our business is – among other things – the insurance of loss and damage caused by natural catastrophes and environmental risks. Such aspects as climate change strategy, radiation exposure, and protection against emissions are thus at the centre of focus in our activities – and that means in our investments too.

Nevertheless, the integration of sustainability criteria in its investments is, in terms of the work this involves in actual practice, a major challenge even to Munich Re. One reason for this is that neither science nor everyday practice has come up with a generally accepted definition of sustainability. Whilst some publications concentrate on the aspect of environmental protection, other authors put equal emphasis on ethical, cultural, and social aspects. This means that companies first have to investigate, discuss, and define the specific features of the criterion that are relevant to them in the context of their own investments. We have done just this with regard to our own investment process. The relevant investment requirements are specified by a competent team of experts. In collaboration with the respective investor in the Munich Re Group, experts from share research and portfolio management analyse and classify possible issuers and investment alternatives. Technologies with an environmental impact are assessed, for example, as are the sustainable activities of global companies.

The next stage is the proper allocation of the sustainability criteria in the entire investment process. Insurance companies in particular must take account of capital market requirements. They must achieve satisfactory returns from their investments, observe the minimum requirements in terms of the security of their investments, and they must guarantee the required liquidity at all times. Consideration is then given to the experts' evaluation of sustainability in the concrete investment decision.

Asset management thus moves within a "magic square".



This means that management is required to optimize the company's investments: maximizing the return but also strictly observing the other conditions of security, liquidity, and sustainability – just as the son was instructed to do by his father.

Our success in this field has also been acknowledged by the capital market. Munich Re shares are included in the Dow Jones Sustainability Group Index and in the FTSE4Good Index launched in 2001. These two share indexes contain the most sustainable of the world's joint-stock companies as assessed in a process of thorough research.

PETER M. MEYBOM is the head of Financial Management & Consulting at Munich Re.

07 Climate protection and the Kyoto Protocol – A year of progress?

The annual climate summits are a

As Munich Re's analyses have shown for years, the loss and risk situation with regard to weather-related events will become much more severe as a result of climate change. What effect can the latest resolutions on international climate protection have on this?

The feeling at the end of the 7th UN climate summit in Marrakech (Conference of the Parties/COP 7) on 9th November 2001 was that the Kyoto Climate Protocol is now safe and can at last be ratified – meaning that it can be translated into obligations that are binding under international law. Scientists have warned, however, that the intended greenhouse gas reductions will not really help the climate. What effect will the agreements that were reached in Kyoto in 1997 have on the world's climate? Can climate change be slowed down or even stopped altogether? The Kyoto Protocol will again be the subject of fierce debate in 2002 – beginning on the periphery of the UN world summit that will take place in Johannesburg in September, ten years after the first meeting of 178 nations in Rio de Janeiro. COP 8 will go into the next round in the autumn. In any event, many nations and groups of companies have already declared their intention to ratify the Kyoto Climate Protection Protocol in the historic year of "Rio +10". A major role in this is played by the idea that with ten years having elapsed since the first resolutions on climate protection were passed, globally binding agreements should at last be established.

The climate protection protocol formulated in Kyoto in Japan specifies that by 2012 the forty largest industrial countries in the world should lower their emissions of greenhouse gas by an average of 5.2% compared with 1990. It will only be binding under international law when 55 of the nations that are responsible for at least 55% of the greenhouse gas emissions of the industrial nations sign the protocol (cf. the article in "topics – Annual Review of Natural Catastrophes 2000").

WHAT DOES A REDUCTION OF 5.2% MEAN FOR THE CLIMATE?

If it were really possible to reduce the emissions of six greenhouse gases in comparison with 1990, this could certainly be called progress in terms of climate protection – as a signal at least, because in absolute terms a reduction of 5.2% is too little when it comes to "saving the climate". What is more, since the Marrakech resolutions, forest areas and certain agricultural methods can be counted as carbon-dioxide absorbing measures (CO_2 sinks). In simplified terms, countries that grow large numbers of plants that absorb the greenhouse gas carbon dioxide will also be allowed to discharge more carbon dioxide into the atmosphere from their power stations. According to the latest calculations, the result of including CO_2 sinks is that the target for reducing emissions globally will actually be lowered from 5% to below 2%. So this is still a very small drop in a very large ocean. And no more. For the following reasons:

- The minimum called for by the German Bundestag's study commission on the protection of the earth's atmosphere in its final report in 1999 was that CO_2 emissions should be reduced by 30% by 2005, by 45% by the period 2020 to 2030, and finally by 80% by the middle of this century in Germany and comparable industrial countries (the reference year being at that time 1987).
- The German Advisory Council on Climate Change (WBGU) that was set up by the Federal Government writes in its annual report of 1995: "In the very long term, i.e. over several centuries, anthropogenic CO_2 emissions from the use of fossil fuels must be reduced to zero, even if those resources were inexhaustible."
- Numerous calculations by the Intergovernmental Panel on Climate Change (IPCC) confirm that on account of the long life of individual greenhouse gas molecules the average global temperature in the course of this century would increase by a further 1°C to 1.5°C even if the emissions could be stopped immediately.

platform for negotiations between politicians, associations, initiatives, and NGOs. Munich Re is a regular participant.

IS THE KYOTO PROTOCOL WORTHLESS?

In the light of these statements the reductions proposed in the Kyoto Protocol appear completely inadequate. But it would be wrong to condemn the Kyoto process as the "wrong way", as sceptics are constantly trying to do. After all, assuming that ratification really does take place, other important processes will be stimulated in addition to the pure reductions:

- Ratification will promote the establishment of cross-border emissions trading systems. The new general conditions are likely to encourage large sections of the economy to save energy or use it more efficiently, as the first attempts at implementing trading systems have shown. This will trigger bursts of innovation, particularly in technology and energy-intensive sectors. If it emerges that climate-friendly development creates market opportunities and jobs, this could even lead to a boom in climate protection.
- Some of the Kyoto mechanisms, like the Clean Development Mechanism, for example, represent nothing other than ecological development aid in the field of climate protection and stand – in other words – for perceptive technology transfer. Developing countries will receive – on the basis of financial support – a chance to adjust to future requirements with ecological means. These efforts are particularly important because of the fact that there is no longer any way of preventing a great deal of the expected climate change.
- The community of nations throughout the world will have the opportunity to demonstrate that it can act in concert to tackle and – in more or less harmony – come to grips with a global problem.
- Last but not least, the implementation of the protocol will also open up market opportunities for the insurance industry (cf. Environmental Statement 2001, page 7).

MUNICH RE'S ROLE

Since the inauguration of its geoscience research group almost thirty years ago, Munich Re has continuously observed the developments in the environment, and especially those in the atmosphere. In the 1970s, long before political committees began discussing the subject of climate change, Munich Re's special publications were already pointing to this risk complex and the risks involved. Since the 1980s we have drawn the attention of the insurance industry, its clients, and the interested public throughout the world to this important topic for the future in many information events and publications. Active participation in committees and working groups, such as the UNEP Financial Initiatives, is a matter of course for Munich Re (UNEP-FI, website: http://unepfi.net/; FI is a coalition of banks and insurers within the framework of UNEP, which in addition to addressing the subjects of environmental protection and sustainability, takes an active part in meeting the challenge of climate protection).

We have been present at the global climate summits since the very beginning (COP 1 in Berlin in 1995) and have followed the political processes very closely. We regularly place our statistical analyses at the disposal of politicians, environmental groups, and the media, analyses which show that climate change will severely aggravate the risk situation in terms of natural hazards.

We will continue to expend our energy in the future dealing with the effects of the changes in our climate and environment and with the countermeasures that may be adopted. The question as to whether the Kyoto Protocol will now become binding under international law is a question that is being discussed intensively this year, and we hope that the answer will be clearly in the affirmative: a first and an extremely important step in the direction of climate protection, which must be close to our hearts not only for business reasons.

THOMAS LOSTER is the head of the special section for weather-related and climate-related risks in Munich Re's Geo Risks Research Dept.

As in ancient times: The farmer sows his seed ...

08 Risk management: When farmers' wisdom fails

A partnership between the farmer, the state, and the insurance industry is also good for sustainable land management.

"Swamped" A view of flooded fields in Dörpstedt-Bünge (in the district of Schleswig-Flensburg) on 30th October 1998. Several hundred hectares were inundated when the dykes on the River Treene burst.

At the end of June 2000 – a field in Brandenburg. As in the other eastern states of Germany it is hot – way above the average of recent years. And it has been like that since April. The crops are suffering from dry stress. Extreme evaporation, hardly any rain, desiccated soil. In some areas the harvest is a complete loss. The recorded losses come to over €300m. A catastrophe for the farmers and no exception in Europe. But an example of the risks that the agricultural sector is exposed to. And it is under pressure from almost all sides. On the one hand, the public is calling for farmers to take a more ecological approach to agriculture and to gear their production towards more quality, environmental groups are calling for more effort to be made in terms of biodiversity, and politicians are calling for the maintenance of cultured landscapes – what is needed is the multifunctional farmer. On the other hand, it is becoming more and more difficult for farmers to operate at a profit. There are two causes of all this: the effects of the European Union's agricultural policies and the low prices for agricultural produce.

The EU's Agenda 2000, for instance, regulates the common agricultural policy. The main areas of focus include the environment, food quality, and the vitality of rural areas. It also regulates intervention prices, i.e. the prices that farmers are guaranteed for the most important crops and beef, for example. In order to stop over-production, a policy of compulsory fallowing has been introduced. Agri-environmental programmes are intended to encourage farmers to use production methods that are compatible with the protection of the environment and natural resources. They also include environmental requirements and agri-environmental commitments regarding, for example, the handling of fertilizers and liquid manure.

In order to be able to prosper in such a market in the long term, the farmer must use his resources economically. He must make his operations more commercial, think more business-like, and invest in specialization. However well farms are run in commercial terms, they are always exposed to external influences. Periods of excessive moisture, thunderstorms, hail, or extreme summer drought leave deep marks in crop farmers' business results. Livestock farmers are faced with the threat of epidemics like foot and mouth disease or swine fever and new types of diseases like BSE.

THEREFORE, AGRICULTURAL ESTABLISHMENTS TAKE HIGH RISKS. THEY TOO NEED RISK MANAGEMENT. BUT WHAT RISK INSTRUMENTS ARE AVAILABLE TO FARMERS?

In Germany, for example, livestock farmers are insured by livestock insurance and a state epidemic fund against the increasing danger of epidemics. Farmers' crops are insured for loss and damage caused by hailstorms, but not for other weather-related risks such as windstorm, flood, and drought. This is currently being discussed but so far no solution has been found. Ad hoc disaster assistance does exist, however, in the form of payments from public funds, e.g. for uninsured crop losses following flood, drought, or other natural catastrophes – but farmers do not have a legal entitlement to this aid. Whether a farmer receives

Drought in the United States – A lot of dust swirls up as a farmer drives his tractor across his desiccated field. The farmers in the Midwest states hit by severe drought are still waiting in vain for it to rain.

compensation in the event of a loss depends on authorities such as the chamber of agriculture or the ministry of agriculture, which determine the amount on a case by case basis – so a farmer can never be sure of getting compensation in the event of a catastrophe. A further deficit is that it may take up to two years or even longer before a farmer actually receives the payment he has been promised. In short, an economically thinking farmer cannot plan ad hoc disaster assistance as a reliable and fixed component of his risk management.

Opportunities for the insurance industry

Together with the specialist agricultural insurers, the Munich Re agricultural team has the job of developing new solutions and suitable products. The model for any risk partnership between agriculture, the state, and the insurance industry is the multi-peril crop insurance system in the United States. This federally subsidized agricultural insurance system is a reliable instrument for risk management in the agricultural sector. In such a partnership it is possible to cover various risks encountered in plant production.

Unlike Europe, where there is no such standardized system, the United States has for many years had an established comprehensive, federally subsidized crop insurance system. This system pays compensation for loss of revenue caused by natural hazards and fluctuating prices. The US agricultural sector has thus been given an assured competitive edge internationally. Farmers in the United States can insure their entire crop against all kinds of natural hazard and against insect infestation and plant diseases. The government's participation in this system is vital. It ensures that a large proportion of the farmers take part by subsidizing premiums and providing catastrophe reinsurance. But the government profits from this system too. The cost of subsidizing the premiums (it pays up to 50%) is lower than what it might have to pay for an agricultural sector that is repeatedly getting into financial difficulty as a result of catastrophes and is thus less competitive than its international rivals. To make up for these spontaneous catastrophe payments, the government can plan the agricultural sector into its budget.

The American government assumes the entire administrative fees of the agricultural insurance system, which is a widely accepted and very significant instrument of risk management among farmers in the United States. They can control their risk themselves in that they only pay a processing fee for small covers and contribute a portion of the premium themselves for larger covers. This instrument only applies to crops at present, but the intention is to extend it to livestock in the future.

In Europe each country has its own more or less efficient model of state assistance for crop losses. In the majority of EU countries farmers have no legal entitlement to compensation. There is no reliable calculation basis for the operations of agricultural establishments – not only in Germany.

The effects of a future state-subsidized insurance system in Germany and Europe

In conjunction with the Technical University at Weihenstephan, near Munich, the agricultural insurance section at Munich Re has investigated the effects of multi-peril crop insurance and livestock insurance on the business results of agricultural establishments. Two simulation studies – CRIS (Crop Insurance Simulation) and ANIS (Animal Insurance Simulation) – were performed in order to identify the benefits of agricultural insurance for the management of selected agricultural establishments.

The results show what advantages would emerge from agricultural insurance for agricultural establishments. It would give protection against threatening losses after extreme loss events and stabilize the agricultural establishment's financial situation. An agricultural establishment is only insurable if its management is site-specific and sustainable.

This also has repercussions on the shift towards sustainable agriculture. The ecological farmer runs a higher financial risk in managing his crops. Ecological production is also governed by special environmental requirements, it requires more work, and the yield is usually lower because farmers make less use of fertilizers and avoid intensive cultivation. An economically thinking farmer whose financial situation is supported is much more willing to accept the additional effort and gear his production to sustainable and ecological aspects. The required insurances largely relieve him of worry as far as crop losses and poorer results through weather-related hazards are concerned.

The insurance industry's options

As the leading reinsurer, Munich Re supports the introduction of risk partnership as an instrument of agricultural policy in the EU. This would also make an indirect contribution towards maintaining an intact ecosystem and could thus protect our environment and the natural world. A suitable concept for this new insurance product could be developed with the knowledge of our agricultural team, which could be a driving force in its development and introduction.

BRITTA KSYK is a graduate agricultural engineer and an underwriter in the agricultural section at Munich Re.

PERSPECTIVES

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PERSPECTIVES

TODAY'S IDEAS FOR TOMORROW'S WORLD

Münchener Rück
Munich Re Group

The simplified environmental statement of the Munich Reinsurance Company 2001

Munich, 23rd April 2002

1 Introduction

Dear Reader,

In the year 2000 Munich Re further systematized its involvement for the environment with the introduction of an environmental management system and had itself examined by an external accredited environmental verifier in line with the EU Eco-Management and Audit Regulation. We are now pleased to present our second environmental report, which is aimed to bring you up to date on our endeavours in the cause of environmental protection and sustainable development. It will provide you with information on the main developments in the business year 2001 and the progress we have made towards reaching the environmental protection targets to which we have committed ourselves in our environmental programme for 2001–2003. **This environmental report is our simplified environmental statement as defined in the EU Eco-Management and Audit Regulation. It is valid for the Munich Reinsurance Company at its location in Munich.**

A report on Munich Re's environmental involvement in the year 2001 would be incomplete if it did not briefly mention two crucial events that had a major impact on our business operations that year.

Over and beyond other major loss events like the earthquakes in El Salvador and India, the sinking of the world's largest mobile oil production platform off the coast of Brazil, and the most expensive windstorm catastrophe in the history of Taiwan caused by Typhoon Nari, it was the terrible terrorist attack in the United States on 11th September that hit Munich Re hardest.

The second event to have a major impact on our business was the process of restructuring that we went through in the year 2001. It was the most comprehensive transformation in our company's 120-plus-year history.

Through a strategic reorientation of our organization in the reinsurance divisions that was geared to the market and to our clients we have created the structural framework we will need to maintain our ability to react quickly and flexibly to the growing demands of the market in the future. In the course of this restructuring process about 800 staff members took on new responsibilities, which involved numerous moves to different sections and workplaces.

These events naturally had major effects on our environmental management system and the attainment of our environmental protection targets. The comprehensive structural changes and their organizational and personnel impact now make it necessary to revise our environmental management system and its regulations governing accountabilities in the field of environmental protection. They also went hand in hand with a shift in our priorities for the year 2001, so that some of our environmental ambitions had to be put on hold for the time being. Other new aspects were adopted in our catalogue of action on account of current developments.

The following pages will put you in the picture as to what Munich Re has achieved in terms of environmental protection and sustainable development in the past year. We hope this will further stimulate a dialogue in partnership with you and look forward to your critical support.

Claudia Wippich Dirk Reinhard

2 Munich Reinsurance Company

Our company, our business

This environmental report (our simplified environmental statement) relates to the Munich Reinsurance Company (hereinafter referred to as Munich Re) at its Munich location. It is the parent company of the Munich Re Group.

Reinsurance companies are "insurers for insurers". By passing on part of the liability it assumes to a reinsurer, a primary insurance company (cedant) can insure risks that would otherwise exceed its economic strength because of their size or their hazardousness. The reinsurer receives that share of the primary insurer's income from the policyholder (premium) which corresponds to its participation in the risk and carries a share in any loss event that may occur.

Munich Re is a leading reinsurer and assumes risks in the following lines of business: life, health, accident, liability, motor, marine, aviation and space, fire, and the engineering classes (machinery, erection all risks, contractors' all risks, electronic equipment insurance, and others). Then come the "miscellaneous" risks, under which the remaining classes of property insurance are subsumed: burglary, glass, hail, water damage, windstorm, livestock, householders' and homeowners' comprehensive insurance, as well as credit, fidelity guarantee, legal expenses, travellers' baggage, and the specie insurance of private risks).

Munich Re offers preventive risk management and risk financing, tailor-made reinsurance solutions, innovative coverage concepts, and competent support with new technologies. In collaboration with specialist institutes and companies we perform fundamental work in the investigation of loss causes with the aim of minimizing and ideally preventing losses. Our experts advise primary insurers in the assessment and insurance of risks and support them in the process of assessing and adjusting losses. Service is also offered in areas that are not directly linked to the assumption of risks, such as in further training, consultation in connection with new products, international investments, and asset management for primary insurance companies;

Munich Reinsurance Company in figures (€ m)

cf. Annual Report of the Munich Reinsurance Company 2001

	2001	2000	1999
Gross premiums written	15,464	12,818	10,955
Investments	48,655	43,384	40,211
Net underwriting provisions	39,592	34,559	32,355
Shareholders' equity	4,449	4,228	3,951
Profit for the year	441	441	328
Dividend	221	221	168
Dividend per share in €	1.25	1.25	0.95
Share price at 31.12. in €	304.95	380	251.8
Market capitalization at 31.12.	53,961	67,239	44,548

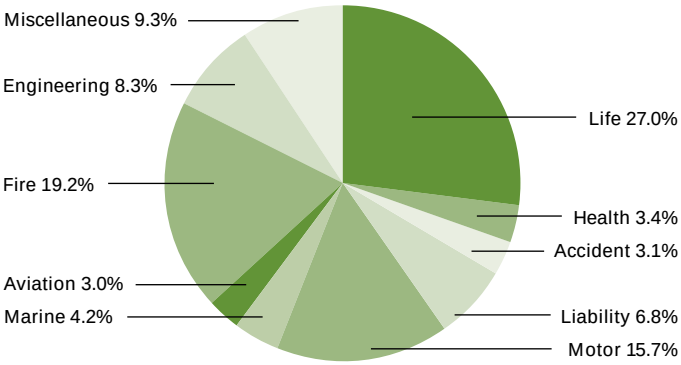
The fair value and carrying amount of Munich Reinsurance Company's most important investments (€ 000)

	Fair value	Carrying amount as at 31st December 2001
Real estate	2,564,006	964,097
Equity investments*	56,363,983	21,931,132
Fixed-interest securities	6,231,259	6,055,201

* Equity investments are share certificates and investment fund certificates as well as participations and shares in associated companies. The equity investments include the Munich Reinsurance Company's shares in Allianz (23%) and Allianz Life (40.6%); at 31st December 2001 the fair values were € 16.3bn and € 2.6bn respectively.

and in the use of electronic media, telecommunications, and the introduction of data-processing programs, e.g. expert systems.

The gross premium income by class of insurance is as follows:



The Munich Re Group

The Munich Re Group is active not only in reinsurance but also in primary insurance and asset management.

In the business year 2001 the Munich Re Group achieved 57% of its turnover from reinsurance. It services more than 5,000 clients in 150 countries throughout the world and is represented around the globe by about 60 Business Units.

The Munich Re Group includes the ERGO insurance group, incorporating the VICTORIA, Hamburg-Mannheimer, DKV, and D.A.S. insurance companies, and the Karlsruher life insurance and the Europäische travel insurance companies, thus offering a wide range of insurance solutions in the primary insurance sector.

A further field of business pursued by the Munich Re Group is asset management, which is handled by MEAG – a joint subsidiary of Munich Re and ERGO. MEAG is also responsible for the administration of our real estate. The Group's investments total some €160bn.

The Munich Re Group employs more than 35,000 people throughout the world.

3 Munich Re's environmental guidelines

The environmental guidelines form an integral part of our corporate strategy and are applicable throughout the Reinsurance Group.

Environmental protection and sustainability: our commitment
Preamble to the environmental guidelines of the Munich Reinsurance Company

As a leading risk carrier and provider of financial services operating worldwide, Munich Re acknowledges its responsibility for environmental protection and sustainability. Preserving the natural foundations of life is also a contribution to value-based management, as our economic success is inseparably linked with protection for people, the environment, and physical resources.

Seeing opportunities in risks
As reinsurers, we support and safeguard innovative technologies and large industrial projects. The risks associated with these form the focus of our interest and responsibility, both locally and globally. We use our knowledge of climatic and environmental changes – which are increasingly caused by man – to manage risks by consistently promoting preventive measures. In our financial sphere, we take account of environmental criteria when taking investment decisions. Through our investments we promote suitable environmental related projects, and we observe ecological aspects when managing our property investments. In close cooperation with our clients we develop our services further on an on-going basis in order to continually reduce environmental damage and environmental risks for everyone's benefit and to exploit the business opportunities inherent in the risks, both today and tomorrow.

Acting prospectively at our business locations
We aim to reduce as far as possible the environmental impact arising from our business operations and in connection with the use of our properties. Besides complying with statutory provisions, of course, we also need to pay particular attention to consistently avoiding waste and emissions, as well as to reducing our energy and water consumption. To this end, we orient ourselves towards the highest technical standards wherever economically reasonable. We also choose our suppliers and service providers according to these principles.

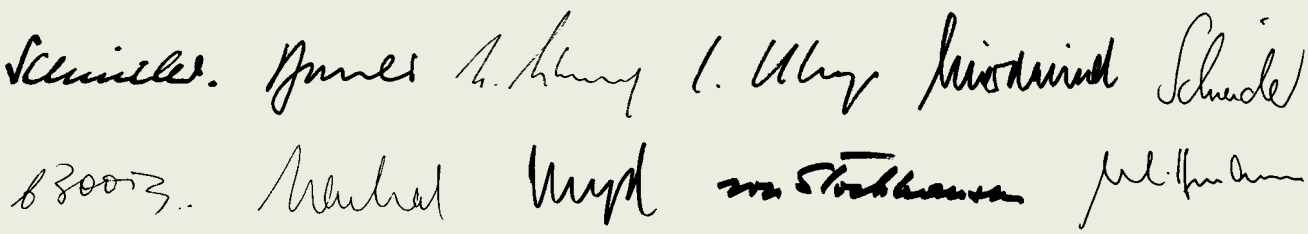
Learning from each other through dialogue
Intensive research and development help us to assess current and future risks and to find appropriate starting points for our environmental related activities. This enables us to exert a positive influence on our partners' risk behaviour, in order to meet the challenges of the future together. We take our knowledge and experience to the public at large and encourage the exchange of information on relationships in the area of environmental risks. We communicate openly on the subjects of the environment and risk, both in-house and with the outside world.

Taking responsibility with commitment
Our staff are responsible for implementing the environmental guidelines in their particular area of influence, observing the environmental impact of their actions and decisions. We agree concrete goals which we document each year in our environmental programme and against which we measure our performance. By means of targeted training and promotional measures as part of our environmental management system, we are continually developing our professional and personal skills as regards environmental protection and sustainability.

On the basis of our vision and our guiding principles, we declare these to be the general principles of our dealings.

The Board of Management of the Munich Reinsurance Company

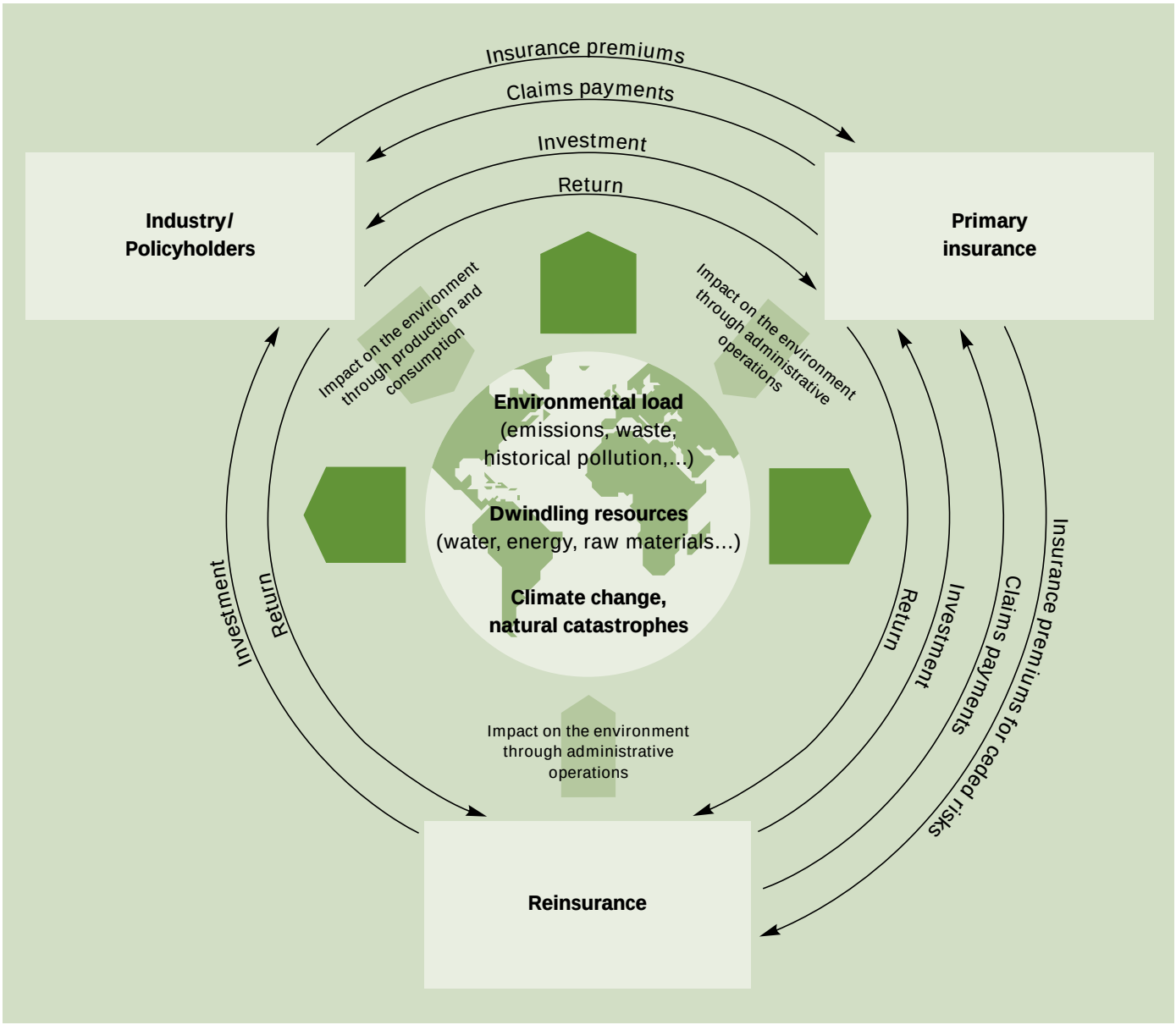
Munich, September 2000



4 Product ecology

Can a reinsurer and financial services provider use its products and services to have an impact in terms of environmental protection and sustainable development? Exerting an influence would at first sight appear difficult and only indirectly possible. This needs explaining. On the one hand, Munich Re assumes its clients' risks, i.e. primary insurance companies' risks, throughout the world in the form of reinsurance. On the other hand, it invests capital coming, for example, from its premium income. Primary insurance companies are (like Munich Re itself too) administrative firms and are only slightly involved in the causation of detrimental environmental influences. The diagram below shows the interaction between policyholders (private persons, industrial companies, etc.), primary insurance companies, and reinsurers and reveals the connections in the areas of risk assumption, risk transfer, and investment.

Leading reinsurers throughout the world have already registered in the past a dramatic increase in weather-related and climate-related catastrophe losses. The global climate will also continue to be affected by man-made changes in the future, as leading scientists confirm, and these changes will be accompanied by dramatic increases in natural catastrophe events. The economic effects on the insurance industry find expression in two forms: in claims payments that are likely to continue increasing and in the capital market's reaction to events that are capable of having a major impact on the worth of investments.



The subject of environmental protection and sustainable development is characterized by strong dynamism in the financial services sector too. In the following sections therefore, we will – besides reporting on the environmental programme – also go into some detail in each case on individual subjects that have emerged as a result of such current developments.

Climate change strategy

On account of the "double exposure" described above, environmental protection and in particular climate protection are a business case for Munich Re in terms of both reinsurance and investments.

We aim – in our own business interest – to make a contribution towards averting or at least attenuating the risks that have been predicted. We will examine the implications on our business even more closely than before and on the basis of this examination conceive measures that will make it possible to adjust to the predicted trends and to cope with them. We have these risks in focus and the opportunities this development offers and we are integrating them more and more in our business decisions. The main aspects of this climate change strategy are currently being worked out by a group of experts. It will embrace all sections of our reinsurance business, risk assessment, loss prevention, product development and design, and loss management. But it will also relate to the integration of "sustainable" criteria in our investments, so that here too we will be in a position to avoid risks arising from climate change or its causes for the value of our investments as far as we can.

Flexible instruments in the framework of the Kyoto Protocol as a new field for business?

In November 2001 representatives of governments from all over the world agreed that the Kyoto Protocol, aimed at the reduction of greenhouse gases, should now be ratified without delay. International experts, it is true, say that global emissions of these greenhouse gases need to be reduced much more than called for in the protocol if the global increase in temperatures is to be limited to a tolerable measure (cf. Section 8 of the ENVIRONMENTAL MAGAZINE). Nevertheless, the ratification of the Kyoto Protocol will have an important signalling effect, and Munich Re certainly holds this international agreement on climate protection to be a very important first step.

There are other important instruments for the reduction of greenhouse gas emissions incorporated in the Kyoto Protocol, the so-called flexible mechanisms:

– Emissions trading
– Climate protection projects in the form of joint implementation projects (JI) in industrialized countries
– Climate protection projects in the form of clean development mechanisms (CDM) in developing countries

More detailed information may be found at the website of the United Nations Framework Convention on Climate Change at http://unfccc.int/.

Projects and investments that are performed in the framework of the flexible instruments entail a whole number of risks that can be covered using the familiar insurance solutions (e.g. marine, liability, machinery, etc.).

In addition, however, they involve some new types of risk. In the course of the transactions within the framework of emissions trading, for example, there are issues that need to be straightened out relating to the seller's liability. When calculating the cost of climate protection projects – such as the reconditioning of a power station or the construction of a wind farm – due consideration is also paid to the returns from the sale of excess emission rights. If a power station fails to operate correctly or if wind turbines are damaged, this will have an additional effect on the return from the sale of emission rights.

Munich Re followed the developments very closely in 2001. In 2002 we will make our plans in this respect more concrete and pursue the possibility of product development.

4.1 Reinsurance

Numerous measures were agreed with the reinsurance pilot areas (cf. Munich Re's Environmental Report 2000) within the framework of our environmental programme. The majority of these measures were successfully implemented in 2001. On account of the restructuring of our reinsurance divisions at the beginning of 2001, however, we had to change the priorities for a number of projects. This was influenced even further by the effects of the events on 11th September 2001. We now present a short status report on those projects that we had intended for 2001 in the reinsurance sector:

Goal: To enhance the impact of liability law on environmental policy

Measure	Deadline	Status	Comment
Produce an expert report on European environmental liability insurance for the EU Commission	03/01	completed	The report will be published in 2002 as part of book project planned by the Springer publishing house.
Produce an expert report on European environmental liability insurance for the Federal Environmental Office	05/02	in progress	Munich Re is a member of a research group led by Prof. Juliane Kokott (Universities of St. Gall and Heidelberg) that has been commissioned by the Federal Environmental Office to conduct a research project called Environmental Liability in International, European and National Responsible Regimes and Methods of Damage Assessment. The focus is on "pure environmental damage". Goal: Analysis of various national liability regimes (e.g. USA, UK, I, F, NL) and suggestions for German legislation.

Goal: To promote our clients' knowledge in the fields of environmental protection and environmental management through information and training

Measure	Deadline	Status	Comment
"Environmental management systems" This brochure will inform insurers on the most important aspects of various EMSs in the assessment of environmental liability risks.	10/01	in progress	Postponed until 2002. The Association of German Insurers (GDV) has meanwhile published a guide which recommends its members to give constructive thought to the implementation of an environmental management system in accordance with EMAS or ISO 14001. This recommendation was strongly supported by Munich Re, which is represented in the Presidential Council and the Presidential Committee of the GDV.
Incorporate the subject of risk reduction through environmental risk management in training courses for staff and cedants	03/01	completed	In our complete revision of the themes and content of our seminar programme for our cedants and staff we have incorporated the topics of environmental risk analysis and environmental management in various events.
Produce various brochures with information for insurers relating to environmental risks: – Surface cleaning of metals – Environmental risks in industrial agriculture – Flat-bottom tanks – Treatment walls – a new technology for groundwater remediation	06/01	completed	These leaflets were distributed among our German clients. Our international clients will be supplied with them by our International Organization.
Launch a tool for assessing risks involving environmental liability for the international market (initially EU): NATURE	12/01	completed	The brochure and demo version of the new software tool were distributed to the Munich Re Business Units. The product is also being marketed in client seminars and during visits.

Goal: To promote the knowledge and awareness of complex connections in our insurance fields through scientific investigations

Measure	Deadline	Status	Comment
Support a thesis and dissertation on the subject of agricultural insurance and the environment	on-going	in progress	One of our new staff is at present writing a dissertation at the Institute for Agricultural Engineering, Weihenstephan, with the title "Analysis and adjustment of error in the local calculation of yield in combine harvesters to derive a standardized algorithm for yield mapping". This dissertation is intended to contribute towards promoting towards promoting the use of modern information technologies in the service of environmentally sound and sustainable agriculture. Completion date: around June 2002. The results of the work are to flow into acorresponding product development in the sector of crop insurance.
In collaboration with recognized institutes and organizations set up a project dealing with the subject of environmentally sound and sustainable agricultural production	on-going	in progress	

Goal: To support environmental activities through innovative products and extensions of cover

Measure	Deadline	Status	Comment
Make initial preparations for the introduction of state-funded multi-peril insurance for animal and plant production in Germany and the EU, with a mandatory requirement of site-specific crop management and the application of good professional practice.	10/01	completed	The concept of a new agricultural insurance system based on a risk partnership between agriculture, the state, and the insurance industry was presented in March 2001. More information on this may be found in an in-depth article in the magazine section. In collaboration with the Technical University at Weihenstephan a simulation study was performed in 2001 on the effects of multi-peril crop insurance on the financial situation of agricultural establishments. A simulation study on the subject of livestock epidemics is currently in progress. Completion date: May 2002.

The responsibilities for measures aimed at developing concrete pointers and aids relating to environmental issues during risk inspections and in the evaluation and settlement of claims changed in the course of restructuring so that the implementation of these measures was postponed until 2002.

4.2 Finance

Sustainability and Munich Re shares

Sustainability is playing an increasingly important role on the international capital markets. Investments that take ecological and social criteria into account as additional aspects achieved a 50% higher growth rate in the United States than conventional shares. The volume of environmental funds sold in Germany rose by approx. 50% in 2001. The so-called engagement strategy is also widespread particularly among asset management firms in the United Kingdom. This means that if asset managers have any reservations about environmental standards or business practices, they enter into a direct dialogue with the companies they have invested in or make use of their voting rights at AGMs.

Our inclusion in the Dow Jones Sustainability Index and the FTSE4Good Index shows that Munich Re meets the demands placed on sustainable investment in terms of its shares too.

The mounting significance of sustainability criteria has been reflected particularly in the stark increase in inquiries from investment funds and research companies that are concerned with sustainability in the context of investment decisions. In the second half of 2001 we received about 25 inquiries and questionnaires on this subject.

In order to be in a position to cope with the increasing number of inquiries and at the same time to present Munich Re's activities in a proper light, we have developed a policy of close cooperation between Investor Relations, Human Resources, and Environment over the past year. We hope to further intensify our communications with representatives from the field of sustainable investment in the year 2002, and are doing all we can to create the necessary conditions for such a dialogue.

More information on this subject may be found at http://www.sustainability-indexes.com and http://www.ftse4good.com.

Analysis of the connection between sustainability and financial performance

There is no contesting that environmental protection and sustainability have established themselves as serious competitive factors. However, when looking at an investment in terms of its return the question continually arises as to what concrete connections actually exist between ecological and social aspects and the economic success and performance of investments. Although there are a few studies that have been published which attempt to find a solution to this question, none of them in our opinion come up with a satisfactory answer.

In September, therefore, Munich Re decided to take part in the project "Environmental and Sustainability Transparency for the Stock Markets" organized by the Institute for Environmental Management and Business Administration at the European Business School (EBS).

The objective behind this project, which has the financial backing of the Federal Ministry of Education and Research, is to find out what environmental and social criteria have a positive influence on the value of a company.

Besides analysing these connections, the project will also examine the flow of environmental and social information between analysts and companies. Information formats and key figures for evaluating environmental performance and sustainability strategy are also to be developed and tested.

On account of the complexity of the subject it was of decisive importance that our colleagues in Investor Relations, Human Resources, and Finance not only declared their willingness to actively support our participation in this research project but have also supported it with great enthusiasm.

The project will be concluded in November 2002. We hope that the results will lead to a better acceptance of sustainability aspects in the field of investments. We also expect a great improvement in the communication of environmental and social information with analysts.

More information may be found at http://www.instoec.de/indexing.htm.

Implementation of measures in our environmental programme

The adoption of our environmental programme at the end of 2000 set the scene for a more intensive consideration of the subject of sustainability in the sector of finance too. This was given further impetus at the beginning of 2001 by the Board of Management's resolution that the aspect of climate risks in asset management should be dealt with comprehensively within the framework of a climate change strategy that was to be developed. This made it necessary to adapt the measures in the environmental programme to the new requirements of the discussion process.

Goal: Anchoring sustainable criteria in our asset management

Measure	Deadline	Status	Comment
Add sustainability and environmental criteria to Munich Re's in-house catalogue of criteria for investments	03/01	in progress	The catalogue of criteria was produced. MEAG are examining the conditions necessary for its implementation.
Examine the potential for investing in shares and funds with a particular focus on sustainability	03/01	in progress	MEAG was commissioned with the task of developing a concept.
Examine the potential for investing in funds with a particular focus on sustainability	12/01	in progress	A concept is to be developed that is based on the results of the feasibility study.
Examine the potential for setting up such funds for third parties too	12/01	in progress	MEAG was commissioned with the task of developing a concept.
Gather information on an ongoing basis regarding environmental aspects at companies in which we have shareholdings and discuss questions that emerge in Supervisory Board meetings	03/01	in progress	The main industrial companies in which we have shareholdings have been examined in terms of their environmental impact. Based on this examination a catalogue of questions was developed which is to be distributed at Supervisory Board meetings and which is to indicate potential for improvements. It is now at the fine-tuning stage.
Broaden the information basis for our asset management and intensify research in the area of sustainability	06/03	in progress	
Draw up a concept for the implementation of environmental protection measures in property used by third parties	06/03	in progress	MEAG was commissioned with the task of developing a concept.

Our two finance divisions are responsible for the implementation of the measures in the field of asset management. Fin-FMC (Financial Management and Consulting) are concerned with the investments we hold for trading purposes; Fin-Kon (Group Investments) is responsible for, among other things, our strategic participations in companies and also looks after Munich Re's memberships on supervisory boards.

Active securities trading and the administration of Munich Re's extensive real estate used by third parties is the responsibility of MEAG MUNICH ERGO AssetManagement GmbH. MEAG is the joint asset management company of Munich Re and ERGO.

On account of the fact that Fin-Kon and Fin-FMC have overlapping tasks and very similar objectives in the environmental programme it soon became clear that closer cooperation than ever was required.

The largest project was the development of a suitable strategy for asset management within the framework of our climate change strategy. The tasks involved were linked up with the measures prescribed in the environmental programme. There are four central tasks with which MEAG has now been commissioned:

– Investigate the degree to which our investments are exposed to hazards related to climate change.
– Examine current investments in terms of sustainability. The yardstick for this is a comprehensive catalogue of criteria for the integration of sustainability criteria in investments, which includes both absolute and relative criteria (best-in-class criteria) and negative criteria.
– Develop a concept for a test portfolio using the best-in-class approach.
– Assess the applicability of sustainability criteria in future capital decisions under the aspects of risk and return.

5 Operational ecology

In the year 2001 we continued to keep a watchful eye on environmental protection in our own operations, which means avoiding and reducing harmful environmental effects that can be caused by our business activities at our Munich location.

Our Munich location embraces at present eleven office buildings and the grounds between Leopoldstrasse and the English Garden. It accommodates workplaces for approx. 2,500 staff. Besides offices and meeting rooms, the buildings also house the necessary infrastructural installations: kitchens and dining rooms, cafeterias, the computer centre, the international training centre, underground car parks, and the staff centre, all linked by underground passages. Because of the steep rise in staff numbers in recent years and the refurbishment of our office building South 1, which was ready for opening in April 2002, we have had to rent temporary office space for approx. 900 staff in buildings in the vicinity.

The following areas are of particular relevance in environmental terms:

– the hydraulically-operated conveying equipment (e.g. passenger/goods lifts),
– emergency generators (storage of diesel fuel),
– refrigerating plants (use of refrigerants),
– the rainwater utilization plant (water treatment),
– the garage,
– nursery and gardening,
– print film development.

Some examples of environmental protection in the operations at the Munich location

Optimizing data collection
Collecting the enormous volume of data for the environmental audit involves a considerable amount of work and requires the help of numerous colleagues from General Services, IT, and Accounting. Over the past year we have therefore given serious thought to the question of making the collection and analysis of the data more efficient for all concerned. In a joint project with our IT colleagues we put our environmental audit on a "more professional" basis. The result is a database tool that makes data collection much easier and provides more sophisticated opportunities for analysing the data.

Our environmental data was first collected at this level of detail in 1999. Now we can look at these figures for three years altogether, so that this year we are for the first time in a position to make time-series analyses of individual key figures, e.g. the consumption of paper or water.

The key figures and chart of accounts for the environmental audit are in line with the recommendations of the Association for Environmental Management in Banks, Savings Banks, and Insurance Companies (VfU). The VfU's environmental auditing principles have been accepted by and large throughout the financial services sector.

Environmental review 2001

FIXED ASSETS

Input		As at 31.12.2001		Output
697.54 m²	Land	39,590 m²	Land	0 m²
0 m²	Building area (net)	103,167 m²	Building area (net)	0 m²
10 pcs.	Building facilities and fixtures	403 pcs.	Building facilities and fixtures	0 St.
569 pcs.	Technical facilities and vehicles	1,748 pcs.	Technical facilities and vehicles	171 pcs.
3,594 pcs.	Office equipment	58,434 pcs.	Office equipment	935 pcs.

CURRENT ASSETS

Input		As at 31.12.2001		Output
24,524,000 sheets 26,691 pcs. 345,790 pcs.	Paper - Copying paper - Sheet pads - Envelopes, padded envelopes	6,074,800 sheets 2,145 pcs. 36,489 pcs.	Paper Printed office paper, forms, envelopes	387,813 pcs.
51,363 units	Office articles	75,285 units	Refill articles	4,504 pcs.
18,500 units	Advertising gifts	12,757 units	Advertising gifts	41,201 units
29,082 pcs.	Electronic data media	26,926 pcs.	Electronic data media	2,999 pcs.
88,136 kg (P)	Incoming mail	–	Letters Packages	42,019 kg (P) 85,977 kg (P)
329,257 pcs.	Packaging	1,190 pcs.	Packaging (out)	9,257 pcs. (P)
800,207 kg (P)	Food, beverages, tobacco	14,063 kg	Food portions	481,620 portions

WATER

	Input	As at 31.12.2001		Output
63,850 m³ (P)	Drinking water	0 m³	Waste water	64,600 m³ (P)
750 m³ (P)	Rain water	n.r.		
n.r.	Groundwater and surface water	0 m³		

ENERGY

	Input	As at 31.12.2001		Output
9,441,031 kWh	Electricity		Energy output (collectible energy, waste heat from technical installations)	n.r.
10,949,479 kWh	District heating		Supplied electricity (in-house generation of electrical energy)	0 kWh
50 l	Emergency diesel (not for heating)			

(P) = projection; n.r. = not recorded

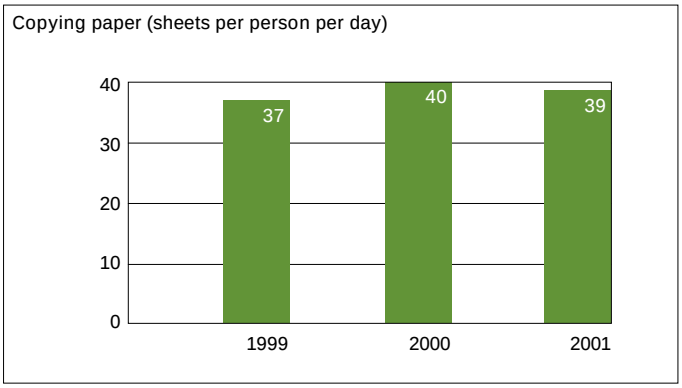
Procurement

The greatest potential for exerting an influence in the field of resource management, i.e. in the observation of all movable material, is to be found without any doubt in the area of procurement. We aim to incorporate environmental criteria increasingly in the procurement of the materials required in the company in addition to economic and technical aspects.

The focus of the past year has been on the following:

– Office paper:

A glance at the figures showing the development of paper consumption (approx. 40 sheets a day for each staff member in recent years) and the associated consumption of resources makes it clear that there are considerable potential savings in this area.



In order to take full advantage of this potential in the future, the following measures were prepared and scheduled for implementation at the Munich location at the beginning of 2002:

– Replace elemental chlorine-free paper with bright white total chlorine-free paper for external documents.
– Introduce recycled paper for use in printers and copiers for all kinds of internal documents.
– Provide staff with full information on saving paper when printing and copying.

There was an intensive preparation phase during which it was possible above all to answer questions relating to the throughput of the new types of paper in the technical systems installed in Munich and the economic and logistic effects. This was followed by a three-month test phase, during which about 30 staff in a wide variety of functions tested the new types of paper, and especially the new recycled paper, in their daily work in the office. The results of the test phase were surprisingly positive so that we can expect the changeover to the new types of paper throughout the company to be a great success.

– IT hardware:

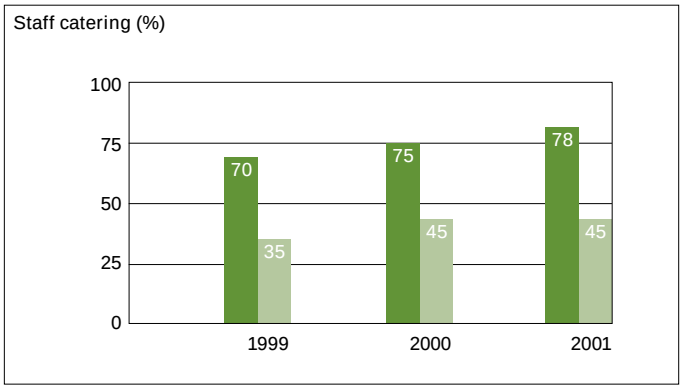
In this respect, power consumption is not only a serious environmental factor but also an economic one. The production and disposal of IT hardware go hand in hand with a high consumption of resources. At the same time we regard it our duty to protect our staff and the environment from unnecessary strains from pollution and radiation. In terms of cost efficiency, it is also in the company's interest to minimize its financial risks by taking advantage of the manufacturer's obligation to accept old equipment.

For this reason we have drawn up a catalogue of ecological criteria for various types of IT hardware (laptops, printers, screens, PDAs, etc.) that leans very heavily on the relatively strict requirements of Germany's Blue Angel environmental label system. These requirements were also extended for the most part to types of equipment for which no Blue Angel label is awarded (servers, routers, etc.).

The first thing to do now is examine how far our hardware suppliers are able to meet these requirements without neglecting the cost aspect and the technological functionalities. An important role will also be played by the signalling effect that is achieved if a company like Munich Re includes ecological criteria in its functional requirements for hardware.

– Staff catering:

Cooperation with regional suppliers has always been one of the basic principles pursued by the Munich Re's kitchen management in its daily purchase of foodstuffs. In addition to short delivery routes (and times) this regional approach contributes to a relationship of trust between suppliers and Munich Re which is indispensable in the sensitive food sector. In 1999 regional products accounted for 70% of the products served to staff, a figure that was increased to 75% in 2000.



Besides concentrating on regional products, we also endeavour to offer a wide range of vegetarian products. Particularly under the influence of the BSE crisis, the proportion of vegetarian products increased from 35% in 1999 to 45% in 2000. This also reflects the general trend towards a lighter diet. For about two years now, the subject of ecological products has been included in the planning of our kitchen operations. Although purchasing ecological products is sometimes still a logistic challenge for a large kitchen like Munich Re's (producers are often not geared to coping with such large orders) and the prices often exceed our catering budget, the proportion of ecological products at Munich Re already reached 5% in the year 2001. This is certainly an area where there is still a great potential for development, a potential that is not so easily exploited, however, because of the reasons stated above. Nevertheless, we aim to increase the proportion of ecological products we use.

– Office furniture:

In the large-scale procurement of office furnishings for the refurbished South 1 Building, we gave considerable thought to ecological requirements. Although proof of environmental compatibility has long been a matter of course in our selection of suppliers, we have repeatedly found that there is still room for improvement. In the case of South 1, for example, we concerned ourselves not only with the demands on the product itself but also held in-depth discussions on the production methods used in manufacturing the office furniture. We were unable to draw on generally accepted environmental norms for office furniture, like the ecological guide for IT hardware, because at the European level, for instance, they are still in the development phase. As an alternative, however, the exchange of experience with environmental officers who are faced with similar problems in other companies has proven very worthwhile.

On the basis of our experience, we are planning to develop a detailed catalogue of criteria for environmental requirements with regard to office furniture in 2002.

http://europa.eu.int/comm/environment/ecolabel/producers/pg_furniture.htm

Goal: To raise the proportion of materials procured in line with ecological criteria

Measure	Deadline	Status	Comment
In cooperation with the units involved in the procurement process: – Search for ecological alternatives – Define ecological criteria – Examine "technical" practicability – Decide on implementation Particularly for standard products (e.g. paper, IT hardware)	03/01	completed	see above
Produce lists of ecological criteria successively for further product areas (office furniture, vehicles, etc.)	09/01	completed	see above and the section on transport

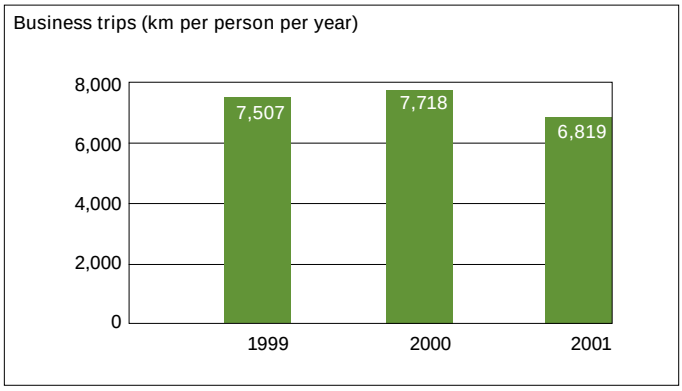
Goal: To lower CO_2 emissions

Measure	Deadline	Status	Comment
Attain a further 5% increase in the proportion of regional foodstuffs, coupled with controls of suppliers and manufacturers	12/02	completed	see above
Create incentives for more travel by rail, create incentives for changing over to public transport	on-going	partially implemented	Introduction of the product "Fly and Ride" in September 2001. This means that our staff are entitled to use their inner-German air ticket for free travel on public transport systems in the departure cities and destinations.

Transport

As far as the company cars for senior-executive staff are concerned, we put our faith in their environmental awareness through voluntary commitment. As car exhaust technology has undergone continuous improvement in recent years, the emission of CO_2 per driven kilometre has become the most important criterion. A guide has been written specifying which vehicles are still acceptable from an environmental point of view.

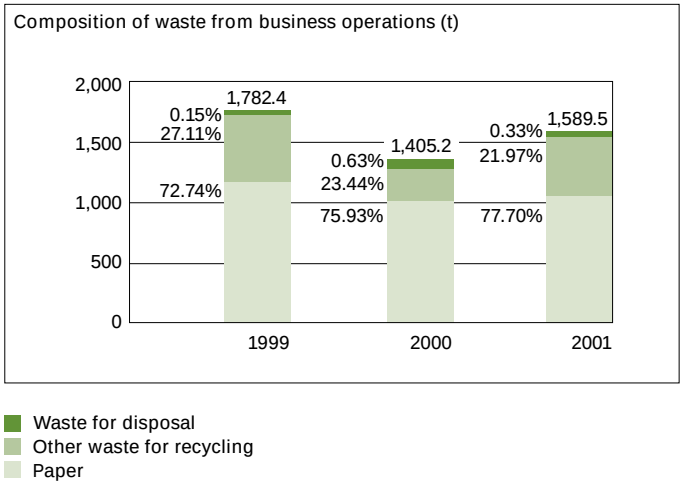
At the same time we are looking into ways of making it possible to use alternative propulsion systems.



The development of business trips in 2001 is marked by a decrease of approx. 11% compared with the previous year. The main reason for this drop in the average volume of travelling is to be found in the reorganization of Munich Re. In the new structure each of our clients has only one person to approach as their main contact. This also leads to more efficient travelling in the servicing of our client relationships.

Waste disposal

In 2001 Munich Re signed a contract governing the reconditioning and reselling of IT hardware on the basis of ecological principles. An important criterion for Munich Re in signing this contract was that reusing equipment was a positive way of avoiding waste. Used but still operable equipment is examined and then sold to staff at preferential conditions or put on offer at the Internet marketplace run by recycle it GmbH (more information at www.recycle-it.de).



The composition of waste from our business activities has remained more or less constant in recent years, with about three-quarters of it being paper waste and one-quarter other waste for recycling. The fact that the volume of paper waste increased again in 2001 is due to an extensive destruction of files in the wake of internal moves after the restructuring of the company.

WASTE

	2001	2000
Waste from business activities	**1,589.5 t**	**1,405.2 t**
Paper for recycling	**1,235.0 t**	**1,067.0 t**
Other waste for recycling	**349.2 t**	**329.3 t**
Waste not requiring monitoring (recycling)	**147.3 t**	**142.6 t**
– Glass	16.6 t	16.3 t
– Metal	7.7 t	7.3 t
– Plastics	6.2 t	6.0 t
– Polystyrene	0.0 t	0.0 t
– Biowaste (compostable waste)	80.1 t	78.5 t
– Food scraps	36.7 t	34.5 t
Waste requiring monitoring (recycling)	**200.7 t**	**185.9 t**
– Mixed household waste	195.5 t	181.2 t
– Contents of grease traps	2.5 t	2.5 t
– Electronic scrap (IT equipment)	2.7 t	2.2 t
Waste requiring special monitoring (recycling)	**1.2 t**	**0.9 t**
– Developing agents	1.1 t	0.7 t
– Fixing agents	0.2 t	0.2 t
– Mixtures of solvents	0 t	0 t
Waste for disposal	**5.3 t**	**8.8 t**
Waste requiring monitoring (disposal)	**2.7 t**	**4.5 t**
– Electronic scrap (data media)	2.7 t	4.5 t
Waste requiring special monitoring (disposal)	**2.6 t**	**4.4 t**
– Contents of sludge trap in car-wash	1.4 t	0.6 t
– Operating resources containing oil	0 t	< 0.1 t
– Used oil	0 t	0.4 t
– Solvents	1.2 t	2.9 t
– Laboratory chemicals	0 t	0.4 t
– Fluorescent tubes	3,785 pcs.	3,740 pcs.
– Energy-saving bulbs	1,466 pcs.	2,420 pcs.
– Batteries	0 t	0.03 t
Waste from building projects	**3,757.5 t**	**9,438.4 t**
Mineral construction materials	3,512.2 t	8,851.7 t
Metal construction materials	15.0 t	337.4 t
Insulating and sealing materials	1.5 t	11.0 t
Wooden materials	51.7 t	101.2 t
Plastics	0.3 t	17.1 t
Charge materials and fuels	0 t	120.0 t
Biological materials	143.0 t	2,812.4 m^3
Mixed forms	33.8 t	74.5 m^3

Planning and construction of property for our own use

In the year 2001 two construction projects have really kept us on our toes: the refurbishment of our office building South 1 (we reported about this in the last issue) and the construction of our new office building Münchener Tor on Munich's northern ring road. Scheduled for completion at the end of 2003, Münchener Tor will provide about 1,000 workplaces in an ensemble comprising a low six-storey building, an entrance hall, and a 22-storey tower. The majority of this office space will be used for Munich Re staff. In the planning of this new building all the materials to be used were assessed in ecological terms. This assessment ranged from the production of the raw materials to their disposal e.g. on the basis of such criteria as toxicology, power consumption, regenerability, local availability. On the basis of a critical ecological assessment, a rigorous search was made for alternative materials.

Furthermore, in line with the criteria developed last year for the planning and construction of property we use ourselves, an ecological energy plan was developed for this building too. This results in an overall saving on electricity in comparison with a conventional office building of over 40%. The building's CO_2 emissions will be over 430 t a year lower too. These are the key points of the energy plan:

– Natural ventilation using the upward flow of air through a chimney
– Intake-air conditioning through an underground duct
– Thermal mass of concrete floors for the cooling and heating of building components
– Closed-circuit cooling systems for free cooling at night
– Free groundwater cooling of the ceilings by day using extraction and injection wells

Goal: In construction and refurbishing projects holistic observation in the light of ecological aspects for the whole period of use

Measure	Deadline	Status	Comment
Update and develop existing lists of criteria for the construction/refurbishment of property we use ourselves. Successively implement criteria specified in the lists for the construction/refurbishment of property we use ourselves	on-going	completed	see above
Formulate contractual requirements for planners and technical planners with regard to reducing the consumption of resources and the emission of pollutants, using renewable energy sources, and producing the necessary documentation (e.g. input/output sheets)	on-going	completed	see above

Use and upkeep of our property

In the year past we have again focused on reducing our consumption of resources in the use and upkeep of our office buildings. Comprehensive measures were taken that will form the basis of our systematic energy management in the future. In 2001, for example, all the consumption meters in our office buildings that are connected to our central process control system were linked up to a trend monitoring system. The data are analysed and entered into monthly reports on the consumption of energy in the various office buildings. There are still gaps in the readings for water consumption. This deficiency is to be remedied in the current year.

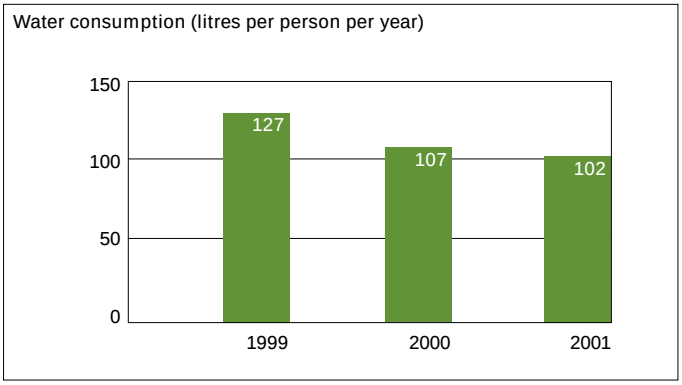
The figures for water consumption stated in the environmental audit for the year 2001 are based on a projection. Owing to the gaps in the readings, we will not be able to give exact figures until in April when the meter readings are published.

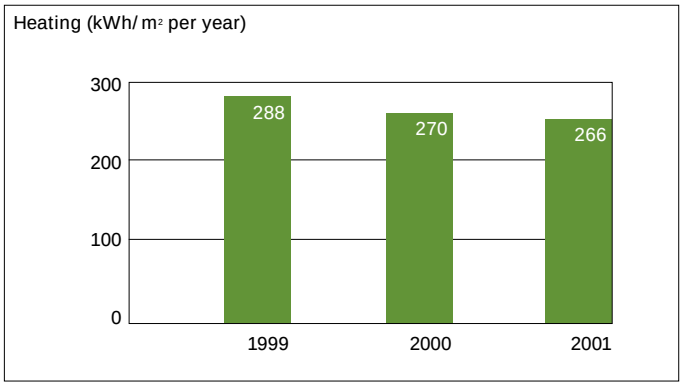
As we have optimized the backwash cycles of the water treatment systems and installed flow controllers in the kitchen area, however, we assume that the specific water consumption will have been reduced.

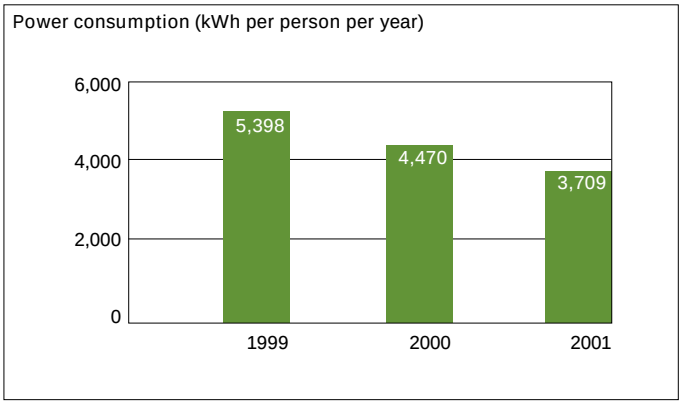
Nevertheless, the consumption of water overall has increased due to the increasing numbers of staff.

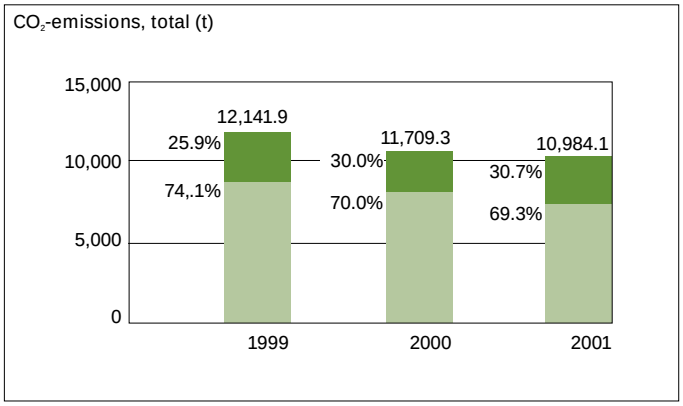
Our consumption of power and district heating was reduced, in some cases substantially. This is due among other things to the continued improvements in the running times for the air-conditioning and refrigeration facilities.

We have now made progress in our efforts to replace the traditional lamps with newly developed energy-saving bulbs where this had previously been impossible due to the lack of suitable product groups.









Goal: To save resources

Measure	Deadline	Status	Comment
Introduce systematic energy management in order to optimize the use of the operating installations (with regard to power, district heating, and water)	12/01	almost fully implemented	see above
Reduce the specific water consumption by approx. 10%	12/01	completed	see above and also "The Munich Reinsurance Company's key environmental figures 1999–2001 at a glance"

The Munich Reinsurance Company's key environmental figures 1999 – 2001 at a glance

		2001	2000	1999
Staff at Munich location		2,545	2,356	2,182
Power consumption	kWh per person per year	3,709	4,470	5,398
Heating	kWh/m^2 per year	266	270	288
Water consumption	litres per person per day	102	107	127
Copying paper	sheets per person per day	39	40	37
Business trips	km per person	6,819	7,718	7,507
CO_2 emissions	kg per person per day	17.3	19.9	22.3
Waste from business operations	kg per person per day	2.5	2.4	3.3
Staff catering				
Proportion of regional products	%	78	75	70
Proportion of vegetarian products	%	45	45	35

6 Environmental management

The work processes at Munich Re form the basis of our environmental management system, which has been validated in line with the EMAS Regulation since the end of 2000. Environmental protection aspects are firmly integrated in each of the concrete phases of the process flow (cf. Environmental Report 2000). Consequently, the main accountability for the implementation of environmentally related measures lies with those responsible for the respective work processes at Munich Re, the Divisional Units and the Central Divisions. We have thus created a platform that permits us to control all environmental activities systematically and to achieve our goals successively in terms of environmental protection.

Our targets and the programme of action drawn up by Munich Re in the realms of environmental protection and sustainable development are specified in our Environmental Programme 2001–2003, which may be accessed in the Intranet by all our staff. In each section of this report there is a table showing in brief form the extent to which the various measures in the environmental programme have been implemented.

In the year 2001 our environmental management system was affected by the most comprehensive programme of restructuring that Munich Re has ever achieved in its 120-plus-year history. The strategic reorientation of our reinsurance divisions has created the structural framework we need to maintain our ability to react quickly and flexibly to the growing demands of the market in the future. With effect from 1st July 2001 the old matrix organization of underwriting and regional divisions was replaced by seven new operative divisional units. One person in each of these operational units has the overall responsibility for client relationships, so that each of our clients has only one main responsible contact.

Merging our staff into the new organizational units not only involved the extensive process of filling the jobs inherent in the new structure but also meant that between May and July approx. 950 people had to move to different locations. The new distribution of work naturally has an impact on our environmental management system.

Now that the new organization has been put on a firm footing, the environmental management system must be adjusted to the new structure. This is what we have planned for 2002. On account of the restructuring process, it was necessary to postpone projects aimed at extending the environmental management system to other insurance areas and the international organization.

The seven new operational units for reinsurance business at a glance:

EUROPE 1
Together with our international organization, this division looks after our clients in Germany, Austria, Switzerland, Eastern Europe, Turkey, the Turkic states, Greece, Cyprus.

EUROPE 2 AND LATIN AMERICA
Together with our international organization, this division looks after our clients in the United Kingdom, Ireland, Denmark, Sweden, Norway, Finland, Iceland, the Netherlands, France, Belgium, Luxembourg, Italy, Malta, Spain, Portugal, Latin America.

ASIA, AUSTRALASIA, AFRICA
Together with our international organization, this division looks after our clients in Asia, Australasia, South-East Asia, Greater China, Africa, and the Middle East.

NORTH AMERICA
This division is responsible for our two subsidiaries American Re and Munich Re of Canada.

SPECIAL AND FINANCIAL RISKS
This division focuses on the development of innovative product ideas and new marketing channels, the opening of new client segments, and credit and aviation and space insurance.

CORPORATE UNDERWRITING/GLOBAL CLIENTS
This division looks after global clients and also carries supraregional and suprastructural responsibility for all basic issues of underwriting, mathematics, and loss management in the non-life business of our worldwide organization.

LIFE AND HEALTH
This division processes our global life and health business, an arrangement that corresponds to the structure at many of our client companies.

Goal: To extend Munich Re's environmental management system

Measure	Deadline	Status	Comment
Include other areas at the Munich location	12/03	start postponed	see above
Incorporate the environmental management system in our international organization	12/03	start postponed	see above

Responsibility for environmental protection at Munich Re continues to be divided up as follows:

The full Board of Management
– decides on Munich Re's strategic position in the field of environmental protection and sustainable development,
– passes the environmental guidelines,
– names the Board Member responsible for environmental issues.

The Board Member responsible for environmental issues
– is the person to contact at Board level regarding environmental protection and sustainable development,
– is responsible for environmental protection goals being in line with the company's overall strategy.

The Divisional Units and Central Divisions
– set environmental goals and decide on the measures that are appropriate for their respective area of responsibility and are responsible for their implementation,
– are responsible for the observance of statutory and administrative environmental protection regulations and laws.

The Environmental Officer
– coordinates the way Munich Re presents itself to all target groups in connection with the topics of environmental protection and sustainable development,
– represents Munich Re on international committees and vis-à-vis the general public in the field of environmental protection and sustainable development,
– reports to the Board of Management regularly on our environmental protection performance and the application and effectiveness of the environmental management system.

Corporate Communications / Environment
– shapes and implements Munich Re's environmental management system and develops it further,
– supports the Board of Management and the Divisional Units and Central Divisions in the implementation of the environmental protection goals,
– encourages an open dialogue on aspects of environmental protection and sustainable development with the staff and external target groups,
– coordinates and monitors the attainment of the environmental protection goals.

If you have any questions or suggestions, please contact us:

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7 Communications, training, motivation

One of the most important ways that Munich Re can exert an influence in the area of environmental protection is to create awareness for the complex connections with regard to the global environmental situation. A central role is played in this by the issues of climate change and natural catastrophes. With its Geo Risks Research Dept., Munich Re has become an important early-warning system. The staff in this group have for many years now been following developments in this field around the globe and with their know-how and the results of comprehensive statistical analyses are involved in the scientific and political dialogue. In the past year alone the staff of this research group held some 80 external and 25 internal presentations on the subject of climate change, natural catastrophes, and their effects on the insurance industry. An audience of millions has become familiar with their findings and their professional competence through numerous reports in the press, interviews with the media, and television appearances.

Publishing our first environmental report was a major step towards advancing the dialogue in the area of environmental protection. It was distributed to all the staff, the chief executives of our international organization, our clients, and the interested public. The echo was extremely positive, especially from our clients.

The Institute for Ecological Economic Research (IÖW) has reviewed our first environmental report as an independent expert and allocated it an imaginary position in the Ranking of Environmental Reporting 2000 published in the business journal "Capital". In this ranking of the 150 largest German companies, Munich Re would have reached a gratifying 21st place – a result that endorses our approach, but at the same time motivates us to make even further improvements.

More information may be found at www.ranking-umwelt-berichte.de/index_e.html.

Internal communications

We have adopted various measures to significantly enhance the supply of information and communications on environmental subjects for our staff in Munich. For instance, the environmental unit hosted one of the events in the in-house MR Forum series entitled "Environmental protection in a reinsurer's business", for which more than 100 staff signed up. The subject of environmental protection has also established a firm place for itself in the induction course for new staff. And we inform our staff regularly about current developments in our staff magazine go ahead__>>.

Further measures in our environmental programme at a glance:

Memberships and dialogue

Constructive dialogue on environmental protection issues with the interested public and professionals from the realms of science, economics, and politics is a matter of course for Munich Re experts. Our involvement has a long tradition, in the following groups for example:
– the climate working group of the UNEP Finance Initiative,
– the Intergovernmental Panel on Climate Change (IPCC),
– the Advisory Committee of the European Climate Forum (ECF),
– the Steering Committee of the UNEP Insurance Initiative, for which we have also been treasurer since mid-2001.

Since the beginning of 2001 Munich Re has been a member of econsense, a forum for sustainable development initiated by the Federation of German Industries (BDI), along with other leading global players and organizations in the German economy (www.econsense.de).

We have also dealt with current topics in the form of an external dialogue, e.g. in three events, each in collaboration with the Umwelt Akademie:
– "Environmental liability in Germany and in Europe – The role of liability law in European environmental politics"
– "Banks and insurance companies – Sustainable investments in the ethical and ecological context"
– "Ecological pension funds – Chances and risks"

Further information may be found at www.die-umwelt-akademie.de.

Goal: To improve the qualifications of our staff and enhance their motivation and identification with the subject of environment and sustainability

Measure	Deadline	Status	Comment
Create an environment page for the Intranet and the Internet	05/01	completed	As planned, an environment page was put on the Intranet, where staff can access all the available information on in-house environmental protection at Munich Re. Information on the subject of environmental protection may also be found in our Internet forum (www.munichre.com) under the heading “Disasters, Environment, Agriculture“.
Write an online course on the environmental guidelines and the environmental management system and make it available on the Intranet and CD-ROM	03/01	in progress	We are striving for cooperation with the Federal Ministry of Education and Research within the framework of a state-funded project “Vocational training for sustainable development in the insurance industry“.
Draft and make a presentation on the subject of environmental protection and sustainability as part of the Munich Re Colloquium	03/01	in progress	The Munich Re Colloquium is a three-day event for our staff that takes place regularly at our Schliersee country guest house. A colloquium focusing on “Environment – scientific, economic, philosophical“ is planned for March 2002.
Include environmental topics in the induction course for new staff	12/03	completed	see above
Produce and publish environmental information sheets on selected product groups and topics	on-going	implemented in part	Tips on how to save paper (see Section 5) can be found on the Intranet.

Munich Re publications in 2001 on the subjects of climate, natural catastrophes, and the environment:
(may be ordered by e-mail: info@munichre.com)

	Order no.
topics Annual Review of Natural Catastrophes 2000	302-02908
Winter storms in Europe (III)	302-03108
Perspectives – Munich Re's Environmental Magazine 2000	302-02812
Das neue Bundes-Bodenschutzgesetz (The new Federal Soil Protection Act)	302-03117
Agricultural Forum – 14th March 2001 A study on the drought in eastern Germany in the year 2000 – Losses and loss financing	
Who, when, what, how, why? – A portrait of Münchener Ecoconsult GmbH	302-02920
Brochures in the series Casualty Risk Consulting – Information for Insurers	
– Flat-bottom tanks	302-02700
– Treatment walls – A new technology for groundwater remediation	302-02701
– Environmental risks in industrial agriculture	302-02664
– Surface cleaning of metals	302-02665