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Natural Catastrophes
Insurance Cover.
A Diversity of Systems

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por J. P. Morales
Gestado por Otto Neyses
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MADRID
1873.

PERFILES
de las montañas altas
DE LA TIERRA
Dib. y grab. por Otto Neyses

CONSORCIO DE
COMPENSACION
• DE SEGUROS •
MINISTERIO DE ECONOMIA Y HACIENDA

Natural Catastrophes Insurance Cover.

A Diversity of Systems



CONSORCIO DE
COMPENSACION
• DE SEGUROS •
MINISTERIO DE ECONOMIA Y HACIENDA

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PROLOGUE

Natural disasters have for some decades shown a clearly upward tendency in terms of the figures for financial and insured losses. In 2007, insured natural disaster damage exceeded USD 22 billion, a figure which is, while not by any means negligible, below the line of trends in the last three decades and well under the record for losses in 2005, when hurricane Katrina alone caused insured damage of some USD 66.5 billion. This is an astonishing sum, nearly three times the insured losses assigned to the second event by order of disaster intensity - hurricane Andrew (Florida, 1992).

Concentration of population and property, increased exposure and its value, the occupation of areas of risk, shortcomings in environmental management and a degree of active influence of climate change, depending on the zone, are factors to be taken into account in explaining the gradual rise of mean financial losses registered as a consequence of natural disasters in the last three decades. The upward tendency in these losses is also reflected in the indemnity liabilities insurers and reinsurers have had to confront.

Various formulas have been used right across the international scenario to finance these losses. Added to the traditional solutions involving insurance and reinsurance cover, other financial instruments for alternative risk transfer, using the capacity offered by the capital markets, have been seen in recent years. Moreover, together with insurance solutions channelled through the private market, specific systems have appeared in some countries for disaster cover which, using some of these formulas, or combinations, draw on public participation.

Heterogeneity is the predominant feature arising from comparative analysis of these systems, from the oldest, such as the building insurance monopolies in the Swiss cantons, the Spanish Insurance Compensation Consortium or the Earthquake Commission-EQC in New Zealand, to the most modern, or “third generation”, such as the systems in the Caribbean (CCRIF), Mexico (FONDEN), Romania (PRAC), Taiwan (TREIF) and Turkey (TCIP). The input and backup of international institutions (the World Bank) and the use of new mechanisms in risk financing (alternative transfer using disaster bonds, parametric insurance, etc.) are some of the features to be found in these new models.

The description of the solutions for cover (private, public or with public-private participation) in place in some countries is the subject of this book, the second updating of a work of compilation by the Insurance Compensation Consortium in 1994. However, this third edition offers two major novelties. Firstly, it is now published in Spanish and English; and secondly, the project is part of the World Forum of Catastrophe Programmes. An initiative bringing together natural disaster cover systems involving public participation, initially the brainchild of David Middleton, Director General of the New Zealand Earthquake Commission (EQC), the Forum is an open, flexible platform designed to enable systems choosing freely to participate, to exchange experience and information connected with their main activity —cover and compensation of damage from natural disasters— and other related aspects (damage adjustment, claims management, etc.), putting the systems’ experience, where appropriate, at the disposal of national and international institutions (the OECD, the World Bank...) requiring collaboration to study the differing options.

The first Forum meeting took place in San Francisco (USA) in April 2006, and the second in Madrid in September 2007, at which representatives came together from the Caribbean, Cali-

fornian, French, Icelandic, New Zealand, Norwegian, Swiss, Taiwanese, Turkish and Spanish systems.

It is a source of great satisfaction for the Insurance Compensation Consortium to contribute with this third edition of the book to an understanding of the regimes applied around the world to insure natural hazards, and it is pleased to be able to integrate it into the World Forum of Catastrophe Programmes initiative.

Ignacio Machetti Bermejo
General Manager Director
Consorcio de Compensación de Seguros

PRESENTATION

“Natural Disaster Risks – a Worldwide Diversity of Systems” was the title of the first project undertaken by the Insurance Compensation Consortium to compile data on some of the world’s systems for the cover of natural disasters, published in book form in 1994. Praise for this publication on the part of professionals in the insurance industry led to its being updated, and the new edition, in 1999, was entitled “Natural Disasters and their Insurance Cover - a Comparative Study”.

A few years have passed since then, in which natural disasters have continued to draw a substantial part of the attention and concern of the insurance and reinsurance markets and of students of the matter and the public authorities as well. The truth is that disaster damage figures continue to rise, reflected in the indemnity liabilities the insurance and reinsurance mechanisms have had to confront. The natural hazards coverage systems, whether private or with public involvement, have been developed against this backdrop. Not only have insurers’ response mechanisms and solutions evolved in an effort to adapt to each new situation, but new disaster cover systems have also emerged.

The aim of the third edition of this compilation work has been to gather the most recent developments these years have seen in the field of those cover systems. Thus the Insurance Compensation Consortium once more states its commitment to the promotion of study and to the spread of understanding and information on aspects related to natural disaster hazards. No doubt the English version of this edition will provide a boost to its further dissemination.

It must be emphasised that on this occasion, and for a number of the book’s chapters, we have had the good fortune to draw on the collaboration of experts from each country and system, especially those represented at the two sessions of the World Forum of Catastrophe Programmes. The Insurance Compensation Consortium wishes to acknowledge that collaboration expressly.

Finally, I can not finish this presentation without thanking the effort devoted to this work by my colleagues from the Technical and Reinsurance Manager Direction: Alfonso Nájera Ibáñez (moving force of this study), Carmen García Canales, Marta Piniés de la Cuesta, Gema Fuertes Castro, Olga Reviejo Sánchez and also Guy Williams, who helped us to review the English edition. Their contributions have made this publication possible.

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CONTRIBUTIONS

Some chapters have been prepared by experts from the agencies and institutions included in this book. This is the case of the chapters relating to the following countries or areas:

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INTRODUCTION

Today, when we refer to natural disasters, we speak not only of the forces unleashed by nature, but also of the human component. This anthropic factor is becoming increasingly more detectable—when climatic events are concerned—in the process unleashing disasters through induced climate change (greenhouse gases), but above all we find it in the determination of the scope of natural disasters of all kinds, as a consequence of human activities and conduct which increase the vulnerability of people and property in the face of these risks. Such vulnerability not only refers to the proclivity of a population to sustain damages from events of this nature, but also to the capacity of that same population to recover from the disaster through its own means.

In reality, from a social, political and economic point of view, it only makes sense to speak of a natural disaster if we take into account the aforementioned human yardstick, which we now know is not found solely at the end of the disaster sequence, in terms of victims, but also as a conditioning factor of the vulnerability and even as an agent inducing climatic phenomena susceptible of degenerating into catastrophes.

In the last three decades, damage from natural disasters has undergone a significant and disturbing increase. In general, the amount of the economic and insured damage is greater in countries with a higher level of development, because the value of the exposure is greater and because the insurance market is more highly developed. Nevertheless, in relative terms (for example, if a damage/GDP ratio is established), natural disasters are often more damaging for the economies of the less developed countries which, in addition, have a lower capacity for recovery and have scant access to financial mechanisms (including insurance cover) which would provide them with such response capabilities. These are the same countries which also tend to suffer a greater loss of human life due to catastrophic natural events.

The reason for the increase in losses stems from a number of factors which, in one way or another, release back to what we said earlier about the human aspect. Considering the problem from an insurance perspective, among the main factors determining the increase in the damages to be assumed by insurers and reinsurers, we can mention: the greater concentration of people and goods exposed; the increase in the value of these exposures; a greater penetration of insurance; the occupation of areas of risk for housing and productive or leisure activities, shortfalls or deficiencies in town planning, the regulation of land use and environmental management, as well as a growing influence of climate change. To this must be added, on many occasions, ignorance of the risks representing a threat to each particular community and the absence of a culture of prevention.

Following the occurrence of a natural disaster, the return to normality of a community can be very costly, so that adequate and abundant financial resources are needed to support the capacity for recovery and reconstruction. The sources of such means are basically of two kinds: relief and risk financing mechanisms, which, in turn, basically consist of insurance coverage (insurance and reinsurance) and/or alternative risk transfers, without ruling out self-insurance (captive) solutions as well.

In the face of a disaster, governments often find themselves forced to use a significant amount of public resources for rebuilding the country's vital structures as soon as possible and in order to provide relief to the aggrieved parties. In certain cases, the countries lacking these resources, and

basically the least developed countries, find that they need to seek international relief from other countries, international organisations and non-governmental organisations.

With respect to the public resources for reconstruction, apart from the funds used for the rehabilitation of structures and basic services, the relief provided to the aggrieved parties (enterprises and private individuals) are channelled through direct donations or by means of soft loans to which a very low rate of interest—or no interest at all—is applied, with lengthy repayment periods. In most countries, such aid is given case-by-case, arranging for the funds to be granted and determining the criteria of distribution to be applied on an “ad hoc” basis. However, other countries have specific mechanisms in place, with their respective operating rules and administrative systems, through which the budgetary relief provisions are to be channelled in line with objective parameters. Examples of this second kind of relief include the cases of Australia (Natural Disaster Relief Arrangement-NDRA), Austria (*Katastrophenfonds*), Belgium (*Fond de Calamités*), Canada (*Accords d'aide financière en cas de catastrophe-AAFCC*), Norway (*Statens Naturskadefond*), the United States (Small Business Administration), etc.

The public aid is, without a doubt, in response to real needs. However, apart from situations of discrimination and of utilisation under criteria of political expediency to which the less institutionalised relief could give rise (aid offered on a case-by-case basis), such relief poses two basic problems: 1) the disbursement of funds drawn from public budgets could be difficult to sustain in the case of a significantly high scale of disaster damage; and 2) the fact of having the assurance of receiving public relief in the case of a disaster often inhibits the responsibility of potential aggrieved parties to protect their property, by failing to adopt measures to mitigate risk and rejecting the purchase of insurance.

The specific characteristics of natural disasters insofar as risk, with erratic behaviour in comparison with other insurable risks, on account of their low frequency (occurrence) and high intensity (volume of loss), require specific insurance solutions. Solutions which, with an ideal technical approach, must guarantee sufficient financial capacity and the efficient management of losses (with a large number of claims concentrated in a short period of time), seeking to provide cover to the largest number of policyholders possible (extensive mutualisation) at affordable prices, and attempting to avoid the typical risks of coverage of this kind: adverse selection and moral hazard.

Insurance markets, in some instances with the participation of government administrations (in varying degrees depending on the case concerned), have tried to provide an insurance response to the challenges of natural disasters, in relation to the particular circumstances of each country in aspects such as their level of economic and social development, the structure and size of the national insurance market, the insurance culture, the most threatening kinds of risks, history of losses, risk perception, etc. The heterogeneity of situations among different countries explains the diversity of insurance solutions and of specific systems for covering natural disasters, which are observed in the international sphere. The differences affect practically all of the elements that make up the covers, some of which are described briefly below:

- **Participation of the Private Market and Different Areas of Government.** In this regard there is a wide range of possibilities: market exclusivity, public monopoly or a public-private cooperation relationship taking different forms as the case may be. In turn, public participation can arise in direct insurance or reinsurance solutions, or with alternatives for the channelling of risk towards the capital markets (catastrophe bonds). Moreover, this public presence can bring with it a limited or unlimited State guarantee.
- **Compulsory Cover.** When cover is supplied by the private market, in general its acquisition is voluntary with some exceptions, such as in the case of Norway. And when there is

public participation in the insurance provided, the usual situation is for cover to be compulsory. This compulsory feature is linked to the ownership of property (real estate) or to the purchase of policies in certain branches (generally, fire insurance). Exceptions can also be found here, such as the purchase of cover under the NFIP in the U.S., which is voluntary.

- **Risks Covered.** Here three kinds of situations are usually found: mono-line insurance (the system only covers a single risk, such as hurricane, flood, earthquake, etc.); closed multiple coverage (the system covers a closed list of disaster events), or open coverage (no *numerus clausus* of risks covered exists, including cover for all natural hazards capable of causing catastrophes).
- **Costing of Premiums.** The price of cover (premiums or surcharges) can be established as a lump sum (fixed amount), or by applying a percentage on the premiums of the basic policy or on the amounts of capital insured. In turn, these premiums may be modulated in line with the risk (according to zones), or there may be a single premium for the territory overall.
- **Damages Covered.** Most systems only cover direct material damages, although there are cases in which coverage extends to the loss of income. The Spanish system includes personal injury, together with the aforementioned covers.
- **Property Covered.** Together with the systems covering damages to residential, commercial and industrial properties, others solely cover damages to homes (as a general rule, including the contents in all cases).
- **Limit of Indemnity.** Although there are systems which, backed by a State guarantee, cover damages without a limit of indemnity, the usual case is to find that, even when such a guarantee exists, a limit is established which can be defined by a maximum amount of indemnity per dwelling, or a global maximum per event, or by conjugating a ceiling per policy and per event.
- **Official Natural Disaster Declaration.** In some systems natural disaster indemnities are conditioned to an official declaration of the disaster by a government body. This declaration is usually made when a number of requirements are met, generally related to a minimum geographical extension affected and a certain degree of damage caused. However, in the case of Spain, for example, this official declaration is not required, and coverage is not conditioned to the extension and amount of the damages.
- **Stabilisation Reserves.** Due to the significant amount of indemnities which a natural disaster could originate, and which require a significant availability of financial resources, some countries allow the creation of instruments for the accumulation of funds through stabilisation reserves which enjoy favourable tax treatment. However, this possibility is not provided for in all countries, which makes accumulation burdensome.

The most recent systems created (Caribbean, Mexico, Romania, Taiwan and Turkey) incorporate new insuring elements, in accordance with the new offers which enable the continuing development of the insurance and reinsurance markets as well as of other financial instruments as alternatives to the traditional covers. Furthermore, particular mention should be made of the presence of international cooperation in the latest insurance initiatives, generally with the backing of the World Bank, but even through support provided by third countries, such as occurs in the Caribbean system.

AUSTRALIA

1. Natural Disasters ¹

Cyclone, storm, flood, hailstorm, earthquake and bushfire are the major events in terms of catastrophic damage caused in Australia by natural events. The Insurance Council of Australia maintains a disaster list recording significant events where government disaster relief arrangements are activated or the insurance industry calls upon CAT treaties. The most significant events are shown in the following table, in which the storm that hit New South Wales on June 2007 must be emphasised. With wind reaching 125 km/h., it caused severe floods.



MAIN CATASTROPHIC EVENTS (1974-2007)

Date	Location	Event	Original Cost (AU\$M)
1974 Dec 24	Darwin NT	Cyclone	200
1983 Feb 16	Victoria	Bushfire	138
1985 Jan 18	Brisbane QLD	Hail, storm	180
1986 Oct 13	Western Suburbs, Sydney NSW	Hail, storm	104
1989 Dec 28	Newcastle NSW	Earthquake	862
1990 Mar 18	Sydney NSW	Hail, storm	243.2
1991 Jan 21	Sydney NSW	Storm	138.4
1992 Feb 12	Sydney NSW	Hail, storm	118
1996 Sep 29	Armidale/Tamworth NSW	Hail, storm	104
1999 Apr 14	Sydney NSW	Hail, storm	1,700
2003 Jan 18	Canberra ACT	Bushfire	350
2003 Dec 3	Melbourne Metro VIC	Hail, storm	124
2005 Feb 2	Sydney, Central Coast, Newcastle, Melbourne, Sth East Vic, Nth Tasmania NSW, TAS, VIC	Hail, storm, wind	216.7
2006 Mar 20	Nth QLD	Cyclone	540
2007 June 7	Newcastle, Hunter Valley, Central Coast	Storm, flooding	1,470

Source: Insurance Council of Australia.

¹ This chapter has been prepared with the special contribution of Karl Sullivan (Insurance Council of Australia).

2. Cover

Since 1978, with the objective of focusing risk-assessment from an insurance point of view, areas of accumulated natural risk have been delimited in Australia, taking post codes as reference. Areas where the lines for such limits are not advisable for topographical reasons are not considered. This system of evaluation is used for cyclones and storm surge, other storms and tempests, hail, flooding from copious rainfalls, earthquake and bushfires. A total of 49 areas of accumulation are defined.

Insurance cover for damage from natural disasters is provided by the private market, with freedom of offer and without obligation to insure². This market expects constant and specialised attention from the public powers in the field of prevention, so that there may be a wider and more generalised introduction of the various covers in relation to the different types of natural events.

Private Australian insurers generally cover damage from wind, storm, hail, rain, bushfire and earthquake, but are more restrictive when it comes to accepting cover for flood (river or sea) and particularly for subsidence in relation to homes and small businesses³.

Most insurance cover available to policyholders and intended for reconstruction following disasters is in household and content policies, for property damage and business interruption⁴.

Earthquake cover is in general included in policies for homes, commercial and industrial risks, insuring both damage from seismic movement and that arising from fire following and tsunamis⁵.

It is common for a deductible to be applied for earthquake cover, of some AUD 200 for household policies, always less than 1% of the insured sum, and about AUD 20,000 in industrial and commercial fire policies.

It must be remembered that one third of Australian homes lack insurance cover for building and/or content⁶. Moreover, according to data of "The Insurance Council of Australia" (ICA)⁷, almost 30% of insured home premises are under-insured, a figure which rises to 35% for content⁸. Meantime, natural disasters cause economic losses annually in Australia of more than AUD 1.1 billion for damage to homes, industries, businesses and public infrastructures⁹.

² High Level Official's Group: "Natural disasters in Australia: reforming mitigation, relief and recovery arrangements". A report to the Council of Australian Governments. August 2002; p. 76.

³ See: *Catastrophe Resinsurance Newsletter*, no. 52, June 1997; p. 96.

⁴ Emergency Management Australia: "Economic and Financial Aspects of Disaster Recovery". Commonwealth of Australia, 2002; p. 7 (www.ema.gov.au).

⁵ Richard Roth: "Foreign earthquake insurance programs". *Paper series B*, no. 3; ICLR, Toronto, 1999.

⁶ Dwyer, A.; Zoppou, C. *et al.*: "Quantifying social vulnerability: a methodology for identifying those at risk to natural hazards". Australian Government, Geoscience Australia. 2004/14, p. 20.

⁷ An association bringing together a majority of insurers, reinsurers and mediators on the Australian market.

⁸ Evers, S.: "Underinsurance in Australian householders' policies: A reinsurer's perspective". *Exposure* (GE Insurance Solutions), no. 14, 1-2 quarter 2005; pp. 19-22.

⁹ High Level Official's Group: "Natural disasters in Australia: reforming mitigation, relief and recovery arrangements". A report to the Council of Australian Governments. August, 2002.

3. Flooding: a Special Case

Residential cover for mainstream flooding¹⁰ continues to be largely unavailable in the Australian Market. The Insurance Council of Australia is progressing a project designed to facilitate the introduction of greater cover and is working closely with Federal and State Governments, as well as insurance companies in general, on a range of initiatives. The principle issues being addressed are the drafting of flood risk maps, an increase in community awareness and a preventive approach to land use planning. Thus construction should not be permitted in areas highly prone to flooding¹¹.

170,000 buildings are vulnerable to 1-in-100 year flood, located basically in New South Wales (the site of Sydney and of Canberra) and in Queensland (whose main city is Brisbane). To this must be added a further 300,000 homes (6.5% of the Australian total) vulnerable to Maximum Probable Flooding, while between 15,000 and 24,000 homes are located in high risk zones, with a possibility of flood once every twenty years¹².

Broadly, two types of flood insurance can be distinguished, depending on whether cover is for “flash flooding”¹³ and/or “mainstream flooding”. Both insurance types are entrusted to the private market, they are not compulsory and their respective penetration rates are 60% and 5%¹⁴.

Some of the largest insurers include, with some limits, cover for “flash flooding” in policies for buildings, content and vehicles – hence the high penetration – but not for “mainstream flooding”, which is taken on by just a few entities which include flooding, without restrictions, in their standard policies, provided that they are not in high-risk zones, and with application of an additional premium which may, according to the location, reach 45%¹⁵.

In any event, within the limited offer of this type of cover, it is more common to obtain it separately, and not as part of a standard policy which, to some extent, influences the low level of penetration of this insurance. It usually excludes damage from the entry of seawater on the coast as a result of surge due to storms or hurricanes (“storm surge”)¹⁶, and as the result of tsunamis and landslips caused by soil saturation¹⁷.

Policies to cover major industrial and commercial risks do not usually encounter problems with flood guarantee, because they cover all risks, including this one.

¹⁰ “Mainstream” or “riverine flooding” is a slower flooding, in wider areas, from gradual soil saturation and for watercourses overflowing, as a result of constant rains or thaws. Vid. ICA: “Flood insurance. Are you covered?” (www.pittwater.nsw.gov.au).

¹¹ Corrigan, P.; Edwards, G.; and Rabbit, M.: “The January 1994 bushfire in New South Wales: an insurance post mortem”. in Britton, N.R.; McDonald, J; and Oliver, J. (Edit): *Insurance viability and loss mitigation: partners in risk resolution*. Proceedings of a seminar sponsored by Alexander Howden Reinsurance Brokers (Australia) Ltd. Brisbane, Griffith University, 1995; p. 170.

¹² Insurance Council of Australia: “Submission to the review of natural disaster relief and mitigation arrangements”. December 7, 2001.

¹³ “Flash flooding”: It is a sudden flooding resulting from fast soil saturation and from watercourses overflowing, as a result of heavy rainfalls in a short time period and in a delimited area. Vid. ICA: “Flood insurance. Are you covered?” (www.pittwater.nsw.gov.au).

¹⁴ The Treasury (Australia): “Flood Insurance in Australia” (Annex), February 2003. In: Paklina, Nina: “Flood Insurance”; OECD, Oct. 2003; p. 23 (www.oecd.org/dataoecd/51/9/18074763.pdf).

¹⁵ *Ibidem*, p. 22.

¹⁶ *Ibidem*, p. 23

¹⁷ The current Insurance Contracts Act, dating from 1984, requires insurers to cover all risks, including flooding. It does also however allow insurers to exclude certain risks provided they are clearly defined in the policy and the policyholder is duly informed. All insurers exploit this legal loophole to exclude tsunami, seawater invasion as a result of storm and landslips, and many others to exclude flooding (See: High Level Official’s Group; *op. cit.*, p. 76).

There has been much discussion, and at different levels, about the need in Australia to arrive at an overall offer of cover for flood in insuring the premises and content of homes and small businesses. Such an overall policy might become the best solution of insurance offer for flood as a means to distribute the risk among all the policyholders, which would lead to a reduction in the cost of the protection and less pressure of adverse-selection as happens with current optional flood insurance¹⁸. The fact is that at present there are areas where the risk is so high that, even if flood insurance was on offer, for many potential policyholders the price of the cover would be beyond their reach.

Sensitive to the public pressure, the Australian market has indeed shown its willingness to collaborate in the matter, while emphasising that any initiative in this field demands the substantial involvement of the Federal Government in all aspects of disaster-prevention and compensation for damage. Thus the insurance sector thinks that the question of flooding requires the co-operation of those involved, including insurers and the Federal Government, along with the State, territorial and local administrations. It also emphasises four main aspects to be tackled: effective flood prevention; the provision of up to date flood maps; effective control plans in flood-prone areas, and information campaigns for the residents of these zones¹⁹.

4. Disaster-Management and Prevention Programmes

Duties in the federal management of natural disasters is assigned to an official body, EMA (Emergency Management Australia), which coordinates the assistance to the Australian States and Territories through the COMDISPLAN (Commonwealth Disaster Response Plan), should the authorities in those administrative areas be overwhelmed in dealing with disasters with their own resources. EMA's activity in relation to natural disasters turns on four main reference points known by their initials, PPRR: Prevention-Mitigation, Preparation, Response and Recovery²⁰.

In relation to prevention, mention can be made of the "Natural Disaster Mitigation Program"²¹, a federal scheme designed to identify and deal with natural risk-prevention priorities (studies, alarm systems, public information, protection of buildings, etc.) throughout the country. This program is funded by the Federal, State and Territorial Governments. Specific to flood risk is the "Regional Flood Mitigation Program"²².

Notable among the initiatives involving the insurance market was the creation in 1994 of the "Natural Hazards Research Centre" (NHRC) in the framework of the Macquarie University programme for research into natural hazards, sponsored by private entities from the insurance market. It was conceived to study this type of risk, with the aim of finding and proposing the right measures for dealing with it. The NHRC was replaced in 2001 by another initiative named "Risk Frontiers", with a similar aim, to which was added the design and management of a natural disaster

¹⁸ The Treasury (Australia): "Flood Insurance in Australia" (Annex), February 2003. In: Paklina, Nina: "Flood Insurance"; OECD, Oct. 2003; p. 24 (www.oecd.org/dataoecd/51/9/18074763.pdf).

¹⁹ Insurance Council of Australia: "Residential flood insurance". Current Issues Brief. www.insurancecouncil.com.au.

²⁰ *Vid.* "Australian Government Assistance for Natural Disasters" (EMA): www.ema.gov.au/agd/ema/emainternet.nsf/Page/Communities_Natural_Disasters_Australian_Government_Assistance_for_Natural_Disasters.

²¹ *Vid.* "Natural Disaster Mitigation Program" (EMA): [www.ema.gov.au/agd/ema/emainternet.nsf/Page/Communities_Natural_Disasters_NDMP_Natural_Disaster_Mitigation_Programme_\(NDMP\)](http://www.ema.gov.au/agd/ema/emainternet.nsf/Page/Communities_Natural_Disasters_NDMP_Natural_Disaster_Mitigation_Programme_(NDMP)).

²² *Vid.* "Regional Flood Mitigation Program" (EMA): [www.ema.gov.au/agd/ema/emainternet.nsf/Page/Communities_Natural_Disasters_RFMP_Regional_Flood_Mitigation_Programme_\(RFMP\)](http://www.ema.gov.au/agd/ema/emainternet.nsf/Page/Communities_Natural_Disasters_RFMP_Regional_Flood_Mitigation_Programme_(RFMP)).

database, and which draws on the financial backing of 12 sponsors in the form of insurers, reinsurers and brokers ²³.

5. Coordination in the Face of Disaster: “Insurance Council Catastrophe Coordination Arrangements”

The Insurance Council of Australia has recently reshaped the manner in which it coordinates insurance industry and Government liaison during the recovery phase of a disaster event. The organisation formerly known as the Insurance Disaster Response Organisation (IDRO) has been disbanded and replaced with a new full-time capability managed by the Insurance Council of Australia. The operation of this capability is enshrined by the new Industry Catastrophe Coordination Plan, published at the start of May 2007.

The refocused industry capability focuses on four key issues with regard to industry-government liaison:

- Providing Senior Industry Representation to each State and Federal Recovery Group.
- Data Sharing & Decision Support.
- Communications - Themes & Messages for the Public.
- Problem Solving - Resolving Issues for the Affected Community.

The Insurance Council plays host to the general insurance industry’s catastrophe coordination capability, providing stewardship and full-time management for the various activities required to ensure that it remains functional, capable and well practiced. The Insurance Council represents industry on each of the States Disaster Recovery Committee (or equivalent), ensuring that disaster victim issues as they relate to insurance, or the lack thereof, are given appropriate attention ²⁴.

6. Disaster Aid: “Natural Disaster Relief and Recovery Arrangements” (NDRRA)

The NDRRA are administered by the Department of Transport and Regional Services, and provide a mechanism whereby the Federal Government grants aid to the Australian States and Territories which seek it, to salvage communities, persons, homeowners, small enterprises, primary producers (farming sector), not-for-profit associations and organisations which lack the resources by which to recover from the catastrophic effects of cyclones, bushfires, earthquakes, storms, tornadoes, floods, tsunamis, meteorite strike and landslips. This assistance may take the form of direct aid (for families), subsidies or grants ²⁵.

Specifically, the purpose of the NDRRAs is to aid in the recovery of communities which have been seriously affected by a natural disaster.

²³ Blong, R.: “Natural hazards risks assessment: an Australian perspective”. *Issues in Risk Science* (Benfield Hazard Research Centre), n.° 4, 2005(?).

²⁴ A copy of the Australian Industry Catastrophe Coordination Plan can be found on the Insurance Council Website: www.insurancecouncil.com.au.

²⁵ Department of Transport and Regional Services: *Natural Disaster Relief and Recovery Arrangements: Determination 2007* (www.ema.gov.au/agd/EMA/emaInternet.nsf/Page/Communities_Natural_Disasters_NDRRA_Natural_Disaster_Relief_and_Recovery_Arrangements_Guidelines).

The Federal Government takes up half the outlay of each State or Territory if it exceeds AUD 240,000, in the case of assistance for individuals (“personal hardship and distress-PHD”). For other type of assistance (no PHD), the Federal Government takes over 50-75% of the charges incurred by each State or Territory beyond a threshold calculated with reference to the income of each State or Territory ²⁶.

Obviously, it is not the intention of these instruments to discourage the taking of insurance cover, or the necessary measures for loss mitigation, but what is sought is to foment the penetration of the covers, to reduce public spending on reconstruction aid ²⁷.

The Federal Government is also able to grant aid directly to those affected via two instruments managed by the Department of Social Security, and identified with the names of “Special Benefit” ²⁸ and “Australian Government Disaster Relief Payments” ²⁹. Although their aims and procedures differ, they are basically designed to assist those whose income is seriously affected by a disaster and who are not entitled to other ordinary Social Security subsidies.

The Australian States also have their own aid procedures. For example, since 1989 New South Wales has a “Rural Assistance Authority” which manages certain aid (basically soft credits) to farmers and agricultural workers affected by a natural disaster.

The ICA has not hesitated to point out that the Federal Administration and State Governments seem to pay more attention to the concession of resources following disasters than to assigning funds to ensure that these do not occur, thereby forgetting that in the US for example, every dollar spent on prevention saves two dollars in aid ³⁰.

7. Provisions for Claim-Rate Fluctuations

Insurers have been asking the Australian economic authorities to make it possible to create special reserves, by favourable fiscal treatment, to deal with natural disasters. Apart from fomenting cover for this type of risk, this measure would save the Australian insurance market many millions of dollars in premiums paid for international reinsurance.

²⁶ *Ibidem*. También, Weeks, N.: “Management of Catastrophes in Australia”, in www.oecd.org/dataoecd/51/33/38120102.pdf

²⁷ High Level Officials Group; *op. cit.* p. 76.

²⁸ Centrelink: www.centrelink.gov.au/internet/internet.nsf/payments/special_benefit.htm.

²⁹ Centrelink: www.centrelink.gov.au/internet/internet.nsf/payments/disaster_relief.htm.

³⁰ Insurance Council of Australia; “Submission to the review of natural disaster relief and mitigation arrangements”. December 7, 2001.

AUSTRIA

1. Natural Disasters and Their Insurance Cover

The main risks affecting the country are flood, storm, landslide, weight of snow, avalanches and hail. Worthy of mention as major losses were the Galtür and Valzur avalanches in February 1999, which caused nearly 40 deaths¹, as well as the 2002 and 2005 floods which generated major losses, referred to in the following section. Together with these floods, mention can be made of the 2000 and 2003 hailstorms, and the storm Kyrill in January 2007 which, with wind gusts of more than 200 km/h, accounted for indemnifications for the insurance market of € 100 million².



Cover of natural disaster risks is optional, taken up exclusively in free market conditions by private insurance companies which, in turn, reinsure on the private market.

Generally, standard household policies cover storms (winds of over 60 km/h), hail, weight of snow and landslides, perils which are covered in commercial and industrial risk policies by means of an optional extension of cover³.

As occurs in the case of flooding, which will be examined later, earthquake cover is offered with quite a number of restrictions, particularly with respect to indemnification limits, which are around € 7,500 for households and somewhat higher for commercial and industrial risks⁴.

Household insurance covers direct material damage to main buildings as well as to secondary and attached structures, such as garages, sheds and storage rooms. As a general rule, buildings are insured for their reconstruction cost, and the cover includes costs of demolition, removal of rubble and fire extinction up to a limit stipulated in the policy⁵. These policies can also cover contents.

Austrian legal provisions do not allow insurance companies to establish tax-exempt equalisation reserves.

2. Flood Risk

Of all natural risks, over the last few years, flooding has proven to be the most damaging and threatening. There were devastating floods in Austria in the summers of 2002 and 2005, over wide areas of the country, produced by intense rainfall which overflowed several tributaries of the Danube, heading the ranking of the most costly floods in terms of material damage and personal injury in Austria during the last century.

¹ www.tirol.gv.at/applikationen/tiris/katastrophenschutz/galtuer-english/

² Versicherungsverband Österreich (VVO): www.vvo.at/index.php?option=com_content&task=view&id=322&Itemid=344&lang=en

³ Guy Carpenter: "New Capital Stabilizes Market". *The World Catastrophe Reinsurance Market: 2007*; p. 24.

⁴ *Ibidem*: p. 24.

⁵ VVO: www.vvo.at/index.php?option=com_content&task=view&id=311&Itemid=326&lang=en

In the 2002 floods, some 60,000 people had to be evacuated, and losses totalled close to 3 billion euros ⁶, insured damage being estimated at between 400 and 500 million Euros ⁷. Broad economic sectors suffered severely from the consequences of the flooding, both in Austria as well as in other European countries, the most heavily affected being infrastructures, agriculture, distribution and the tourist industry. In addition to direct damage, major losses were generated by the interruption of activities and business, electrical outages, cost of assistance, cleanup, and the like ⁸.

Economic losses from the 2005 floods were valued at € 560 million, of which more than € 110 million in damages were covered by the insurance sector ⁹.

Despite the fact that the amount of the losses from the 2002 floods was, as seen above, quite high, only a very limited part of that damage was taken up by the insurance sector, because the percentage of penetration of flood insurance was still at quite low levels ¹⁰.

As in the case of other natural perils, the flood cover available in Austria is optional. Insurers may agree to offer this cover in exchange for premiums additional to the basic guarantees, rather than in combination with other risks. Specifically, household policies can include cover for flood and mudslides, in an extension of cover and through a wide range of options, according to contract, and with an additional premium. An indemnification limit is applied which, for buildings, can be a percentage (often up to 50 %) of the capital insured for the building, or a maximum amount which generally ranges between 3,700 and 7,500 Euros, depending on the company. With respect to contents, indemnification limits tend to be similar to those for buildings ¹¹.

In the commercial and industrial sectors flood insurance solutions can be customised for each consumer, also by means of an extension of cover. In higher-risk areas, the cover for these sectors can be more difficult to obtain and, in any case, will include indemnification limits and high deductibles ¹².

One of the main problems arising from this system is the adverse-selection. With a demand for cover in areas repeatedly affected by flooding, such cover -when it is available is expensive, whereby market penetration is low. The result is that most of the damage caused by flooding in the last decade has been covered by the State in the form of direct governmental aid and European Union financial assistance.

Following the great economic and social impact of the 2002 floods, flood risk management moved into the forefront of the agendas and concerns of the Administration and the insurance market ¹³, through the Austrian Insurers Association (*Versicherungsverband Österreich-V.V.O.*), and channels of co-operation were opened up in a quest for solutions in the field of prevention and also in insurance. In this regard, the Austrian insurance market defends the idea that an insurance solution for contending with the damages from natural disasters in Austria, particularly in connection with the risk of flooding, is only possible through co-operation between the insurance sector and the State, which should become involved to an extent beyond what it has been doing through the

⁶ Paklina, Nina: "Flood Insurance", OECD, October 2003; p. 2 (www.oecd.org/dataoecd/51/9/18074763.pdf)

⁷ Guy Carpenter: "Steep Peaks Overshadow Plateaus". *The World Catastrophe Reinsurance Market 2006*; p. 57.

⁸ Paklina, Nina: *Op. cit.*; p. 3.

⁹ Guy Carpenter: "Steep Peaks Overshadow Plateaus". *Op. cit.*; p. 57.

¹⁰ Under 10 percent. *Vid.* Paklina, Nina: *Op. cit.*; p. 5 (www.oecd.org/dataoecd/51/9/18074763.pdf).

¹¹ VVO: www.vvo.at/index.php?option=com_content&task=view%20&id=239&Itemid=204&lang=en.

¹² Guy Carpenter: "New Capital Stabilizes Market"; *Op. cit.* p. 24.

¹³ Hinghofer-Szalkay, Dagmar and Koch, Bernhard A.: "Austria". In Faure, Michael and Hartlief, Ton (Eds.): *Financial Compensation for Victims of Catastrophes. A comparative Legal Approach*. Vienna, SpringerWienNewYork, 2006; p. 25.

Disaster Fund (see under the following heading), as this formula is insufficient and would not have kept pace with events ¹⁴.

An example of a move in this direction would be the co-operation between the V.V.O. and the Ministry of Agriculture to enable the creation of a natural disaster zoning system, with particular emphasis on the risk of flood, known as the HORA (*Hochwasserrisikozonierung Austria*) ¹⁵, conceived as a means to identify and assess potential risks. The risk zoning data began to be made public in June 2006.

3. Other Systems of Assistance in the Event of Natural Disasters: the Disaster Fund

In principle, the Austrian Constitution attributes to the *Länder* (States) the responsibility for coping with the damage caused by natural disasters, however, since the catastrophic 1951 avalanches, federal aid began to be required and, following the 1965 and 1966 floods, this aid was institutionalised in the 1966 Act, in the form of a Disaster Fund (*"Katastrophenfonds"*). A further Act in 1985 adapted the Fund to the new circumstances, and it is currently governed by the 1996 Act ¹⁶.

The Disaster Fund, financed by withholding a percentage of the revenues from certain taxes, is administered by the Federal Ministry of Finance. Federal in scope, the Fund is intended to cover preventive measures and to compensate damage, beyond a given level of intensity, in case of natural disasters caused by flood, avalanche, earthquake, landslide, hurricane or hail.

Disaster damage to private property is usually compensated by the *Länder*, for up to 20-30% of the loss suffered, and their compensation expenses are 60% reimbursable by the Fund. Damage to public infrastructures in the *Länder* or other local jurisdictions is 50% financed by the Fund ¹⁷.

¹⁴ VVO: "Natural disasters: The State and the private insurance sector in a risk partnership"; Vienna, 31-8-2005 (www.vvo.at/naturkatastrophen-risikopartnerschaft-staat-und-private-versicherungswirts.html).

¹⁵ Wassernet: www.wassernet.at/article/archive/13523. Also, VVO: www.vvo.at/index.php?option=com_content&task=view&id=239&Itemid=204&lang=en.

¹⁶ Federal Ministry of Finance: "The Austrian Disaster Fund". Vienna, August 2006 - July 2007 (english.bmf.gv.at/budget/intergovernmentalfi_252/disaster_fund.pdf?q=Austrian%20Disaster%20Fund).

¹⁷ Federal Ministry of Finance: *Op. cit.*; p. 3. Also, Hinghofer-Szalkay, Dagmar and Koch, Bernhard A.: *Op. cit.* pp. 12 and 13.

society with the best and most adequate protection against major disaster risks⁶. The system was implemented in a slow process, marked by large-scale disasters, and whose main milestones are succinctly highlighted below.

The first steps in the creation of tools for reparation of damage from natural disasters were taken in Belgium in 1967, following the disaster caused by a tornado in the municipality of Oostmalle, and in Westhoek. This first took form in 1976 with the creation of the National Calamities Fund⁷, not an assurance platform but rather one for public aid to victims for damage not eligible for indemnification under insurance cover.

Subsequently, a series of legal rules would inaugurate and develop “storm guarantee”⁸, for its mandatory inclusion in simple risk policies, also covering risks of hail and weight of ice and snow.

Finally, as the upshot of the major payments the National Calamities Fund had to make between 1993 and 2002, particularly for flood damage, the government was forced to give this risk specific insurance treatment. Thus the Act of 21 May 2003 introduced new stipulations into that of 25 June 1992, the Land Insurance Contract Act, making flood guarantee compulsory in certain fire policies for properties in risk areas, and a voluntary extension for property not in those zones. It also created a Tariff Office to fix the rates for risks which did not count on market cover against natural disasters.

An amendment was made to this scheme in the Act of 17 September 2005 to extend the obligation to all simple-risk fire policies, irrespective of the zone, and also covering flood, earthquake, overflow or blockage of public drainage, and landslides or subsidence.

The “simple risks” referred to are in general defined as any property or group of properties whose insured value does not exceed € 743,680.57⁹. This limit rises to € 23,921,725.14 for certain properties such as offices, homes and buildings in which commercial premises do not account for more than 20% of the building’s total accumulated area; agricultural and livestock operations; professional premises except pharmacies; premises for cultural, social, and non-tertiary education purposes; conservatories, museums and libraries; installations exclusively for sport; and medical establishments, hospitals, clinics, children’s homes and rest-homes for the elderly.

Calculation of these limits “takes account of all insurance contracts with the same objective in relation to properties in one place and subscribed by one policyholder, one insured or a society or association in which the policyholder or an insured has a majority interest or manifestly holds a preponderant part of the decision-making power”¹⁰.

Away from the Fire Insurance system for simple risks, in the case of industrial risks which surpass the limit fixed for simple risks, as indicated below, the terms of cover are free, both for “tempest” and of course for flood and earthquake, in the form of a supplement to fire cover or as part of all-risk policies.

The Belgian legislation allows insurers to create tax-free provisions to meet claim-rate fluctuations in natural disasters¹¹.

⁶ *Ibidem*.

⁷ The Act of 12 July 1976 on reparation for certain damage to private property caused by natural disasters.

⁸ Decree of 1 February 1988; Royal Decree of 24 December 1992, and Royal Decree No. of 16 January 1995.

⁹ This amount is linked to trends in the ABEX index, whose base is that of the first quarter of 1988, i.e. 375 (*vid. Assuralia: Op. cit.*; p. XII).

¹⁰ Article 5 of the Royal Decree of 24 December 1992, for implementation of Articles 30, 31, 44, 52, 67 and 70 of the Act of 25 June 1992 on the land insurance contract.

¹¹ This was not introduced with the new law, but it was already existing before.

3. The National Calamities Fund

The National Calamities Fund was created in an Act of 12 July 1976, to contribute to reparation for damage caused to private property (simple and agricultural risks) by natural events of exceptional intensity and generalised devastating effects, fundamentally for risks which are hard to insure (flood, earthquake) and so for claims in which insurance does not indemnify the damage - or does so scarcely¹².

This fund is publicly financed, not by reserves created a priori, but by cash advances, credits and other budgetary input following a disaster¹³. Its contribution is more in the form of aid rather than indemnifications, and which may be sought solely for direct damage, following a disaster declaration in a Royal Decree delimiting the area affected and the criteria for the granting of the aid. There are minimum requirements for such a declaration:

- This is a natural event of exceptional character.
- The total direct damage to private property in the area of claim is a minimum of € 1,250,000.
- Average damage per claim is a minimum of € 5,000.

National Calamities Fund beneficiaries may be individuals and public establishments, and damage is compensated at the real value, following appraisal of the loss by State adjusters and with a deductible of € 250 per event.

If the party suffering the loss has a simple fire risk policy (which includes a compulsory disaster guarantee), the National Calamities Fund makes up the insurer's indemnification if this turns out to be less than the amount the fund would have had to pay¹⁴.

The National Calamities Fund is subdivided in turn into two funds, according to the field in which they operate: the National Public Calamities Fund and the National Agricultural Calamities Fund.

4. Fire Insurance and Other “Simple Risk” Hazards. “Storm” Guarantee

Cover against natural events in the “simple risks” runs in the framework of the insurance regulation previously set out in a Royal Decree of 1 February 1988, which was superseded by that of 24 December 1992, regulating “insurance against fire and other risks, in relation to simple risks”. This latter Royal Decree was in turn amended by a further two, on 16 January 1995¹⁵ and 14 March of that same year¹⁶.

¹² According to the Act of 12 July 1976, a disaster is a natural phenomenon “of exceptional character or unforeseen intensity which causes major damage, particularly earthquakes or earth movements, seaquakes or other flooding of a disastrous nature, hurricanes and other wind events”.

¹³ Assuralia: *Op. cit.*; p. III.

¹⁴ De Groof, A.; De Sutter, R. and Le Roy, D. (Dir: Hecq, W.): Effets du changement climatique en Belgique. Impacts potentiels sur les bassins hydrographiques et la côte maritime. Phase 2: étude proprement dite - présentation des recommandations pour une gestion durable. Document de travail. Convention réalisée pour le compte de l'IRGT-KINT. December 2004; p. 64 (www.ulb.ac.be/ceese/nouveau%20site%20ceese/documents/IRGT_KINT_II_final_d%E9cembre_04.pdf).

¹⁵ Arrêté Royal du 16 Janvier 1995, modifiant l'Arrêté Royal du 24 Décembre 1992 réglant l'assurance contre l'incendie et d'autres périls, en ce qui concerne les risques simples.

¹⁶ Arrêté Royal du 14 Mars 1995 rectifiant l'Arrêté Royal du 24 Décembre 1992, réglant l'assurance contre l'incendie et d'autres périls, en ce qui concerne les risques simples, modifié par l'Arrêté Royal du 16 Janvier 1995.

Article 1 of that Royal Decree of 24 December 1992 establishes that it applies to insurance contracts whose main objective is cover for simple risks against damage caused by fire and other related risks (lightning, explosion, etc.), and others, notable of interest here including labour conflicts, storm, hail, weight of ice or snow, natural disasters and water damage.

The following are excluded from its field of application:

- All-risk jewellery, art objects, furs, photographic and audiovisual apparatus, and luggage insurance.
- Technical insurance (machinery breakdown, all construction risks, etc.).
- Insurance for fire, theft, crash glasses and other damage in motor vehicle policies.
- Business interruption insurance other than that guaranteeing salary indemnification.
- Crop insurance against hail.
- Insurance against livestock diseases and mortality.
- Global bank insurance, insurance for the transport and custody of securities, falsification of cheques and computer fraud.

For “storm” guarantee to apply, there must have been winds of more than 100 km/h or significant damage over a 10 km radius. Under the legislation, in “simple risks” the scope of this guarantee cannot be limited to a quota of the capitals insured for building and content, so that the cover must be offered for 100% of the insured sum. In any event, as a general rule for “simple risks”, in natural disaster losses or those for other risks covered by the policy, other than fire and those related to fire, the insurer must pay the indemnification to the insured within the thirty days following the end of the appraisal or, failing that, the date on which the amount of damage was set. In new-value insurance, that indemnification may not be less than 100% of the new value (less age), provided that the insured rebuilds, repairs or replaces the damaged property; if the insured does not rebuild, repair or replace the damaged property, that indemnification may not be less than 80% of the new value (less age).

That age of damaged property, or the damaged part of a property, is deducted only when it exceeds 20% of the new value in claims related to guarantee against storm, hail and weight of snow and ice, or when it exceeds 30% of the new value for claims related to other guarantees. If not a new-value insurance, but one of some other value, indemnification may not be less than 100% of the latter.

There is a compulsory excess for “simple risks” per claim and which is not insurable. When the policy is subscribed, the parties may agree to increase the excess, which is usually quite a lot higher for earthquake and flood.

5. New Natural Disaster Cover System. A Compulsory Guarantee

The cover introduced by the Act of 21 May 2003¹⁷, restricting the guarantee of mandatory inclusion against natural disasters to flood risk and only for properties situated in risk areas, overlooked the principle of solidarity among those insured and, in practice, proved unworkable.

¹⁷ Amending the Act of 25 June 1992, the Land Insurance Contract Act, and that of 12 July 1976 on the reparation of certain natural disaster damage to private property.

Amendments were necessary, as in the Act of 17 September 2005¹⁸, to introduce a more effective system of cover, combining such solidarity among those insured (all paying for the cover, irrespective of the level of risk), the solidarity among insurers (which must participate in the *Caisse de Compensation*) and the solidarity among citizens (the State becoming the ultimate guarantor of the system)¹⁹. In order to share the risk, each insurer has to take its own reinsurer.

5.1. Risks Covered and Risk Areas. Definitions

As of this Act, the insurer concluding the property insurance contract for fire hazard covering simple risks must provide guarantee against natural disasters of earthquake, flood, overflow or blockage of public drainage, and landslides and subsidence. The compulsory nature of this guarantee is no longer linked to areas of risk and extends to all simple-risk fire policies.

Natural disasters are understood as follows:

- **Flooding.** It is the overflow of water courses, canals, lakes, ponds or seas following atmospheric precipitation, melting snow or ice, broken dykes or tsunamis. Initial overflow, along with any other occurring within 7 days (168 hours) between the flood and the water's return to normal, is considered a sole event.
- **Earthquake.** It is the earth tremor of natural origin, which destroys, breaks or damages property which is insurable against this hazard, at a minimum magnitude of 4 degrees on the Richter Scale, and produces damage within a 10 km radius. Flooding, overflow and saturation of public drainage and landslides or subsidence arising as a consequence are included in earthquake risk. An earthquake and aftershocks occurring within 72 hours following the initial phenomenon are considered part of a single event.
- **Overflow or blockage** of public drainage caused by flooding, precipitation, storm, melting of snow or ice, or inundation.
- **Landslide or subsidence**, i.e. the movement of a significant mass of land which destroys or damages property, due in full or in part to a natural phenomenon other than flood or earthquake.

An insurer can reject natural disaster cover in case of insurance of a building or part of a building or its content, built more than eighteen months following the date of publication in the Official Belgian Gazette of the Royal Decree classifying the location as an area of risk.

Cover for these disaster risks involves an increase in the premium set by the Tariff Office (see paragraph 5.4). The Tariff Office also sets the maximum premium for the "bad" risks. These are not taken by one insurer but all the insurers are involved in the coverage.

5.2. Damage and Properties Covered

This guarantee takes in simple risks (including hospitals, schools, etc.). In principle (see exclusions) the same assets are covered as in the base contract, provided that this involves direct material damage. Material damage is understood as that affecting the structure and the substance of

¹⁸ In relation to natural disasters, this Act amended that of 25 June 1992, the Land Insurance Contract Act, and that of 12 July 1976 on the reparation of certain natural disaster damage to private property.

¹⁹ A summary of the system's development, with its main components, and used as a reference for this section, can be found in the Assuralia brochure "La couverture des catastrophes naturelles". *Assur-Info*, 19 October 2005.

the property insured. However, not just damage which is a direct consequence of the phenomenon guaranteed is insured, but also any arising from an event resulting from such phenomenon e.g. fire, explosion, and broken piping and channelling, in addition to damage to insured properties caused by measures taken by the authorities to safeguard and protect property and persons (dam relief flooding, etc.). The guarantee also includes costs of rubble removal and demolition, and those for re-housing for the three months following the claim, if the insured home is uninhabitable.

Under natural disaster guarantee, the insured sums may not be other than those in the base fire contract.

5.3. Damage and Property Excluded from the Guarantee

Unless otherwise expressly provided for in the policy, the following property and damage are excluded from the guarantee:

- Unstored harvests, livestock out of doors, crops not in greenhouses, land and reforestation.
- Objects outside buildings, unless permanent and securely attached to them.
- Constructions which are easily displaceable or dismountable, and their content, except when the insured's habitual place of residence.
- Gardens, ornamental cultivations, paths, terraces and luxury installations (swimming pools, sports tracks, etc.).
- Buildings or parts of buildings under construction, transformation or repair, and their content, unless occupied or they can normally be occupied.
- The bodies of land, air, sea, lake and river vehicles.
- Transported merchandise.
- Robbery, vandalism, damage to real property as a consequence of robbery or attempted robbery.

In addition to indirect and personal damage, loss of profit and the costs of loss of rental are excluded. Nor is damage covered which is caused to electrical apparatus and its content as a result of disruption in the distribution network, or damage whose repair is provided for in special legislation or international conventions.

5.4. The Tariff Office

In the case of property for which there is no cover on the market, or for which cover is available only at excessively high prices (in premiums or in deductibles) as a result of exposure to risk of the assets to be covered, a Tariff Office is created to specify the rating terms for such risks. The premiums and claims related to risks using this mechanism to set their tariffs are distributed among all insurers operating in simple-risk fire cover in Belgium.

The Tariff Office comprises four members representing the insurance sector, four representing consumers, and a chair, all appointed by the King for six years. The Ministers of Finance, Home Office and Consumer Protection may appoint observers to the Office.

5.5. Indemnification and Deductibles

The legislation sets a limit on intervention, by event and insurer, according to their simple-risk portfolio. According to the Act, “an insurer may, following a natural disaster, limit total indemnification to the lower of the two sums obtained with application of the following formulas:

- a) $\text{€ } 3,000,000 + 0.35 \times P + 0.05 \times S$
- b) $1.05 \times (\text{€ } 3,000,000 + 0.35 \times P)$

P = premium and surcharge revenues, excluding acquisition costs, for guarantee of fire, electricity and related simple-risk guarantees implemented by the insurer in the financial year prior to that of the claim.

S = amount of indemnification owed by the insurer for a natural disaster other than earthquake and exceeding $\text{€ } 3,000,000 + 0.35 \times P$. For earthquake, the coefficient of 0.35 and the sum of $\text{€ } 3,000,000$ are replaced by the figures of 0.84 and $\text{€ } 8,000,000$ ²⁰.

The National Calamities Fund takes up losses covered beyond those limits, albeit to a ceiling, of $\text{€ } 280$ million, except for earthquake, where the Fund’s intervention limit is $\text{€ } 700$ million. Beyond those ceilings, the indemnifications are reduced proportionally.

In terms of deductibles, for natural disaster risks the insurance contract may not apply a deduction of more than $\text{€ } 610$, indexed, per claim²¹, so that the maximum on 1 September 2005 was $\text{€ } 1,008.81$.

5.6. Equalisation Reserves

To deal with the disaster risks provided for under the system, the entities are authorised to create equalisation reserves, which are tax-free and are endowed up to a ceiling of three point five times the insurance branch’s annual revenues.

5.7. The Sequence of Interventions in Case of Claim

On the occurrence of a disaster included within the scope of application of this system, a series of steps must be taken, affecting the commitments concerned, to the extent that the loss situation demands. Should major disaster losses exceed the capacities of the direct insurers and their reinsurers, the National Calamities Fund intervenes up to its ceilings of $\text{€ } 208/700$ million with the guarantee of the State. Should that prove to be insufficient, then the indemnities are reduced proportionally.

5.8. Prevention

The State undertakes to adopt and enforce the appropriate preventive measures against natural disasters at all levels of the Administration: State, regions, provinces and municipalities. It will also take extreme care to ensure that construction permits are not issued in areas of risk.

²⁰ Articles 11.3 and 11.4 of the Act of 17 September 2005.

²¹ This figure is linked to trends in the consumer price index, at the December 1983 base index, of 119.64 (1981 Base = 100).

CANADA

1. Natural Disasters

Canada's special geographic situation makes the country particularly susceptible to the rigours of certain atmospheric events such as hail, storms, ice precipitations, avalanches, weight of snow, flooding, tornados, etc. Flooding is probably the most common disaster and is the atmospheric event which, overall, produces the most damage. The floods which covered the region of Saguenay (Quebec) in July 1996 caused insured damage of approximately 249.5 million Canadian dollars (CAD). The 1993 Winnipeg floods were responsible for CAD 234 million in insured damage¹, while in Ontario, floods in August 2006 left insurers facing losses of CAD 520 million².



A large part of the flood disasters registered in Canada during the twentieth century were concentrated in four provinces: Ontario, New Brunswick, Quebec and Manitoba³.

Other phenomena have also caused major disasters, as in the case of the hailstorm in Calgary (Alberta) in September 1991, with insured losses of CAD 430 million⁴. However, the record for destruction goes to the particularly virulent ice storm during the first days of 1998 in Eastern Ontario, Quebec and New Brunswick, which caused 25 deaths and gave rise to more than 730,000 claims, representing insurance losses of CAD 1,757 million⁵. This was undoubtedly the worst natural disaster in the history of Canada, with economic damage amounting to CAD 7,000 million⁶. Moreover, windstorms and rain occurring in August 2005 in Ontario inflicted heavy losses, and insurance companies had to meet claims worth around CAD 500 million⁷.

In any event, earthquakes pose the most serious potential disaster risk and, although in the past century their incidence was not insignificant (fifteen quakes of more than 6 degrees on the Richter Scale), their destructive effects were fortunately limited, because they were felt in remote sparsely-populated regions⁸. This good luck is of little comfort and is no guarantee for the future,

¹ Insurance Bureau of Canada (IBC); "Facts of the general insurance industry in Canada 2006", pp. 20-21 (ibc.ca/en/Need_More_Info/documents/FactsBook2006.pdf).

² Guy Carpenter: "New Capital Stabilizes Market". *The World Catastrophe Reinsurance Market 2007*; Sept. 2007; p. 8.

³ Shrubsole, Dan *et alii*: "An Assessment of Flood Risk Management in Canada". ICLR Research; Paper Series, n.° 28; January 2003; p. 12 (www.iclr.org).

⁴ Insurance Bureau of Canada (IBC): "Facts of the general insurance industry in Canada 2005", pp. 20 (ibc.ca/en/Need_More_Info/documents/FactsBook2005.pdf).

⁵ IBC: *Op. cit.*; p. 21. Also, Vellinga, P. and Verseveld, W.J.: "Changements climatiques et événements météorologiques extrêmes". WWF, September 2000; p. 19 (www.wwf.fr/content/download/174/880).

⁶ Sécurité Publique Canada: www.securitepublique.gc.ca/res/em/nh/bl/index_1-fra.aspx

⁷ IBC: *Op. cit.*; p. 21.

⁸ Cfr. Shilts, Elizabeth: "On shaky ground". *Canadian Geographic Magazine*, November-December. 1996 (www.insurance-canada.ca/swissre/earth4.htm). Among the great seismic events recorded in Canada it must be pointed out the

because it is known that two of the most active seismic zones (“critical zones”) are among those of greatest population density: the provinces of British Columbia and Quebec. Paradoxically, these critical zones represent only 4% of the nation’s territory, while earthquake risk can be considered very low in 90%, and medium in 6%⁹.

2. Natural Disaster Coverage

The criterion of Canadian insurers, headed by the Insurance Bureau of Canada (IBC), is that if there are insurable natural disasters these should be taken up by the private market. This means that all relevant precautions must be taken (awareness, risk assessment and management, financial health, etc.), depending on the type of risk, particularly with respect to the potential loss and to insurers’ response capacity and solvency, which is closely monitored by a supervisory body: the OSFI-BSIF (Office of the Superintendent of Financial Institutions).

In general, cover is affordable on the Canadian market for climatic and seismic risks, except for floods, which are excluded from standard household policies. Where such cover is offered, in limited areas, prices are extremely high, as are the deductibles. On the other hand, for commercial risks, flooding can be guaranteed under multi-peril policies¹⁰. Depending on their location zones, households can obtain cover against damages caused by the obstruction of stormwater drains due to intense rainfall by means of the same standard policy or in exchange for payment of an additional premium¹¹.

Among experts there is some doubt that the involvement of the federal government in, for example, a flood insurance scheme similar to the U.S. *National Flood Insurance Program* would be legally possible¹².

Household insurance policies cover a number of natural risks including fire, lightning, storm, tornados and hail (excluding damage to trees and outdoor antennas). On the other hand, cover is not usually provided for avalanches, landslides or other earth movements, or for floods, as mentioned above, or the weight or pressure of ice or snow. In any case, the cover included in household insurance varies, depending on the company, the cost of the cover, the deductibles, and also each province’s legislation.

The rate of penetration of earthquake insurance cover differs from one province to another. For example, in British Columbia, 96% of homeowners have fire insurance and 63% acquire earthquake cover, moreover, 80% of companies have covers which include earthquakes¹³. However, in

earthquake which took place on January 26, 1700, in the subduction area of Cascadia (British Columbia), with 9 degrees of magnitude, followed in significance by the earthquake occurred on August 22, 1949, near the Queen Charlotte Islands (British Columbia), with 8,1 degrees of magnitude (earthquakescanada.nrcan.gc.ca/historic_eq/top10_e.php).

⁹ Keller, G.R. and Amodeo, F.A.: “The Canadian Insurance Market”. January 2001 (www.irmi.com/Expert/Articles/2001/Keller01.aspx). The potential economic damage from a major earthquake in British Columbia is estimated at around 30,000 million CAD, half of which would be insured losses, amounts far superior to the capacity of the province’s insurance market. A major earthquake in Quebec could cost insurers as much as CAD 5,000 million (Cfr. Guy Carpenter; *Op. cit.*; p. 9).

¹⁰ Guy Carpenter: *Op. cit.*; p. 8.

¹¹ Cfr. Shrubsole, Dan *et alii*: *Op. cit.*; p. 27. Also, IBC: Media Release, April 30, 2007 (www.ibc.ca/en/Media_Centre/News_Releases/2007/04-30-2007-2.asp).

¹² *Ibidem*: p. 7.

¹³ Kovacs, P. and Kunreuther, H.: “Managing catastrophic risk: lessons from Canada”. Paper given at the Conference on

Quebec earthquake cover is added to less than 10% of household policies, although 55% of commercial businesses purchase this guarantee ¹⁴.

3. The Special Case of Earthquakes

However, as already pointed out, earthquake remains the most worrying risk, which is why both the insurance market and the supervisory authorities are coordinating their efforts ¹⁵ in devoting special attention to the insurance treatment of this risk, so that in an eventual earthquake disaster, insurance institutions would be able to operate with all guarantees for the insured parties affected. This effort was in response to a clear awareness that neither individuals nor the government nor insurers are financially prepared for a major earthquake in an urban centre ¹⁶.

Earthquake insurance in Canada covers two clearly differentiated risks - shakes and the fires following; and this is normally arranged under differing schemes. Thus, the cover for damage caused by seismic movements is not included in a standard household policy, but can be acquired as an extension of cover ("*earthquake extension*") or a supplement to a main policy, covering property damage (home and contents), and also possibly taking in business interruption, survival costs, damage to vehicles, etc. ¹⁷. It is, therefore, an additional cover, not just with its own premium, the rate for which depends on the location of the property protected (according to defined risk zones) and the form of construction of the buildings, but also accompanied by a substantial deductible, of between CAD 250,000 and 500,000 ¹⁸.

With respect to cover for fire damage following an earthquake, some insurers exclude this from standard household policies ¹⁹ and others offer it additionally as a supplement. The government's position would be in favour of every fire policy, without the need for purchasing an extension of guarantee for earthquakes, would include the risk of fire following an earthquake. However this position is not shared by the IBC ²⁰. The market defends the criterion of grouping the earthquake-related risks together (including the risk of fire) in a separate specific policy, as the best way to manage the risk more effectively ²¹. The fact of the matter is that damages as a result of a subsequent fire could even be greater than those caused by the shake itself, particularly in the event of broken gas mains ²².

As part of this concern over earthquake risk, the OSFI-BSIF worked in collaboration with the Insurance Bureau of Canada to define basic lines of action for multi-peril insurers in connection with this hazard, which appeared in 1998 under the title "Earthquake Exposure Sound Prac-

Earthquakes ICLR/IBC; 23 March 2001. Simon Fraser University, Vancouver; p. 20 (opim.wharton.upenn.edu/risk/downloads/01-09HK.pdf).

¹⁴ Cfr. Guy Carpenter: *Op. cit.*; p. 9.

¹⁵ The cooperation process began in 1995 with the creation of the "OSFI-Industry Earthquake Task Force", a working group commissioned with proposing appropriate strategies and policies in order to be prepared for the risk of earthquakes.

¹⁶ Cfr. Insurance Bureau of Canada (IBC): "Canadian earthquake exposure (and the insurance industry). A proposal for strengthening industry discipline". February 1997.

¹⁷ OSFI-BSIF: Guideline (Earthquake exposure sound practices); May 1998 (www.osfi.gc.ca).

¹⁸ Keller, G.R. and Amodeo, F.A.: *Op. cit.*

¹⁹ Insurance Canada (www.insurance-canada.ca/consinfo/general/uaskus/uaskusMore.php?uaskus=8).

²⁰ Guy Carpenter: *Op. cit.*; p. 9.

²¹ Ministry of Finance (British Columbia); "Insurance Act Review - Discussion Paper". March 2007; p. 8 (www.fin.gov.bc.ca/scp/fcsp/InsuranceAct_Review_DiscussionPaper.pdf).

²² Baker, Mark: "Natural Hazards and the Canadian Insurance Industry". ICLR Research, Paper Series n.º 25. December 2002; p. 7.

tices”²³. The aim is for insurance companies to be financially sound enough to confront Probable Maximum Loss (PML) in case of earthquake; in this context, the measurement of PML is of maximum relevance.

The OSFI-BSIF controls the accumulation of premiums of this insurance and, for this purpose, established the obligation for insurance companies to report the earthquake premium provisions (EPP) which they must compulsorily establish. The companies endow their tax-free reserve each year with up to 75 percent of the annual earthquake premiums, net of reinsurance. Initially it was intended for each insurer to be able to cope with earthquake losses in a 250-year return period event, and now the aim is to increase that capacity in the next few years to a 500-year return period event²⁴.

Finally, in 1998 the insurance sector created the Institute for Catastrophic Loss Reduction, an initiative designed to coordinate efforts to reduce risks affecting Canadian insurers²⁵.

4. Claims Emergency Response Plan (CERP)

The Insurance Bureau of Canada (Quebec Sector) organised the Claims Emergency Response Plan as a mechanism to coordinate all insurance areas (agents, brokers, adjusters, the claims personnel in companies and other support mechanisms required) in dealing with a community affected by a disaster, to process claims quickly and indemnify the largest possible number of those insured without delay. The CERP operates in co-operation with provincial emergency organisations²⁶.

5. The Disaster Financial Assistance Arrangements (DFAA)

The DFAA have been in force since 1970, providing an instrument whereby the Federal Government offers financial backing to provincial and territorial governments requesting it and which have undertaken aid programmes for victims of natural disasters, when the damage represents a heavy burden for their economies. The provincial and territorial governments decide on the amount and type of aid to be granted to those who have suffered loss.

Federal Government involvement is determined according to a pro-rata formula depending on the provincial population, and restricted to so-called “eligible” costs, which include those for the reestablishment of infrastructures and public services, for reparation of essential personal property, and for small enterprises and farms. Repairs covered by an insurance policy can not be compensated through the DFAA.

On the other hand, it is a requisite, for entitlement to federal aid, that those costs exceed 1 CAD per inhabitant of the province or territory. Under this system, the federal aid does not go directly to the individuals affected but rather to the territories and provinces.

²³ OSFI-BSIF: Ligne directrice: “Saines pratiques applicables aux engagements relatifs aux tremblements de terre”. Mai 1998 (www.osfi-bsif.gc.ca/app/DocRepository/1/fra/directrices/prudentielles/directrices/b9_f.pdf).

²⁴ Dickinson, Julie (Superintendent of BSIF): Address in Toronto, on 26-10-2007 (www.osfibsif.gc.ca/app/DocRepository/1/fra/discours/ibc07_f.pdf).

²⁵ ICLR: www.iclr.org/

²⁶ Insurance Bureau of Canada: www.bac-quebec.qc.ca/en/emergency_response/index.asp.

The expenses to be considered under the DFAA are divided into several layers. In the first layer of expenses (1 CAD per inhabitant) the Provincial Government assumes one hundred percent of the cost; in the second layer (2 CAD per inhabitant) the Government of Canada assumes fifty percent; in the third layer (2 CAD per inhabitant) the Government of Canada assumes seventy five percent. The Government of Canada will assume ninety percent of the cost above the last layer ²⁷.

The DFAA are administered by PSC (Public Safety Canada) and, since the commencement of the programme in 1970, this system has provided the channel for disaster aid in an amount in excess of CAD 1,800 million ²⁸.

²⁷ Public Safety Canada (www.publicsafety.gc.ca/prg/em/dfaa/index-eng.aspx).

²⁸ Public Safety Canada (ps-sp.gc.ca/prg/em/dfaa/index-en.asp).

THE CARIBBEAN

1. The Caribbean Catastrophe Risk Insurance Facility (CCRIF). Introduction ¹

Caribbean countries are highly exposed to natural adversities, mainly hurricanes, earthquakes, volcanic eruptions and tidal waves, which can result in disasters affecting their entire economic, human, and physical environment. Since 1970, the damage caused by natural disasters in this zone has averaged more than 2% of the GDP of the countries affected. While these are aggregate data, individual events can result in total destruction in a matter of hours.



Of particular concern are the hurricanes, because of their destructive potential and their recurrence. It is estimated that a major hurricane hits the Caribbean basin every two and a half years, as it lies directly in the track of storms originating in the Atlantic Ocean. The impact of hurricanes is highly variable. During the last 27 years (1979-2005 inclusive), 13 were “loss-free” with no significant damage. Over 8 of the years, the losses recorded were caused by a single hurricane. Over the remaining 6 years, significant damage was caused by multiple storms. In 2004, for example, four storms (Charley, Frances, Ivan and Jeanne) led to considerable devastation with combined losses of almost USD 4.5 billion. Albeit rarely, a single hurricane can affect more than one country, as with Ivan in 2004, which caused damage in eight different states. In addition to frequency, intensity is the major factor determining losses. The records show that storm losses to private property, public infrastructure and other state property can be considerable (the losses in 2004 from Hurricane Ivan in Grenada were calculated at USD 800 million, about two times the country’s GDP, of which government losses counted for nearly a third).

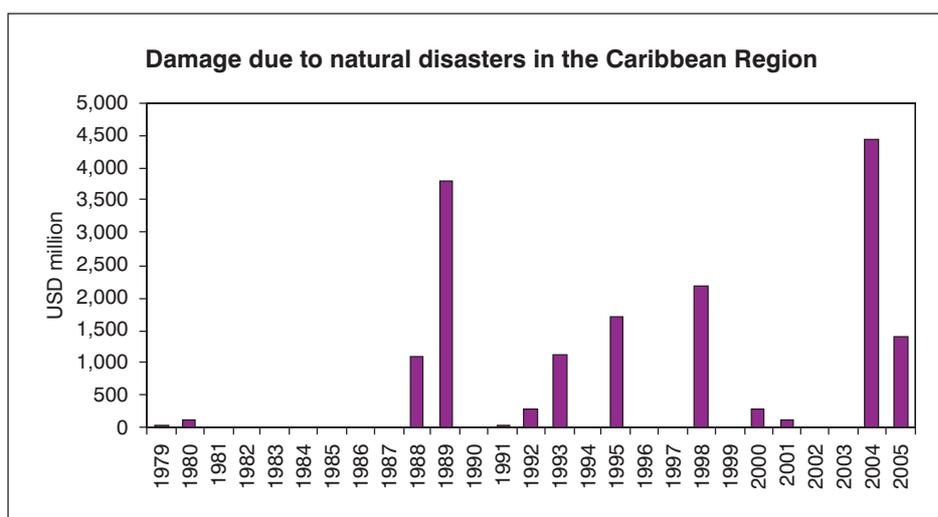
Other natural risks are less frequent, but can be as devastating as hurricanes. For a number of reasons, ranging from the growing concentration of assets to poor environmental management, the loss burden arising from natural events is increasing.

Because of their small size, Caribbean countries have very limited financial capacity to respond to adverse natural disasters. Larger states can generally absorb the impact, diverting funds from unaffected areas to those which have suffered damage. However, such geographic risk-diversification is virtually impossible in the small island-states of the Caribbean. The inability to respond effectively, both physically and financially, to disasters frequently slows recovery, which ultimately worsens the relationship between natural disasters and the vulnerability of the poorest population. Because of very limited savings, the poor have less capacity to overcome the effects of catastrophes, and are often reliant on governmental recovery programmes.

¹ This chapter has been prepared by Milo Pearson (CCRIF), Simon Young (CCRIF), Francis Ghesquiere (World Bank) and Olivier Mahul (World Bank).

MAIN NATURAL DISASTERS IN THE CARIBBEAN (1979-2005)

Year	Country (hazard type)	People affected	Damage (thousand USD)
1979	Dominica (<i>Davis and Frederick</i>)	72,100	44,650
1980	St. Lucia (<i>Allen</i>)	80,000	87,990
1988	Dominican Republic (Flood)	1,191,150	
1988	Haití (<i>Gilbert</i>)	870,000	91,286
1988	Jamaica (<i>Gilbert</i>)	810,000	1,000,000
1989	Montserrat (<i>Hugo</i>)	12,040	240,000
1989	Antigua, St. Kitts/ Nevis, Tortolla (<i>Hugo</i>)	33,790	3,579,000
1991	Jamaica (Flood)	551,340	30,000
1992	Bahamas (<i>Andrew</i>)	1,700	250,000
1993	Cuba (Storm)	149,775	1,000,000
1993	Cuba (Flood)	532,000	140,000
1994	Haití (Storm)	1,587,000	
1995	St. Kitts and Nevis (<i>Luis</i>)	1,800	197,000
1995	U.S. Virgin Islands (<i>Marilyn</i>)	10,000	1,500,000
1998	Dominican Republic (<i>Georges</i>)	975,595	2,193,400
2000	Antigua/Barbuda, Dominica, Grenada, St. Lucia (<i>Lenny</i>)	268,000	
2001	Cuba (<i>Michelle</i>)	5,900,012	87,000
2004	Cuba, Jamaica, Cayman Islands (<i>Charley</i>)	202,620	1,000,000
2004	Bahamas, Dominican Republic, Puerto Rico, Turks and Caicos (<i>Frances</i>)	8,450	
2004	Cayman Islands, Grenada, Jamaica, St. Vincent, Cuba, Barbados, Trinidad and Tobago, Haití (<i>Ivan</i>)	419,805	3,431,564
2004	Haití, Puerto Rico, Bahamas (<i>Jeanne</i>)	303,426	21,000
2005	Cuba, Haití, Jamaica (<i>Dennis</i>)	2,523,000	1,400,000
2005	Cuba, Haití, Jamaica, Bahamas (<i>Wilma</i>)	101,600	



In addition to these restrictions on the geographical diversification of risk, an inability to increase the level of credit (these countries are already heavily indebted) also prevents the possibility of spreading the risk over time. Caribbean countries affected by natural disasters generally have reduced access to external credit at the very time when they need it most, limiting their capacity to respond to their most urgent needs. Credit lines made available by international bodies like the IMF (excepting *Emergency Natural Disaster Assistance*) are often slow to materialise, and increase the debt burden as these loans usually have to be repaid over a very short period of time. Under these circumstances, Caribbean governments have come to rely on the financial aid from international donors to address post-disaster needs. Unfortunately, this aid is also relatively slow, and usually involves specific infrastructure projects, while what governments need is very short-term liquidity in order to maintain basic public services until additional resources are put in place.

Finally, Caribbean governments' access to traditional insurance and reinsurance catastrophe markets is also limited because of the high transaction costs resulting from the relatively small amount of business placed in the reinsurance market. In the absence of efficient market conditions, most financial losses are borne by governments and individuals, impacting disproportionately on the poorest population.

2. The CCRIF. The World Bank's Involvement in its Creation

Under the circumstances stated in the previous section, a catastrophe insurance pool has proved to be the best solution to absorb losses arising from natural phenomena. However, a national disaster risk pool would not be efficient in the case of small states with a high concentrated risk exposure. A regional solution has thus been sought.

Following the devastation caused by natural disasters in 2004, the CARICOM (Caribbean Community and Common Market) Heads of Government asked the World Bank for assistance with gaining access to affordable and effective catastrophe insurance, as a cornerstone in reducing financial vulnerability to natural risks. In terms of both its technical experience and its convening power, the World Bank is well-placed to help with the design and implementation of an insurance pool participated by a number of countries.

The World Bank's response to this request was to design and propose the CCRIF (Caribbean Catastrophe Risk Insurance Facility or "Facility"), a tool which allows Caribbean countries to access international financial markets at the lowest possible cost by pooling each country's specific risks into a single and better diversified portfolio. More specifically, the Facility allows CARICOM governments to purchase coverage similar to business interruption insurance that provides them with immediate cash payments after the occurrence of a major hurricane and/or earthquake. Thanks to the speed at which insurance payouts are handled, this procedure is particularly useful for financing the most urgent post-disaster reconstruction, giving the countries affected time to mobilise additional resources to fund longer-term reconstruction projects. The ultimate cost of the cover depends on the extent of risk diversification, economies of scale and the Facility's initial capital.

3. Operation of the CCRIF as Insurance Tool

To access the reinsurance market where it is most efficient, the CCRIF retains part of the risk ceded by participant countries. To perform this role, the CCRIF is established as an independent

entity to act as a financial intermediary between the countries who have joined the CCRIF and the international financial markets.

The following five main characteristics support the objective of participant countries' efficient access to disaster insurance:

3.1. Pooling of Risk

The pooling concept makes the overall risk more stable and therefore more attractive to the reinsurance markets, thereby reducing the premium cost.

The statistical base of insurance is the Law of Large Numbers. Intuitively, the observed average loss (per policy) approaches the statistical expected loss (per policy) as the size of the insured population increases. In other words, an insurer can almost predict the average losses per policy and thus set the premium accordingly. This logic works when a large number of small independent risks are at stake, as for example in the case of automobile insurance. Unfortunately, natural disasters are not easily diversifiable because many of those insured are affected simultaneously by a single occurrence. Moreover, deviations between actual losses (which can be disastrously high) and expected losses are very large. As a result, insurers have to set up a high level of catastrophe reserves which will enable them to make large indemnity payouts in the case of a major event. These provisions generate substantial costs to the insurer, which are passed on to the policyholder through a catastrophe load to be added to the actuarial cost or pure premium (expected annual loss). The higher the catastrophe reserve, the higher the catastrophe load.

Because natural risks among the Caribbean islands are not perfectly correlated, risk variability in terms of the CCRIF portfolio is less than the combined variability experienced by individual states. Probable Maximum Loss (PML), defined as the largest likely loss caused by a specific catastrophe event for a given period of return, is significantly reduced when the risk are combined into a pool, so that both the cost of coverage and the size of the reserves per policy to be set aside, are lower. Simulations show that pooling each Caribbean country's specific risks allows the Facility to reduce the individual premium of each of them between a third and half compared with the premium they would have to pay if they approached the reinsurance market independently. Likewise comparing the PML of a risk pool including all CARICOM countries with the sum of each country specific PMLs (for a 1-in-200 year event), total necessary reserves are cut by 76% for hurricane and 68% for earthquake. Obviously, the outcome depends on the number of countries joining the pool.

3.2. A Sound Reserve Base

The Facility has been designed to be financially sustainable. Thus premiums are set at a level sufficient to meet expected losses, operating costs and reserve accumulation (net of inflation). The CCRIF will not pay dividends; profit posted will be reinvested to accumulate reserves, considerably reducing the cost of reserves (catastrophe load) on the portion of the risk retained. The benefits in terms of reserves depend on the amount of capital assembled at the time the system starts up. With sufficient reserves, the Facility will be able to dedicate a decreasing portion of the premium collected to the purchase of reinsurance, allocating an increasing portion to the accumulation of reserves, thereby reducing the Facility's dependence on the reinsurance markets. Likewise, an insufficient level of initial reserves makes it more difficult for the Facility to augment the reserve base, ultimately affecting the capacity to maintain its financial sustainability.

3.3. Low Operating Costs

The Facility's design costs are being funded by the World Bank together with grant financing from the Government of Japan. Without such input, the Facility would have to charge higher premium rates to recover the start-up costs. In operation, the nature of the Facility ensures that costs are kept to a minimum. With parametric insurance², the loss adjustment process to determine the insurance payout is not necessary, but depends exclusively on the measurable characteristics of a catastrophic event, or the underlying index, generally measured by independent agencies. Finally, participant countries will benefit from economies of scale in the Facility's day-to-day operating costs, which is expected not to exceed 5% of premiums collected.

3.4. Stability of Premiums

Catastrophe insurance premiums are known to be highly volatile, making it difficult to plan and implement insurance programmes. This problem was aggravated following the 2004-2005 hurricane season, which led some reinsurers to increase the price of some insurance layers for catastrophe risk in the Caribbean by 100%.

One of the objectives of the CCRIF is to stabilise the insurance cost. A catastrophe insurance pool can act as an efficient intermediary between the ultimate insurers and the reinsurance markets. With sufficient accumulated reserves, the pool can smooth the cost of risk transfer, and thus the insurance premiums, by changing the risk-retention levels. As the reserves base grows, the Facility will enhance its capacity to retain a larger portion of risk and provide participant countries with greater stability than that offered by commercial markets.

3.5. Sustainability

A major goal of the Facility is to attain a high level of survivability while maximising long-term sustainability. To achieve that, the system needs to set a level of financial security allowing for the accumulation of reserves, while guaranteeing those participants that loss compensation will certainly be paid. A major challenge faced by the risk manager is to balance opposing needs for reserves accumulation and survivability. A strategy whereby the system transferred most of its risk portfolio to the reinsurance market would ensure a high level of survivability, but would compromise the chance of accumulating reserves over time. On the other hand, a strategy in which the system retained a significant part of the risk might jeopardise its survivability in any given year.

The speed at which reserves are accumulated, and the level of survivability will also affect its insurance commitments. Design of the CCRIF used international best practice standards. The CCRIF will always maintain a risk of default probability below 0.05%. The Facility will initially develop a financial risk-premium strategy that guarantees capacity to pay claims for at least a 200 year period of return³, and will seek to reach sufficient claim payment capacity to survive a 500 year period of return, as from the sixth year of implementation. The strategy for a 200 year period of return carries a 99.55% annual probability of survivability. If the claims-paying capacity is not sufficient to meet the liabilities, the sums claimed will be prorated according to available funds.

² Parametric insurance refers to the insurance contract which determines claim payments according to intensity indices of a pre-determined natural event, in a pre-determined geographical area and in a pre-determined period of time, up to a pre-determined annual limit. See the section on the "Nature of the Cover".

³ Period of return corresponding to a BBB+ rating, pursuant to the S&P system.

The Facility’s financial sustainability is heavily influenced by the number of participants; the more diversified the portfolio, the less vulnerable it will be to “peak” exposures. To encourage continuous participation, CCRIF member countries are required to pay a non-refundable admission fee.

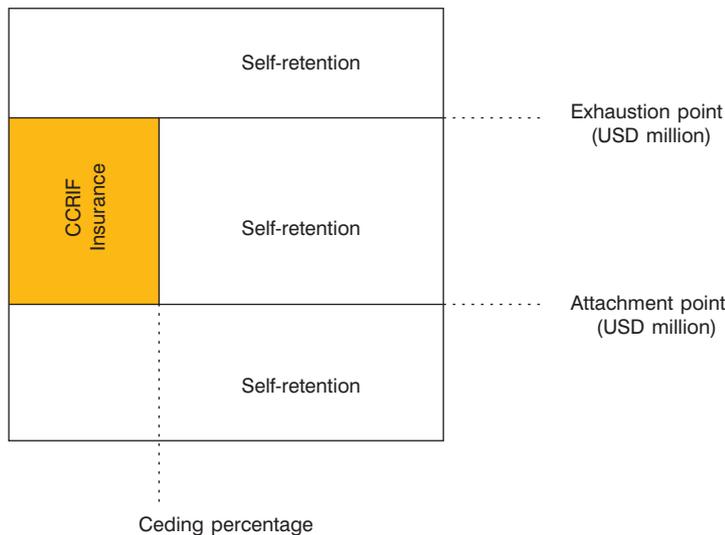
4. Nature of the Cover

As already mentioned, the Facility’s insurance contract is “parametric” in nature. Payments under these products are based on the intensity of a natural event (e.g. wind speed, earthquake shaking intensity). Unlike traditional claims settlements, which require an individualised assessment of loss on the ground, parametric insurance relies on the valuation of losses made using a pre-defined formula based on variables that are exogenous to both the insured and the insurer, but which are closely correlated with the individual losses.

The parametric index used by the CCIRF to proxy wind damage is calculated from data provided by the U.S. National Hurricane Center, the World Meteorological Organisation’s regional forecasting centre. For earthquakes, the data is provided from the World Data Center for Seismology via the U.S. Geological Survey. Application of an equation to these entries gives the value of the index for each country and risk. For larger countries, the final index is a weighted average of two or more zones.

In principle, any index can be valid for these purposes, provided it is agreed to in advance and it is clear, unambiguous, and is not subject to manipulation by the interested parties.

The CCIRF insurance scheme covers a part of estimated government losses (percentage ceded and not retained), less a pre-determined deductible (attachment point) and up to a pre-determined upper limit (exhaustion point).



Government loss was modelled to include the following components:

- Direct damage to government buildings.
- Reduction of annual tax revenue as consequence of damage to commercial facilities, business interruption, loss of import taxes, and tourism taxes ⁴.
- Losses from damage to public infrastructure (bridges, roads, piping, hospitals) ⁵.
- Relief expenditures provided by the government ⁶.

Each of these loss components is first estimated separately and then combined, to assess the overall government loss for a country. Based on these elements, EQECAT, an independent risk-modelling firm, has developed a model to estimate the budgetary deficits that each Caribbean government would incur in case of a hurricane and/or earthquake. In addition, all the indices required for parametric insurance were carefully developed.

Parametric insurance has important advantages. Losses can be quickly paid to the Treasury of the country affected, operating expenses are reduced, moral risk and adverse selection are avoided, attraction of the financial markets is enhanced (reinsurance and securitisation) and the system works with transparency. However, this type of insurance faces some challenges. One of them is *basis risk* which appears when payout does not exactly match the actual losses. By definition, the index used by parametric contracts is an indicator of real losses, and thus carries the possibility that the parametric insurance indemnity may underestimate or overestimate the actual losses. To overcome this drawback, regional hurricane and earthquake estimations have been calculated using state-of-the-art catastrophic risk modelling techniques. At the same time, parametric indices have been meticulously designed to minimise the *basis risk*. Other drawbacks are the lack of knowledge policyholders and governments have with this type of insurance, and the technical and market limitations to extend parametric insurance to other hazards, such as volcanic eruption.

5. Cost of the Cover

A detailed risk model has been developed to assess individual risk exposure to both hurricane and earthquake for each country, or in other words, the frequency (probability) with which a risk occurs for different levels of intensity. For hurricane risk, the intensity is expressed according to wind speed and, for earthquakes, by ground acceleration. The results have been represented as curves which point to exponential increments as the intensity of the risk increases, i.e. the ratio of damage rises faster than increases in intensity.

The insurance premiums are calculated based on the estimated risk faced by each individual country. This procedure guarantees that cross-subsidisation is minimised.

The cost of coverage is calculated based on the country-specific Average Annualised Loss (AAL), the catastrophe load and the operating costs. The components of the insurance premium depend on the terms and conditions of the policy selected by the individual participating countries (deductible, excess, limit) and the structure of the CCRIF portfolio (number of participants and conditions of their policies), which will impact the Facility's reserve requirements and the cost of reinsurance.

⁴ It is estimated by relating the degree of damage to commercial buildings with annual national tax reduction.

⁵ It is estimated based on total damage to residential buildings in the same area. Information available on previous hurricanes shows that damage to infrastructures ranges from 15% (Grenada) to 129% (Bahamas). Based on these data, a table of infrastructure loss ratios has been developed for each country and risk.

⁶ It is assumed to be 1% of total damage to residential buildings in the same area.

Duration of parametric policies offered by the Facility is annual. They are effective as of 1 June each year and will cover either one or both risks.

6. The CCRIF'S Operational Structure

The CCRIF is supervised by a Board of Directors composed of representatives from the donors and participant countries as well as regional and international industry experts. The Board of Directors is supported with the technical advice of a specialist company acting as Facility Supervisor which performs the front-office operations, such as risk-management, financial modelling, policy management, premiums collection and claims settlement. A Captive Manager is retained to perform the Facility's back-office functions under Cayman Islands law.

The Facility's asset management will be responsibility of an independent specialised agency (the Asset Manager), that will be subcontracted by the CCRIF.

The Facility has acquired coverage in the reinsurance or alternative risk-transfer markets. A reinsurance broker, Benfield Group, has helped to design a reinsurance strategy reflecting the circumstances of the market, and handles reinsurance operations on behalf of the Facility⁷.

Once the CCRIF's design work was completed, the World Bank Treasury participated in the transfer of USD 20 million of the CCRIF's catastrophe risk through a swap transaction.

7. The Legal Structure of the CCRIF

The CCRIF has been constituted as an independent legal entity, registered and licensed as an insurance company in the Cayman Islands. The company is owned by a commercial trust (the *CCRIF Trust*) also domiciled in the Cayman Islands.

8. CCRIF's Funding. Donations

As already mentioned, to enter the CCRIF, participant countries paid an admission fee. For each country, the Participation Fee is equivalent to the amount of its annual premium.

To financially support the CCRIF, possible donor partners were called on to contribute either directly to the CCRIF, or through a fund to channel donors' funds, the CCRIF Multi-Donor Trust Fund. This Fund's resources are administered by the World Bank. The terms and conditions under which the World Bank disburses funds from the CCRIF Multi-Donor Trust Fund have been set forth in an agreement signed by the World Bank and CCRIF. These repayments will be assigned, as necessary, to finance operating expenses, risk-transfer premiums and loss payments accruing to the Facility.

A donors' conference was held on 26 February 2007 to procure funds for the initial cost of establishing the CCRIF and the financing of the first few years of operations.

Preparatory studies for the start-up of the CCRIF were funded via donations from the Japanese Government and World Bank loans. These studies included the development of hurricane and earthquake models used to assess the potential quantitative impacts on Caribbean countries, as

⁷ Initial talks with significant reinsurance agents show that non-proportional reinsurance might be the most efficient strategy.

well as the structure of a financial risk strategy, and the design of the Facility's legal and organisational structure.

The donors' role is of vital importance as it helps the Facility to build up its own reserves at an accelerated pace. These reserves are essential for two reasons. First, the CCRIF was required to have a minimum amount in reserves to be able to access reinsurance markets. Whether reinsurers provide risk capital through proportional or loss excess agreements, they demand that the primary insurer (here the Facility) retain part of the risk. Still more important is that the initial level of reserves will be essential to ensure the Facility's long-term sustainability. Initial reserves will allow the Facility to retain some of the risk and allocate just a limited portion of the premiums collected toward the acquisition of reinsurance, giving it the opportunity to grow its reserves over time. Excessive and chronic dependence on reinsurance would not be sustainable for the Facility, as it would be highly expose to price cycles and would probably reach a point at which it could no longer provide insurance service at a reasonable rate.

In case of dissolution of the CCRIF, its assets will be returned to the CCRIF Trust (as 100% owner of the company). Upon dissolution of the CCRIF Trust, its assets will be distributed among the beneficiaries of the CCRIF Trust (the participant countries) to be used only for specific purposes. Funds remaining in the CCRIF Multi-Donor Trust Fund will be returned to donors, in accordance with the agreements entered into between each donor and the World Bank.

9. Joining the CCRIF

The potential benefits of the economies of scale resulting from risk pooling could only be achieved with the participation of a sufficiently large number of countries. 16 countries (including CARICOM member and associate states) have joined CCRIF to date: Anguilla, Antigua and Barbuda, the Bahamas, Barbados, Belize, Bermuda, the Cayman Islands, Dominica, Granada, Haiti, Jamaica, St. Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines, Trinidad and Tobago, and the Turks and Caicos Islands.

Guyana and Surinam are not threatened by hurricanes or earthquakes and so are not participating in the CCRIF at this time.

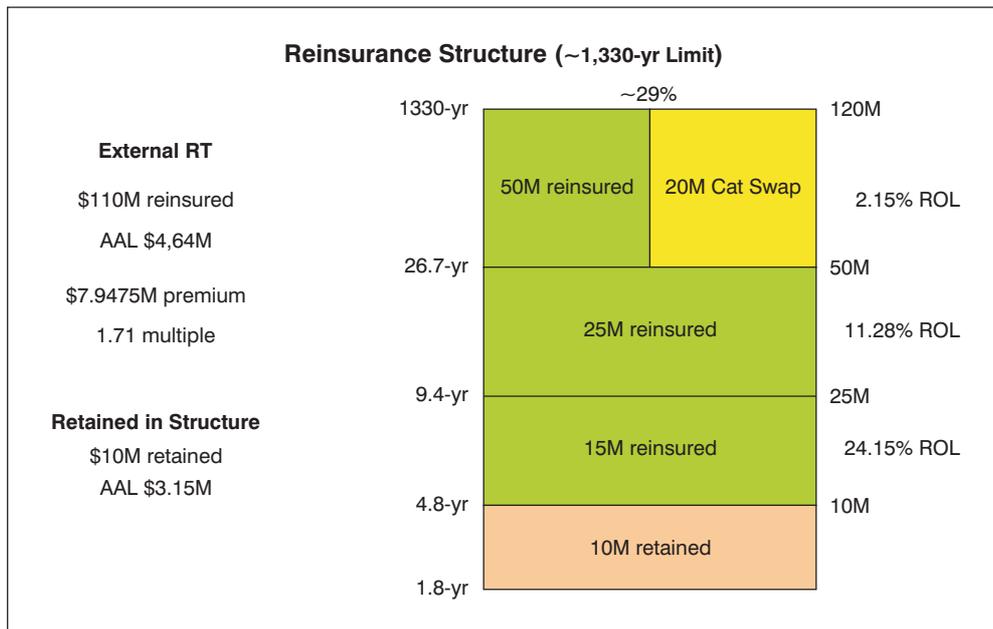
10. The First Year CCRIF's Figures

The CCRIF was launched on 1 June 2007, with a portfolio composed of 31 policies subscribed by the 16 participant countries. In general terms, the coverage contracted is higher for hurricane than for earthquake.

For its first fiscal year, the CCRIF draws on both capital and donor funds of some USD 87 million, which breaks down as follows:

Donors' funding:	USD 45 million
Capital:	
Admission fees:	USD 20 million
Premiums:	USD 20 million
Asset Income:	USD 2 million

The CCRIF has been able to secure USD 110 million of loss payment capacity on the international reinsurance and capital markets. The reinsurance is structured into four layers: a first layer, of USD 10 million, has been retained by the CCRIF. The second (USD 15 million) and third layers (USD 25 million) have been underwritten by international reinsurers. The top layer (USD 70 million) is financed in a mixed regime, by reinsurance (USD 50 million) plus through a cat swap transaction (USD 20 million) between the World Bank Treasury and the CCRIF. This is the first time developing countries have had access to derivative financial products to insure themselves against natural disasters.



11. CCRIF Financial Structure and Claims Paying Capacity

The current financial structure and claims paying capacity is a result of a Dynamic Financial Analysis (DFA). The DFA is a financial analysis model which uses the Monte Carlo methodology. DFA has been used to test CCRIF finances to a 10 year horizon, with the following results:

- After the first 10 years, the Facility is solvent 99.86% of the time, in other words, it is insolvent in just 14 of the 10,000 ten-year series.
- 90% of the time, the Facility has more than 115 million dollars of capital at the end of 10 years.
- The average policy premium multiple for those 10 years is 1.8.
- The “smallest event” which can bankrupt the system in any of the 100,000 years modelled is a 1-in-3,500 year event.

DENMARK

1. Natural Disasters ¹

The most frequent natural disaster risks in Denmark are storm ², flood and hail. Cover can be contracted for these and for landslide and subsidence, but not for earthquake, volcanic eruption and avalanches, which are rare in Denmark and are generally excluded from policies.

Storms have caused severe damage in Denmark over the last ten years. The storm “Anatol” (December 1999), with gusts of wind reaching above 180 km/h, caused serious damage in Northern European countries, particularly in Denmark. Total insurance losses in these countries reached USD 2.23 billion ³.



Later, in January 2005, the storm “Erwin” -or “Gudrun” in the Scandinavian countries, with gusts of wind over 160 km/h., caused again serious damage, especially to conifer forests in the area of Jutland and in North Sealand as well, with considerable losses to forest. The rising sea level -more than 2 metres with regard to the normal level, caused severe floods in western Jutland and in Limfjorden ⁴. Total insurance losses in the European countries hit by “Erwin” reached figures close to USD 1.9 billion ⁵. Most of the losses were concentrated in Denmark.

Except for seawater flood, all coverable risks are optional, and the guarantee is taken on by private insurance entities in a varied range of possibilities, as stipulated in the contract. This guarantee may take the form of a separate policy, attached to a main policy, or an extension of guarantees, placing all the risks in a single block or distributing them into several, or assigning each risk its own cover. Similarly, and depending on the terms of the policy, the insurance may cover personal loss, direct material damage and consequential loss, whose indemnification limits and deductibles are set out in the clauses.

2. Seawater Flood

2.1. Cover and its Compulsory Inclusion

Act No. 340 of 6 June 1991 - later amended by Act n.º 349 on Compensation for Damages Caused by Storm, dated 17 May 2000, created a plan for the indemnification of property damage

¹ This chapter has been prepared with the special contribution of Heidi Hylleborg (Danish Storm Council).

² See Greig Fester (Nordic Division): “Danish GAP. Geographical Analysis Project”. 1996.

³ Swiss Re: “Natural catastrophes and man-made disasters 2005: high earthquake casualties, new dimension in windstorm losses”. *Sigma*, 2/2006.

⁴ Guy Carpenter: “Windstorm Erwin/Gudrun-January 2005”. *Specialty Practice Briefing*. January 17, 2005; Issue n.º 2.

⁵ Swiss Re: *Op. cit.*

for floods caused by extraordinary rises in sea level as a result of cyclone (storms). All sectors benefit - private, commercial, industrial, agricultural.

It must be emphasised that for flooding to fall within the scope of application of that system, it must meet two essential conditions: 1.º it must be caused by seawater, and 2.º the invasion of seawater must have been caused by a manifest rise in sea level as the result of a cyclonic event. So this cover is very limited in terms of the insurable event, and of the property which may be assured in this way, as explained below.

This special cover, which is State-guaranteed and must be included in all fire insurance policies (except for automobiles and boats), is administered by the Storm Council, a State body whose members are appointed by the Ministry of Economic and Business Affairs. This Council applies the related regulation, and judges whether the conditions arise for a given event to be considered an indemnifiable flood, based on a prior report issued by the Danish Coastal Authority, and whether the cover conditions are met. Insurers point out that, under this method, the decision to include a given event within the system could be subject to external pressures ⁶.

The damage is appraised by the companies' adjusters according to criteria set by the Storm Council. Apart from providing the appraisal, the companies issue the policy, collect the charge and receive the claims for loss.

2.2. Damage Covered, Exclusions and Limitations on Cover

According to the 6 June 1991 Act, damage to property covered by a fire policy can be indemnified under this system, while the following are excluded:

- 1) Movables and real property when it is generally possible to cover them against flood damage with any authorised company.
- 2) Movables and real property covered against flood damage by other insurance.
- 3) The content of basements, cellars and underground premises.
- 4) Indirect damage.
- 5) Damage to land.
- 6) Personal damage.

Indemnification may be reduced and even refused in full if the damage is caused in buildings (and their content) in any of the following circumstances:

- They were built in areas known in advance to contain serious risk.
- They contributed to or aggravated the damage because of failure to observe the Danish building legislation, having been constructed with inappropriate design or materials, or because of a lack of care in their maintenance.

The same applies if the damage was aggravated intentionally, or it could have been avoided or limited with accessible and easily applicable preventive measures.

⁶ See Danish Insurance Association: "Insurance in the Welfare State. The Insurance Industry's Contribution to the Welfare Debate". November 2004; p. 17 (www.forsikringogpension.dk).

Moreover, according to this Act, persons who have suffered property damage as a result of flooding may be required to take preventive measures if they are to continue to be entitled to compensation, in the case of eventual damage following a future flooding.

A legal reform in 2000, introduced by the *Flood and Windthrow Act* after the catastrophic experience of the storm “Anatol”, extended the field of application of the flood cover system to include regulation of financial aid for the reforestation of private forests lashed by wind⁷, provided that the owners have a base policy on storms.

2.3. Surcharge and Collection

The flood indemnification plan is funded by an annual charge of DKK 20, added to the premiums for all fire insurance policies, excluding own damage insurance for motor vehicles and boats, and other insurance covering flood damage. This charge is collected, together with the appropriate premium, by the insurers, who transfer the sums collected by this means to the Storm Council on a monthly basis. The Council, in turn, deposits the funds in the Danish National Bank. Those insured who have contracted fire insurance outside Denmark on their own initiative must send the charge to that body.

The general and undifferentiated application of this annual charge obviously means that there is no criterion of proportion in the relation between the charge and the type of property covered, the capitals exposed or the risk according to the zone.

2.4. Indemnification and Deductibles

Indemnification is unlimited for direct material damage and other consequential damage (not personal) albeit with a deductible of 5% —DKK 5,000 minimum— for single or two-family homes and for property and personal effects, and of 10% and a minimum of DKK 10,000 for other property.

Should the funds collected by the Council for the aforementioned DKK 20 charge (“ex ante” surcharge) prove to be insufficient to cover a loss, the State, through the Ministry of Economic and Business Affairs, will additionally contribute a limited guarantee of DKK 200 million to the system, which, together with the associated interest, the State will recover with an extra DKK 10 supplement to be added to the charge following the loss (“ex post” surcharge).

2.5. Management of the Cover

It must be emphasised that with this particular cover there is no contractual relation between the insured and the insurer as regards the assumption of the risk of sea flooding and indemnification in case of claim. These liabilities devolve upon the Storm Council.

When a flood occurs, and if the Council establishes that it is a flood in the terms set out above, the insured must file a claim with his insurance company within the two months following the loss. The company will deliver a report on the assessment of the damage, along with any pleas by the insured, to the Storm Council which will, according to its criteria alone, decide on the compensa-

⁷ *Ibidem*: p.17.

tion it deems fit. Thus it is that the insurer is involved in the management of the policy, collection of the surcharge, and the appraisal and handling of the loss.

The Danish legislation does not allow insurers to create tax-free provisions to deal with any fluctuations in claims for damage arising from natural disasters.

3. Looking for New Solutions

Denmark has seen the worst season of storm floods since the forerunner of the Act was initiated in 1991. Since November 2006, close to 4,100 claims originating from a total of four storm floods have been filed with the Storm Council. At present, it is estimated that the due compensations to all the unfortunate Danes who have suffered damage following the storm floods amount to a total of approximately DKK 500 million. In the course of this single season, more damage has been caused as a result of storms than during the entire existence of the Act, i.e. since 1991.

On the basis of these facts, the Storm Council has addressed the responsible minister and informed him that according to the Council, considerable thought should be given to an evaluation of the existing storm legislation with a view to updating the Act. One particular point made by the Council is that the Act does not to a sufficient degree take into account the possibility that very serious storm floods, for instance as a result of climate changes, may also in future entail very costly claims.

Due to the extraordinarily high water level caused by the four storm floods, Denmark has also seen flooding damage generated by prolonged heavy rainfalls that have led to flooding of streams and lakes; damage which is not covered by insurance. Therefore the Storm Council, in co-operation with the Danish insurance companies and the Danish government, is considering how to insure this particular sort of damage. Thus, the question is whether the insurance companies should cover the flooding of streams and lakes or whether it should be provided for in the Act⁸.

⁸ It is not just the Storm Council that receives claims for damages caused by rain. An estimation made by the insurance companies shows that the cloudbursts from June 2007 until 8 July 2007 will result in 8,000-10,000 valid claims (due to cloudburst that have flooded buildings), which will cost the insurance companies around DKK 100-125 million. By way of comparison, in August 2006 there were around 14,000 cloudburst claims totalling approximately DKK 175 million.

when the usual measures which must be taken to prevent such damage would not have prevented it, or could not be adopted.

An interministerial decree will declare the state of natural catastrophe”.

This text points to some keys of the French natural catastrophes coverage system, notably the obligation to include such cover in policies against fire and other property damage (including land motor-vehicles), formalised in a standard clause ⁴; the right of indemnification of insured parties whose property is affected by natural disasters (including business interruption if such guarantee was included in the base contract), and the insured’s liability in the face of such perils.

Right of indemnification is supported by two base assumptions: 1) in relation to the suffered loss, the claimant has contracted insurance – which remains in force – for property damage; and 2) the government declares a natural disaster, in an interministerial decree.

2.1. The Mandatory Nature of the Cover and its Territorial Scope

It is inferred from the foregoing that the obligation demands inclusion of the guarantee in base contracts for certain insurance, but not the subscription of any of them, which is optional. These are in fact obligations on both supply and demand sides, as neither insurer (except exceptional cases established by law and related to disaster prevention) nor insured can reject the cover.

At first the Act restricted the territorial scope of application to mainland France, until Act No. 90-509 of 25 June 1990 ⁵ extended it to the Overseas Departments ⁶. A government ordinance of 19 April 2000 extended cover to the Wallis-et-Futuna Islands, while the Overseas Territories (New Caledonia, French Polynesia, etc.) remain outside the area of application of the Act.

2.2. Declaration of a *State of Natural Catastrophe*, and the Risks Covered

Pursuant to Article 1 of the 1982 Act, a state of natural disaster must be declared in an interministerial decree, which is based on and originated from a proceeding opened by the Prefect of the Department concerned (within one month) drawing on information received from the mayors of the municipalities affected.

An Interministerial Commission is the body entrusted with the issue of the declaration of the state of natural disaster after examination of the files from the Prefects and through the decree referred to. This Commission is made up of representatives of the Ministry of the Interior (Directorate of Defence and Civil Security), from the Ministry of the Economy and Finance (the Treasury and Budget Directorates), from the Ministry of Ecology and Sustainable Development (the Directorate for the Prevention of Pollution and Risks), and from the Overseas Ministry when the overseas Dominions and Territories are affected. The Interministerial Commission’s Secretariat is held by the Caisse Centrale de Réassurance (CCR).

Some aspects of the Commission’s parameters of action are not legally defined with clarity. The Commission itself is authorised to decide in the disaster decree not just the affected areas, the periods and the type of damage to which the natural disaster guarantee should be applied, but also

⁴ These standard clauses were defined in Annexes I and II of the Order of 10 August 1982.

⁵ This is the same Act which, as will be seen below, made storm guarantee general.

⁶ The Overseas Departments are Guiana, Guadelupe, Martinique and Reunion. Under this Act, the regime for cover of natural disasters also extends to the territorial collectivities of Mayotte and Saint Pierre et Miquelon.

the events to which the system can be applied, given the lack of definition of the rules in this sense which, in principle, did not delimit the differences between insurable and non-insurable risks.

There is in fact no exhaustive, closed list specifying and defining the perils which cause damage for which a state of natural disaster must be declared. Indeed, according to the legal text, the decisive element of such declaration is not the event as such but rather its “abnormal intensity” which, in principle, would seem to point to the scale of the damage caused, in terms of seriousness and extent.

There was some confusion because the 1982 Act did not specify the insurability or non-insurability of the risks to be covered by this guarantee, so that it was possible to declare some storms (an insurable risk) as natural disaster, largely because of the scale of the damage caused. To circumvent this drawback, the above-mentioned Act No. 90/509 of 25 June 1990 made clear the exclusion of storms, hurricanes and cyclones from the field of the natural disaster guarantee.

Finally, a further stage in clarification arrived with Act No. 92/665 of 16 July 1992, which made it clear that only material damage for non-insurable risks is classified as an effect of natural catastrophes. Because storms, ice, hail and the weight of snow had been considered insurable, damage from them does not come within the field of application of the Act.

So what risks can be considered to be guaranteed in this system? In principle, and without seeking to provide a closed list: flood, mudslide, earthquake, volcanic eruption, tsunami, earth movement, subsidence (geotechnic drying), channelling (water, mud or lava), and a mass of ice or snow in movement. Clearly, a postscript must be added to this in the form of any natural agents which cause direct damage to property because of their abnormal intensity.

2.3. The Damage Covered, Property Protected, and Exclusions

This is, as already pointed out, a guarantee inserted into a policy for damage (fire, theft, water damage, glass breakage, etc.), which covers direct material damage and business interruption (if included in the base contract) whose decisive cause was the abnormal intensity of a natural agent considered to be an uninsurable risk, when normal preventive measures would not have prevented it and provided that the event was declared a natural disaster by interministerial decree.

It is inferred from the Act that indemnifiable damage is that affecting property belonging to individuals or legal entities other than the State. The damage must be direct and exclusively arisen from the action of a natural event of abnormal intensity on insured property.

The protected property is, in principle, the property stipulated in the base contract, which may include structure and content for homes, industrial and commercial installations, buildings belonging to local communities, and farm buildings (including harvests, machinery or animals in those buildings). It also includes land motor vehicles, greenhouses (not their content), fencing, contention walls and support walls, and forests (when insured under a property damage policy).

The following losses are however excluded from the cover:

- Damage to crops and unstored harvests (or those inside a greenhouse), livestock outdoors, land and plantations (forests are however included).
- Damage from wind as a result of storm, hurricane or cyclone, and from ice, hail or the weight of snow.
- Damage to the bodies of air, sea, lake and river vehicles and to the goods they transport.
- Damage included in compulsory “Work Damage” insurance.

- Damage to property located in the Overseas Departments (DOM), only until passage of the Act of 25 June 1990.
- Damage to property excluded from the base policies, such as plots, fences, contention walls, channelling, pools, etc.

Personal loss is not covered, nor is damage or costs indirectly due to the disaster event (travel, re-housing, rental loss, damage due to power blackout, adjusters' fees, etc.), and excepting business interruption if that was included in the base contract. Damage due to care and salvage measures, or to disappearance or loss of property (except evidence of theft) during the disaster is however assimilated into direct material damage, and so is included in the guarantee, as are costs for rubble removal, demolition, pumping, cleaning and disinfection directly related to the repair of the damage. Costs of geotechnic studies needed for the repair of structures damaged by a natural disaster also fall within the scope of the guarantee.

Under Act No. 2002-276 of 27 February 2002, the natural catastrophes coverage system includes damage arising from land subsidence caused by underground cavities and quarries of natural or anthropic origin, provided that these are not past or present mining operations.

2.4. Tariffs and Cover Management

In return for the guarantee, the insured must pay an additional premium set by the State, at a flat rate without regional differentiation, for all risks covered and any degree of risk-exposure. This additional premium is set in a Ministerial Order for each type of base contract and is applied to the premium or contribution in respect of various types of contract (basic policies).

Currently, and following a number of revisions, the rates are distributed as follows:

Property damage	12%
Damage to land motor vehicles:	
*Fire and theft	6.0%
*Other damage	0.5%
Business interruption	12%

The private insurers collect and manage the additional premiums, administer and manage the policy, adjust and assess the damage and, in general, process claims (always in accordance with the base contract), and they also pay the related indemnifications (with the limits and conditions defined in the base guarantee).

2.5. Claims, Indemnification and Deductibles

In the case of a loss, the insured must file the related claim with his insurer, including an estimate of the property damaged or of the loss suffered, within 10 days in the case of damage insurance, or 30 days in the case of insurance for business interruption, both counted from the time of the declaration of the natural disaster in the interministerial decree.

Following adjustment of the damage, the insurer —if applicable— will indemnify the insured within three months counted from the date of filing of the claim by the insured with the insurer, or from the declaration of the state of catastrophe, if later. Act No. 2003-699 of 30 July 2003 however provides that the insurer must advance a provision within two months, counted as explained.

The amount of the indemnification may reach the total value which is stipulated in the base contract, in the terms and conditions provided in it. These terms and conditions must also be taken into account in the application, where appropriate, of the proportional rule in case of under-insurance. In general, the deduction new for old is applied, but payment may be at the new value if that extension was provided for in the base contract. For business interruption, the guarantee covers loss of gross profit and additional operating costs during the period of indemnification under the contract.

The insured's participation in the cost of the losses is implemented through compulsory deductibles, per contract and event, non redeemable and set by the State by means of a decree. The amounts vary according to the type of property insured, and are currently set as follows:

- a) For land motor vehicles, property not for professional use, and property for domestic use, the deductible is € 380, irrespective of the terms in this respect in the base contract. If the damage is the result of subsidence, the deductible reaches € 1,520, and in the case of vehicles for professional use, the rate to be applied is the one that is stipulated in the base policy if this is higher than the legal deductible.
- b) In the case of property for professional, commercial, farm or craft use, or properties owned by local communities, 10% of direct damage, per establishment and event, with a minimum of € 1,140. If the damage was the result of subsidence, the deductible will reach € 3,050, or the amount provided for in the base policy if higher.
- c) For business interruption, the deductible is 3 days worked, with a minimum of € 1,140, with application of that stipulated in the base contract if the amount of this deductible is more.

Since 1 January 2001, the deductible is increased (except for land motor vehicles) when the loss occurs in municipalities without a Foreseeable Natural Risks Prevention Plan (PPR). In such municipalities, if a state of natural catastrophe was declared there three times in the previous five years for the same sort of risk (such as flooding), deductibles are multiplied by two; if four times, they are trebled and, from five times on, the deductibles are multiplied by four.

2.6. State Intervention

In this system, which in practice operates as a compensation tool, the role of the State is to set the additional premium rates, to establish the deductibles and to declare the state of natural catastrophe. Likewise, with its guarantee, the State backs the Caisse Centrale de Réassurance (CCR) and draws up and applies the risk prevention plans. As backdrop, the State encourages and channels national solidarity (avoiding adverse selection), making natural catastrophes insurance compulsory.

3. The Central Tariffs Office (CTO)

This Office has since 1992 grouped under a single presidency and secretariat other specific Offices created earlier to regulate five types of compulsory insurance: motor car third-party liability insurance, insurance on mechanical lift facilities (skiing), third-party liability insurance in construction, natural catastrophes legal guarantee and third-party liability medical insurance. Those insured may go to each of these Offices.

The Natural Catastrophe CTO was created in Article 5 of the Act of 13 July 1982, then reformed in the Decree of 27 November 1992 which unified the five CTOs.

The CTO has eight members appointed for a three-year term in a decree of the Ministry of the Economy and Finance: a chairman, three representatives of the insurers, two insured representing their group, the chairman of the Caisse Centrale de Réassurance and a commissioner appointed by the Government.

If an insured fails to secure the cover from one or more insurers, he or she may address by means of a certified letter to the Natural Catastrophes CTO, which will process the related file and reach a decision to be imposed on the insurer which is designated by the insured.

On the other hand if, five years following publication of the PPR, an insured fails to respect its provisions, the insurer may resort to the CTO, once the insured has been notified in writing. The CTO will complete the related proceedings and decide whether to increase the deductibles, whether any property included in the contract is excluded from the cover, or whether adopting both these measures. The Prefects or the CCR Chairman may also turn to the CTO when they consider that in certain cases the natural catastrophes guarantee is granted in unjustified or improper conditions, given the insured's reckless attitude.

An insurer may issue policies for properties devoid of natural catastrophes coverage, without prior notification to the CTO, in two cases: 1) if the cover affects properties and activities in areas closed to construction, following the publication of a PPR; and 2) when such properties and activities have been established in breach of current administrative standards issued to prevent natural catastrophes damage.

Finally, according to Act No. 2003-699 of 30 July, the vendor or lessor of a property which has suffered a loss covered by the natural catastrophes guarantee is required to notify it in writing to the buyer or lessee.

4. Reinsurance. Caisse Centrale de Réassurance (CCR)

Insurers can reduce their risks by resorting to reinsurers (local or foreign), notable among these being the Caisse Centrale de Réassurance (CCR), a State body which, although not operating as a monopoly, is the only reinsurer with unlimited State guarantee for deficit years⁷. In turn, the CCR can reassign all or part of the risks taken on⁸.

⁷ Art. 1 of Decree 82-706 of 10 August 1982:

“The Caisse Centrale de Réassurance is authorised to operate in reinsurance to cover risks arising from the effects of natural disasters, with State guarantee...”

Art. 6 of that Decree establishes that the financial relations between the State and the CCR (in the field of reinsurance of natural catastrophes) and the conditions in which State guarantee is granted, are set in an agreement between the Ministry of the Economy and Finance and the CCR.

⁸ Art. 4 of Decree 82-706 of 10 August 1982:

The CCR was created in an Act of 25 April 1946 as a public entity of commercial nature, financially autonomous, and attached to the Ministry of Finance. It has since then run a long historical course, until reaching its latest fundamental change - its conversion since 1 January 1993 to a Limited Company⁹, 100% State-owned, and pursuing its activity as one more reinsurer on the market, parallel to its now traditional role as reinsurer of natural catastrophe risks with unlimited State guarantee.

Because of the scale of natural catastrophes and the scant possibilities of forecasting them, the CCR has provided a fundamental pillar of the system for the cover of such risks, reducing to manageable margins the imbalances which, given the very nature of these events, might arise on the insurance market in the absence of its reinsurance input, with the State's backing.

The conditions in which the CCR intervenes in indemnification as a result of reinsurance operations taken up can be summarised as follows:

- a) A natural disaster has been declared in an interministerial decree.
- b) The guarantee against natural catastrophes included in insurance contracts is in accordance with the terms of the standard clauses¹⁰.
- c) The properties (or activities) concerned are secured by an authorised entity.

Reinsurance with the CCR, in a single agreement or several different agreements¹¹, may take two forms:

- a) A pure participation solution, with a quota-share in which the maximum cession was 90% and the minimum 40%. This type of cession (and the related retention) seeks to avoid the risk of adverse selection.
- b) A non-proportional solution for participation in annual loss excesses (stop-loss) in the part not ceded as quota-share by the insurer. In this way, the reinsurer takes up the losses by the amount in excess of the contractually defined figure, without limitation (State guarantee). Here, this figure is the maximum amount an insurer would have to take on in one financial year, irrespective of the losses rate level.

The possibility arose in 1990 of cover in excess of losses per event, along with a profit-sharing clause according to the results of each assignor and, from 1 January 1997, some major modifications were applied to the reinsurance system, basically as follows:

- The maximum cession ceiling was reduced from 90 to 60 per cent, and minimum stop-loss excesses were raised.

“The Caisse Centrale de Réassurance may reassign all or part of the risks it has accepted in the application of Article 1” (see the previous foot-note).

It is, on the other hand, pointed out that private reinsurers may ask the CCR for excess loss guarantee for the part assigned to them by the direct insurers.

⁹ Act of 17 July 1992.

¹⁰ If this condition is not met, Art. 2 of Decree 82-706 of 10 August allows the CCR to grant its cover, with the endorsement of the Minister of the Economy and Finance.

¹¹ Art. 3 of Decree 82-706 of 10 August: “The general conditions of reinsurance agreements established by the Caisse Centrale de Réassurance for the application of Article 1 (natural catastrophe reinsurance) are approved by the Minister of the Economy and Finance”.

- Differences were introduced into the conditions of cession depending on the type of insurance (single or industrial risks), the geographical location (mainland or overseas) and the scale of the reinsurance portfolio.
- Fixed reinsurance commission was replaced by another according to the assignor's results.
- The rate will be fixed individually for non-proportional cover.
- In small industrial risk portfolios, stop-loss cover was replaced by another reinsurance solution per loss and risk (loss excess per risk).

To restore the financial equilibrium of the natural catastrophes indemnification system, modifications were introduced into the reinsurance regime as of 1 January 2000, valid for five years, and basically involving the setting-up of a cession of 50% in quota-share for natural disaster risks overall, and the abolition of the reinsurance commission. This system was extended in 2005, 2006 and 2007, and it will probably be extended in 2008.

5. Equalisation Reserves

To meet the substantial payments natural catastrophes may represent, the Act of 13 July 1982 allows insurers and reinsurers to create, along with the ordinary technical provisions, equalisation reserves —for fluctuations in losses-rate, with a tax exemption, and in which to place up to 75% of their profits for each year, to a maximum limit of 300 per cent of their annual net premiums. Each financial year's endowment is paid up after ten years.

One of the most important concerns in this sphere, affecting the French natural catastrophes indemnification system, is its financial equilibrium, because the provisions referred to, created by the insurers and the CCR, could be insufficient to cover a major disaster which might occur at any time in France. These provisions were in fact greatly weakened, fundamentally by drought claims (and consequent subsidence affecting buildings) between 1989 and 2000, to which must be added other significant claims for flooding and cyclone.

6. The Generalised Storm Guarantee System

The term "storm" was used in principle generically to take in the hazards of storm, hurricane and cyclone. It was the aim of a guarantee extension of a fire policy: the "TOC" guarantee. Hail and weight of snow were later included in this guarantee which thus was replaced by the "TNG" guarantee.

Indeed, in 1953 the Farming Mutuality granted for free an extension of the TOC guarantee under fire policies for masonry buildings. Then in 1956 the APSAIRD¹² drew up recommendations for storm cover for single and agricultural risks (constructions) and, from 1964, in industrial risks.

The TOC guarantee was extended in 1968 to hail on roofs and, in 1981, to weight of snow on roofs in industrial risks, subsequently enlarged to single risks.

¹² Plenary Assembly of Companies Insuring against Fire and Diverse Risks.

As a result, in France, in the field of natural disaster hazards, storm has been considered an insurable risk and so can be taken on contractually by private insurers which, for a time, the Administration sought to encourage in order to extend this guarantee to the greatest possible number of insureds. Subsequently, this risk is excluded from the scope of application of the Act of 13 July 1982.

In theory, the reach of this type of cover seemed reasonably clear but, in practice, not all was so obvious. In fact, following the passage of the 13 July 1982 Act -which, as already pointed out, makes no reference to whether risks are or are not insurable-, a problem arose: the delimitation between losses which must be dealt with in a “storm” framework, and those which should come under “Natural Catastrophes”. In fact, since 1982 -because of the scale of damage caused, and because many victims did not have storm cover- several events of this type were exceptionally declared to be natural catastrophes, creating a degree of discomfort among insurers and confusion among those insured. Those first declarations were justified as being exceptional, but this became difficult to sustain when the practice was repeated in following years.

On the other hand, the process of inclusion of storm guarantee in policies, started by insurers in 1984, did not yield the expected results because of a cool reception by those insured, particularly in the manufacturing sector¹³.

Thus a solution was put in place for an enhanced and broader application of this guarantee, and for a clarification and delimitation of fields, implemented in Act No. 90-509 of 25 June 1990 which, apart from extending the natural catastrophes coverage system to the Overseas Departments, generalised storm guarantee. Article 1 of that Act included Article L.122-7 in the Insurance Code in the following terms:

“Insurance contracts guaranteeing fire damage to property situated in France, and damage to land motor vehicles, give right to the insured’s guarantee against the effects of wind due to storms, hurricanes or cyclones, on property which is the object of those contracts.

Moreover, if the insured is covered against business interruption as a result of fire, this guarantee extends to the effects of wind due to storms, hurricanes or cyclones”.

As a result, the “generalisation” of storm cover, not applied in the Overseas Departments, becomes markedly compulsory, as the insurer must always offer it to the policyholder who may reject it only explicitly and in writing.

Absolutely logically, shortly after passage of the Act, Article 34 of Act No. 91-5 of 3 January 1991 made the following addition after the first paragraph quoted: “Contracts guaranteeing fire damage to unstored harvests, crops and livestock outdoors are excluded”.

Finally, Act 2000-1207 of 13 December 2000 further modified that Article L. 122-7 of the Insurance Code, to read as follows:

“Insurance contracts guaranteeing damage by fire or any other damage to property situated in France, and damage to land motor vehicles, give the right to insured’s guarantee against the effects of wind due to storms, hurricanes or cyclones, on property which is the object of those contracts, with the exception of the effects of wind due to

¹³ Bidan, P.: “Vade-mecum du régime d’indemnisation des catastrophes naturelles”. *L’Assurance française*, No. 691, 15-28 February 1994; pp. 157-160.

cyclone in which maximum surface winds recorded or estimated in the affected zone reach or exceed a mean of 145 km/h for ten minutes, or gusts of 215 km/h (...)

“Contracts guaranteeing fire damage to unstored harvests, crops and livestock outdoors are excluded”.

Moreover, if the insured is covered against business interruption, this guarantee extends to the effects of storms, hurricanes or cyclones, in the terms established in the related contract.

It is worth emphasising that although the 1990 Act generalises the guarantee against the effects of storm, hurricane or cyclone winds (the TOC guarantee), the market itself has in practice extended this generalisation to hail and the weight of snow (the TNG guarantee).

Specifically, storm insurance, for which rates are not uniformly regulated for the whole market but rather depend on each company, takes on material damage from direct wind action, or the impact of a body projected by the wind against insured buildings, or from the action of hail and snow. It also takes up damp damage inside buildings arising from hail or the weight of snow on roofs, provided that such damage arises within the forty-eight hours following the first flaws. It also secures business interruption caused by interruption of the company’s activity as a result of the material damage.

The reference for the indemnification for damage to real property is the price of reconstruction on the day of the loss, and for furniture the replacement value on that day, with deduction new for old. It is standard practice that, for storms, the guarantee is never granted for the replacement value. Here too, indemnification is subject to discount of a deductible, which is taken on by the insured.

GERMANY

1. Natural Disasters

The natural events which produce most damage in Germany are storm, flood and hail.

The plains washed by the Rhine, Elbe and Weser, and the North Sea coastal area, along with the estuaries of the last two of those rivers, are particularly prone to flooding. The high frequency of occurrence and the severe intensity have led to particularly serious losses in the last two decades. Thus, in the nineties, there were noteworthy the damages caused by the storms in 1990, and by the floods in 1993, 1995, 1997 and 1999 as well ¹.



More recently, in summer 2002, the worst floods since the 1990 storms affected large areas of Germany, fundamentally Bavaria, Saxony and eastern States, when the Elbe and Danube overflowed ². The disaster caused 21 deaths and economic damage estimated at € 11.6 billion, with insured losses of around € 1.8 billion. The disaster most affected infrastructures ³. As a consequence of the scope of the losses, the Federal Government approved emergency aid of € 500 million and a reconstruction fund of 7.1 billion, to which should be added € 444 million from the European Solidarity Fund and € 350 million from private donations ⁴.

In January 2005, the storm named Erwin affected many Northern European countries, from Ireland to Russia, and although not the country most affected, also produced damage in Germany. Two years later, in January 2007, storm Kyrill hit Germany hard and caused insurance damage costing German insurers and reinsurers € 3 billion ⁵. It could be emphasised that in Germany, during the period 1970-2000, 87% of the insured losses as a result of natural catastrophes arose from storms, and 8% from flooding ⁶.

Several studies and simulations point out that in the near future damage from storms will increase in Europe as a consequence of climate change. Germany will be among the countries where this damage is going to increase most intensely ⁷.

¹ Cfr. Münchener Rück: "Catástrofes por fuerzas de la naturaleza en 1997. Una ojeada retrospectiva". *Topics*. 1998; pp. 7 y 13.

² Guy Carpenter: *The World Catastrophe Reinsurance Market 2006: Steep Peaks Overshadow Plateaus*; p. 54.

³ Thieken, A.H.; Petrow, Th.; Kreibich, H. and Merz, B.: Insurability and Mitigation of Flood Losses in Private Households in Germany. *Risk Analysis*, vol. 36, n.º 2, 2006; p. 383.

⁴ *Ibidem*: pp. 383-384. También, Mechler, R. y Weichselgartner, J.: "Disaster Loss Financing in Germany. The Case of the Elbe River Floods 2002". Interim Report (IR-03-021); International Institute for Applied Systems Analysis (IIASA), Laxenbourg (Austria); May 2003; p. 26.

⁵ Luginsland, M.: "Allemagne: contre vents et marées". *L'Argus de l'Assurance*; n.º 7038, 7 Septembre 2007; p. 48.

⁶ Schwarze, R. and Wagner, G.G.: "In the Aftermath of Dresden: New Directions in German Flood Insurance". *The Geneva Papers on Risk and Insurance*, vol. 29, n.º 2, April 2004, pp. 156-157.

⁷ Pinto, J.G.; Frölich, E.L.; Leckebusch, G.C. y Ulbrich, U.: "Changing European storm loss potentials under modified climate conditions according to ensemble simulations of the ECHAM5/MPI-OM1 GCM". *Natural Hazards and Earth System Sciences*, n.º 7, 2007; pp. 165-175 (www.nat-hazards-earth-syst-sci.net/7/165/2007/).

With regard to hailstorms, the storm released over Munich on 12 July 1984 is remembered as especially powerful. This type of natural risk would never have been suspected to be of such catastrophic proportions, however this event left 230,000 vehicles damaged and 70,000 buildings affected, generating economic losses of € 1.5 billion and insured losses of € 750 million ⁸.

Earthquake risk is not especially worrying in Germany, although a quake of magnitude 5.8 (on the Richter scale) with epicentre in Netherlands was felt in the region of Cologne in 1992. In December 2004 an earthquake of magnitude 5.4 was recorded in Southwest Germany, and its epicentre was located in Waldkirch ⁹.

2. Former Special Regimes of Public Intervention in Cover: Baden-Württemberg and Hamburg, and the former German Democratic Republic

It was compulsory in the Land of Baden Württemberg for building owners to take out a fire policy with the *Württembergische Gebäudebrandversicherungsanstalten* in Stuttgart (Württemberg), or with the *Badische Gebäudeversicherungsanstalt* in Karlsruhe (Bade). These are two old entities, created in the mid-eighteenth century, which have been operating as monopolies ¹⁰.

Starting in 1960, this insurance obligation extended to the purchase of cover for buildings (except for greenhouses) and their content against damage caused by natural events (storm, hail, rising water levels, flood, weight of snow, avalanche, landslide, and land slips and subsidence), via a premium charge of 0.08 per thousand of the sum insured for fire. This compulsory regime was also to extend to earthquake in 1971 ¹¹.

The insurance was taken out in one of these two entities, which operated on a not-for-profit basis and according to a compensation system, with a pool created between the two to cover seismic risk. The protection was granted without limit of indemnification, with a deductible.

Also in Hamburg all property had to be insured against fire, storm and hail with *Hamburger Feuerkasse*, which also operated as a monopoly. The applicable deductibles were 10% for storm cover and 5% for hail ¹².

From 1 July 1994, in accordance with demands arising from Community provisions, these entities lost their monopoly status in both States ¹³.

On the other hand, the State insurance entity in the former East Germany (*Staatliche Versicherung*) offered cover against natural events in multi-peril insurance of buildings and homes, along with the guarantee against fire. These natural events were: lightning, rising water level, flood, seaquake, storm, hail, weight of snow, earthquake, landslide, and land slip and subsidence. On reunification, the former State insurer was placed in the hands of Allianz, which agreed to continue to take charge of flood cover ¹⁴.

⁸ SwissRe: Hailstorm in Europe. A new look at a familiar risk. *Focus Report*. 2005. Zurich.

⁹ L'Argus de l'Assurance (www.largusdelassurance.com), 7-12-2004.

¹⁰ Schäfer, Kurt: "Systèmes d'indemnisation des victimes de catastrophes naturelles et de tempêtes en Allemagne". In *Scor Forum* ("Évolutions climatiques et assurane. Synopsis des interventions"), 1 Octobre 1991.

¹¹ SCOR: "L'assurance des ctastrophes naturelles". *Scor Tech*, Avril 1996; p. 8. Also Schäfer, Kurt; *Op. cit.*

¹² Schäfer, Kurt: *Op. Cit.*

¹³ Thomas von Ungern Sternberg: "Les limites de la concurrence: l'assurance immobilière en Suisse". *Risques*, no. 27, Juillet-Septembre 1996; p. 152.

¹⁴ Catastrophe Reinsurance Newsletter; no. 53, July 1997, p. 1. Also, Luginsland, Marie: "Les assureurs allemands gardent

3. Insurance Cover

Except for the cases of public intervention mentioned, now a thing of the past, there has been no system in Germany for insurance cover in which the State in some way guarantees indemnification for victims of natural disasters, nor is it obligatory to contract cover for these events on the private market. The involvement of the public administrations (the Federal Government or Länder Governments) in guarantee against natural disasters is provided for in the creation —voluntarily and in certain circumstances according to the severity of the disaster— of “ad hoc” compensation funds¹⁵, in the concession of low-interest loans and also in the study and implantation of loss-prevention measures (especially in construction) in relation to disaster risks.

At times of a number of floods, as already mentioned with reference to those in 2002, this public financial intervention proved to be of great relevance as a means to compensate losses, so alleviating the small number of insurance indemnifications as a result of the limited extent of cover against this risk¹⁶. The other side of the coin is that this type of aid may have dissuaded quite a few people from seeking insurance protection and implementing risk reduction measures¹⁷.

Apart from this lack of public intervention in the insurance of natural disasters, the reality is that, until relatively recently, it was not possible to voluntarily contract cover for these risks on the private market excepting just those considered insurable, i.e. storm¹⁸, hail and ice, the last of these included in water damage¹⁹.

Faced with the Single Market and with the abolition of the monopolies in Baden-Württemberg, Hamburg and the former GDR, the possibility began to be considered of offering broader cover against natural phenomena, subscribed voluntarily and on the private market. So in June 1991, the Federal Supervisory Council approved the solution designed by the Insurers Association for cover of natural risks under the so-called “Extension of Natural Risk Insurance” formula, offered as optional cover and granted independently (but as a complement) to any household and/or personal property (content) insurance, as well as for industrial and commercial risks²⁰. This insurance covers flood, torrential rain, earthquake, subsidence, landslides, avalanches and weight of snow²¹. The dashing of sea on land caused by storm is a non-insurable risk²².

The properties guaranteed with this new cover are the same as those provided for in the related basic insurance. For example, Combined Household Insurance covers not just buildings, with their components and annexes, but also piping and technical installations inside and outside the building

les pieds au sec”. *L’Argus de l’Assurance*; n.º 6797, 23 Août 2002; p. 9. After the 2002 floods, Allianz, which took charge of severe losses in former East Germany areas, announced an ample rise of premiums and deductibles (Schwarze, R. and Wagner, G.G.: *Op. Cit.*; p. 157).

¹⁵ In principle, State aid for disaster damage as a consequence of natural or technological developments is subsidiary in nature, and the victim must in the first place resort to insurance if entitled to cover which grants a right to indemnification for the damage suffered. See Ulrich, Magnus: “Germany”, in Faure, Michael & Hartfield, Ton (Eds.): *Financial Compensation for Victims of Catastrophes. A Comparative Legal Approach*. Vienna, SpringerWienNewYork, 2006; p. 123.

¹⁶ In the first years of the current decade the penetration of the flood cover among private individuals and firms was below 10 % (Luginsland, Marie: *Op. Cit.*; p. 8). In the former East Germany the penetration rate was between 30 and 40 per cent (Mechler, R. y Weichselgartner, J.: “Disaster Loss Financing in Germany. The Case of the Elbe River Floods 2002”. Interim Report (IR-03-021); International Institute for Applied Systems Analysis (IIASA), Laxenbourg (Austria); May 2003; p. 16).

¹⁷ Schwarze, R. and Wagner, G.G.: *Op. Cit.*, p. 154.

¹⁸ Winds exceeding 74 km/h are required.

¹⁹ Schäfer, K.: *Op. Cit.*

²⁰ *Ibidem*.

²¹ Münchener Rück: *Die Versicherung Weiterer Elementargefahren in der Allgemeinen Sachversicherung in Deutschland*. München, 1993; p. 17.

²² Thieken, A.H.; Petrow, Th.; Kreibich, H. and Merz, B.: *Op. cit.*, pp. 386.

or property, including fences, paths, overhead electrical lines, greenhouses and trees²³. Damage to insured property in the case of buildings under construction, or while not being used due to alterations or refurbishment, is excluded.

Cover does include costs of rubble removal, demolition, displacement and protection, prevention, damage limitation and the replacement of documents.

The right of indemnification is conditional on respect for and application of preventive measures legally demanded or considered reasonable for flood, earthquake and snow pressure, depending on the zone, the property and the particular circumstances of each case²⁴.

In general, because of the nature of these risks, premiums are calculated individually and the end cost of the cover is related to the value of the insured properties, the deductible applied and the level of the flood risk (ZÜRS risk zones)²⁵.

Notwithstanding all that, demand for this insurance solution is quite limited (between 5 and 10% penetration) in the area of household and commercial risks and for those related to damage to personal property, except in Baden-Württemberg and the states of the former German Democratic Republic because of the history of disaster insurance in those areas, as already discussed²⁶. For industrial risk, the penetration of such cover is much broader, being generally included in standard fire policies²⁷.

Because of the difficulties experienced in flood and other natural hazard insurance in Germany (except storm) following the 2002 disaster, proposals arose for the creation of a system for the cover of natural disasters based on the establishment of mandatory insurance, and backing from the State as guarantor of last resort in the case of extreme losses²⁸.

3.1. Storm and Hail

Cover of these risks is normally included in combined property and household insurance (simple risks), covering both buildings and content. Thus the penetration of this insurance, unlike in the situation of the remaining natural risks, is very high, close to 90%²⁹.

In the case of industrial risks, where both material damage (buildings and content) and business interruption are possible, fire insurance may include storm and hail if that is provided for in the extension of guarantees, although storm can also be covered in a separate policy.

3.2. Flood

Of the hazards included in the natural risk insurance solution adopted by the German market, flood is the most important because of the high loss rate this has generated, highlighting the need to take the insurance approach to this risk into special consideration.

²³ Münchener Rück: *Op. Cit.*; p. 17.

²⁴ *Ibidem*.

²⁵ Schwarze, R. and Wagner, G.G.: *Op. Cit.*, p. 159.

²⁶ Mechler, R. y Weichselgartner, J.: "Disaster Loss Financing in Germany. The Case of the Elbe River Floods 2002". Interim Report (IR-03-021); International Institute for Applied Systems Analysis (IIASA), Laxenbourg (Austria); May 2003; p. 16.

²⁷ Guy Carpenter: "The World Catastrophe Reinsurance Market-2006", p. 54.

²⁸ Schwarze, R. and Wagner, G.G.: In the Aftermath of Dresden: New Directions in German Flood Insurance. *The Geneva Papers on Risk and Insurance*, vol. 29, n.º 2, April, 2004; pp. 154-168. GDV on some occasions has suggested to the legislator the need for flood cover to be compulsorily added to every household insurance policy (Luginsland, Marie: *Op. Cit.*; p. 9).

²⁹ Thielen, A.H.; Petrow, Th.; Kreibich, H. and Merz, B.: *Op. cit.*, pp. 386.

Since 2001, under the auspices of the German Insurers Association (GDV), the German insurance market applies a system of flood and heavy rain zoning known by its initials ZÜRS, for risk estimation.

This system establishes four risk zones —from lesser to greater degree of danger— according to flood probabilities (statistical average return period), as follows: more than 200 years (zone I); between 50 and 200 years (zone II); between 10 and 50 years (zone III), and between 0 and 10 years (zone IV). And, in general, properties in zone IV are not insurable, while those in zone I encounter no insurance problems³⁰.

The type of deductible applied varies, by company, and may be 10% of total loss, a percentage of the insured sum, or a fixed amount generally ranging from a minimum of € 500 to a maximum of € 5,000³¹.

4. Equalisation Reserves

German insurance companies, in the field of storm, hail and frost cover, are required to create an equalisation reserve which is endowed yearly with a sum equal to 3.5% of its maximum amount. This amount is calculated as being 4.5 or 6 times (depending on type of risks) the standard deviation of the loss ratio on commercial premiums, multiplied by said premiums.

Endowment of the reserve, in order to profit from tax exemption, has to meet the following conditions:

- The mean of premiums of the last three years must be above 125,000 euros.
- Standard deviation in the loss ratio, calculated on the mean of this ratio in the defined period (in general 15 years, and 30 years for hail), must exceed 5%.
- Loss ratio (plus expenses) must exceed 100% at least once in the defined period³².

³⁰ *Ibidem*: p. 388. Also, Thieken, Annegret y Merz, Bruno: “New model by Aon Rück and the GeoForschungszentrum Postdam (GFZ). Quantification of economic flood losses for extensive loss scenarios“ (2004?); p. 3. (www.gfz-potsdam.de/pb5/pb54/projects/LargeScaleDamages/LargeScaleDamage.pdf). Also, Kron, W.: “Summer 2005 in central Europe: Many Alpine valleys under water”. In Munich Re: *Topics Geo 2005* (Annual Review: Natural Catastrophes 2005). Munich 2006; p. 37.

³¹ Thieken, A.H.; Petrow, Th.; Kreibich, H. and Merz, B.; *Op. cit.*; p. 392.

³² Berry-Stölzle, Thomas and Born, Patricia; “The Effect of Regulatory Lags on Underwriting Cycles: the Case of Germany”. July 2006, p. 14 (www.aria.org/meetings/2006papers/patricia_born%20thomas%20berry-stolzle.pdf). Also, Maurer, R. y Somova, B.: “German Insurance Industry: Market Overview and Trends”. Working Paper Series: Finance & Accounting, n.º 156 (Johann Wolfgang Goethe-Universität Am Main), July 2005; p. 28. Also, Comité Européen des Assurances (CEA) —Property Insurance Committee: “The Insurance of Natural Events on European Markets: Reinsurance Equalisation Provisions”, AB 5051 (06/05), June 2005. And also Price Waterhouse Coopers: “Germany. International Comparison of Insurance Taxation”, October 2007, p. 4 ([www.pwc.com/extweb/pwcpublications.nsf/docid/f5e7616e79072bfcca256fc000a3ad0/\\$file/germany.pdf](http://www.pwc.com/extweb/pwcpublications.nsf/docid/f5e7616e79072bfcca256fc000a3ad0/$file/germany.pdf)).

ICELAND

1. Natural Hazards in Iceland ¹

Iceland has an area of 103,000 km² and some 300,000 inhabitants. In historical terms it is a young country, but also geologically, as evidenced in mere observation of the changing land configuration, as a result of great volcanic and seismic activity.

It is in fact one of the most volcanically active countries in the world, with lava on 11% of its territory, an area equivalent to that covered by glaciers. All types of volcanoes are found there, constituting the natural risk which produces most damage.



THE MOST RECENT MAJOR NATURAL EVENTS

Year	Events
1976	Kópasker Earthquake (Northeast Iceland)
1983	Avalanche at Patreksfjörour (Western Fjords)
1984	Sea floods (Southwest Iceland)
1988	Landslides at Ólafsfirói
1989	Landslides at Seyoisfirói
1990	Sea floods (Southwest Iceland)
1994	Avalanche (Western Fjords)
1995	Avalanches (Western Fjords)
1996	Glacial floods (Skeioarársandur)
2000	Earthquakes in Southern Iceland

Sometimes, as a result of volcanic eruptions under the frozen glacier cover leading to the rapid melting of immense ice masses, enormous pocket of water are created which, when they burst under accumulated pressure, behave as in the collapse of a dam, causing major floods. This was what happened in October 1996 following the eruptions recorded under the Vatnajökull glacier (8,300 km² in S.E. Iceland) from whose ruptured cover a torrent flowed which, together with rocks and other detritus, carried away ice blocks of up to 200 tons, producing waves 4-5 metres high.

¹ This chapter has been prepared with the special contribution of Asgeir Asgeirsson (Iceland Catastrophe Insurance).

The highest level of discharge reached 45,000 m³ per second, and a total of 3 trillion litres of water flowed from the melt. Material loss was caused basically to the route infrastructure². A similar phenomenon, albeit of lesser proportion and consequences, was recorded in December 1998, ten kilometres south of the 1996 eruption³.

Earthquakes are also frequent in Iceland, although they have not in general caused great damage. The last significant earthquakes were in 2000 (17 and 21 June), of a magnitude of 6.6 degrees⁴, causing insured damage of USD 37 million, fundamentally affecting the south of the country.

EARTHQUAKES IN 2000

Earthquakes in Southern Iceland in 2000
17 & 21 June 2000 Magnitude: 6.6 Indemnified damage: 25 and USD 12 million Damage to 3000 buildings Damage to content: 10% of losses Average loss: USD 18,000

Avalanches, landslides, storms and weight of snow are other risks also worth mentioning. The Súdavík and Flateyri avalanches in 1995 caused 34 deaths and major economic losses⁵. Avalanches in Iceland caused 166 deaths and landslides 27 during the twentieth century⁶.

THE MAJOR LOSS EVENTS

Year	Event	Area	Loss amount (USD)
2000	Earthquakes	Southern Iceland	37 million
1995	Avalanches (34 victims)	Western Fjords	14.2 million
1996	Glacial floods	Southern Iceland	7.1 million
1990	Sea floods	Southwest	1.5 million

² Vid. Roloff, Ch.: "Hielo y fuego. Una erupción volcánica bajo un glaciar". Monographic issue, Tema 8 "Volcanes", *Investigación y Ciencia*; 1997; pp. 67 y 68.

³ www.earthice.hi.is/page/ies_grimsvotn1998

⁴ Tronnes, R.G.: "Geology and geodynamics of Iceland" (www.earthice.hi.is).

⁵ Vid. Jóhannesson, T. y Arnalds, P.: "Accidents and economic damage due to snow avalanches and landslides in Iceland". *Jökull*, n.º 50, 2001; p. 86.

⁶ *Idem*: p. 85.

2. Iceland Catastrophe Insurance (ICI). Overview

Under the Icelandic natural disaster insurance system, the owners of homes and of commercial buildings must compulsorily acquire cover against certain natural disaster hazards. This cover also protects contents insured against fire. *Iceland Catastrophe Insurance (ICI)*, a public corporation created in 1975 in a special Act of the Althing (the Icelandic Parliament), and which operates as an insurance company, is responsible for the management of this insurance system. The natural perils included in the system are earthquakes, volcanic eruptions, avalanches, landslides and floods.

Disaster cover is acquired in a separate policy, and the insurers collect the premiums for this cover along with those for fire insurance, in exchange for a collection fee. The policy covers only direct damage resulting from the mentioned natural events. Buildings are insured according to their valuation for fire as assessed by the State Land Registry. Since fire insurance of buildings is compulsory in Iceland, all buildings are likewise insured against natural perils covered by the programme⁷.

The ICI is regulated and the cover of natural disaster events is established in the Icelandic Catastrophe Insurance Act (Act. N.º 55/1992) and in the Regulations on the Iceland Catastrophe Insurance (N.º 93/1993).

3. Cover

All buildings and contents insured against fire are also insured against catastrophe risks. This includes comprehensive policies which incorporate fire. Because of its compulsory nature, the rate of penetration of natural disaster cover for buildings is 100%.

Since 1982, some types of infrastructure, generally not covered against fire, are insured directly with the ICI⁸. Under Article 5 of Act N.º 55/1992, such infrastructures are as follows:

- Geothermal heating systems.
- Waterworks and sewage systems owned by municipalities or the National Treasury.
- Harbour installations owned by municipalities and the National Treasury.
- Permanent bridges of 50 m or longer.
- Electric installations, including publicly owned distribution systems, dams and transformer facilities.
- Publicly-owned telephone systems and communications networks.
- Ski lifts.

⁷ Indridason, N.; Johannesson, F.; Sigtryggsdottir, F. y Gudmundsson, A.: "Evaluation of Building Damage in the June 2000 Earthquake in South Iceland". First European Conference on Earthquake Engineering and Seismology. Geneva, 3-8 September 2006.

⁸ Indridason, N.; Johannesson, F.; Sigtryggsdottir, F. y Gudmundsson, A.: *Op. cit.*; p. 2.

4. Perils and Damages Covered. The Scope of Indemnification

Volcanic eruptions, earthquakes, landslides, avalanches and floods, the main natural hazards in Iceland, are the ones covered by the system and, for the purposes of cover, are defined in Article 1 of the Regulations on the Iceland Catastrophe Insurance (N.º 93/1993). Windstorm cover is provided by the private insurance sector.

Consequential or indirect damages are excluded from the system. Only direct physical losses are covered, as already mentioned.

Under Article 12 of those Regulations, in the calculation of indemnification, the value of the insured assets is determined according to their real value at the time of the loss, taking into account of property depreciation due to the passage of time, and use. Indemnification for partial damage is fixed according to the cost of repair. In case of underinsurance, the proportional rule is applied.

According to Article 7 of Act N.º 55/1992, indemnification does not extend to damage to structures built in breach of the rules in place for reducing risk, thereby aggravating their vulnerability to the natural perils covered. Moreover, under Article 15 of the Act, an indemnification may be reduced or refused if a building suffers damage more than once from a similar event.

5. Insured Capitals

Buildings are insured according to their valuation for fire as assessed by the State Land Registry; contents are insured for the same amount as the underlying fire insurance policy. Infrastructures are insured at their replacement cost.

6. Premiums, Collection and Deductibles

There is a single premium of 0.25 per thousand. Infrastructures —waterworks, geothermal heating systems, sewage systems, electric installations, bridges and harbour installations— not normally insured against fire, are insured separately with the Corporation. In these cases the premium is 0.2 per thousand.

There is a deductible of 5% for each individual loss as well as a minimum deductible indexed according to the building costs index.

PREMIUMS AND DEDUCTIBLES

- A 0.25 per thousand premium for buildings and contents (Collected by the fire insurance companies)
- A 0.20 per thousand premium for infrastructures (Collected by the ICI)
- A deductible of 5% on each loss (Minimum deductible)
- Universal premiums set by Law

The Fire Insurance companies collect the premiums for the catastrophe insurance cover alongside their own fire premiums, and are paid an agreed upon commission.

Individual policies are not issued for catastrophe cover; the fire policy doubles as a catastrophe policy.

The ICI collects the premiums for the infrastructures insured.

7. Management of the ICI

The ICI's senior management is in the hands of a five-member Board of Directors. Three members are elected by the Icelandic Parliament; one is nominated by the insurers that collect the premiums and the Chairman of the Board of Directors is designated by the Ministry of Insurance Affairs. Board members are appointed for four years, and the Board in turn nominates a general manager to run the corporation.

The corporation has a small office with minimum staff, and out-sources most of its activities to the private sector.

8. Extent of Liability

Liability for compensation for each event is limited to 10‰ of the total insured capital at the time of the loss event. Should the total of payable claims exceed that amount, all claims are reduced in proportion. To *meet its liabilities, Iceland Catastrophe Insurance buys reinsurance on the international market and can also secure a State-guaranteed loan.*

9. Claim for Indemnification

Following a loss, the insured must immediately notify the insurer who underwrote the policy, or to the ICI, of that loss. In the former case, the insurer forwards the claim to the ICI. The Board of Directors will decide on the measures to be taken to salvage and protect the properties affected by the loss.

10. Loss Adjustment Procedure

The ICI assesses the damage and manages claims in dealing with losses from natural perils. For the 2000 earthquakes, teams of civil engineers assessed losses to buildings, and private insurance companies those to contents. Loss Assessment centers were set up in the areas affected. These were the largest earthquakes in Iceland for 100 years and although losses were not severe (there were no fatalities and no buildings collapsed) there was a large number of moderate and minor losses to attend to⁹.

⁹ See Indridason, N.; Johannesson, F.; Sigtryggsdottir, F. and Gudmundsson, A.: *Op. cit.*

11. Reinsurance

The ICI has since 1975 purchased Excess-of-Loss reinsurance cover on the world catastrophe reinsurance market. It has been loss-free from the outset, and the two major earthquakes have not altered that fact.

ASSETS AND REINSURANCE COVER

Assets: ISK 14 billion (USD 228 million)
Reinsurance cover: ISK 18.3 billion (USD 288 million)
TOTAL: ISK 32 billion (USD 516 million)
Maximum liability: 1% of the insured value (some ISK 51 billion = USD 803 million)

12. Modelling

A scenario modelling exercise has been undertaken using vulnerability functions derived from the field experience of the June 2000 earthquakes to assess potential losses should an earthquake of similar magnitude occur with its hypocenter below the town of Selfoss, the largest community in the South Iceland Seismic Zone. Further modelling work is underway in co-operation with Guy Carpenter Instrat and other consultants.

13. Fund Investment

Asset management of the corporation's funds is tendered out to investment banks and houses which manage the funds in accordance with an investment policy approved by the Board of Directors, in which the accent is on returns, security, and the liquidity of resources. The funds are invested both in Iceland and abroad.

KEY FIGURES, 2006

• Net premiums: USD 19.5 million
• Net Profit: USD 34 million
• Loss rate: 11.7%
• Cost ratio: 11.1%
• Investment returns: 18%

14. The National Snow and Landslide Fund

Article 12 of the Prospective Measures Against Avalanches and Landslides-Act (Act N.º 49 of 23 May 1997) created a National Snow and Landslide Fund which is managed by the Ministry of the Environment. This was the reaction to the 1995 avalanches.

The Fund's resources come from a number of sources: an annual 0.3‰ rate on the insured value of assets covered against fire, collected together with the premium for the ICI; an annual budget allocation; the interest on loans the Fund grants to local authorities to build defensive structures, and other income.

Its resources are used to cover the expenditure by the National Snow and Landslide Committee on researching and drawing up risk maps; to build and maintain defence structures against these risks, and to expropriate and relocate buildings at risk.

JAPAN

1. Natural Disasters

Of the countries which suffer the most violent forces unleashed by nature, mention must unquestionably be made of Japan, with an ample record of catastrophic events, produced on some occasions by earthquakes and on others by volcanoes, typhoons or tsunamis (in fact a word of Japanese origin meaning “port wave”).

Of all damage produced between 1955 and 2004 by natural disasters in Japan, 2% were due to flooding, 22% to wind and 76% to earthquakes ¹.

Although Japan takes up only 0.25% of the Earth’s surface area, it is the focus for a large percentage of the world’s earthquakes and volcanoes. 20% of earthquakes of magnitude 6 or more have occurred in Japan, where 10% of active volcanoes are also concentrated ². This situation is caused by the more than 1,500 active faults crossing the archipelago and its surroundings ³.

One of the most serious and notorious earthquakes in the twentieth century was that known as “Great Kanto” which, on 1 September 1923, with tremors of up to 8.2 degrees of magnitude (on the Richter Scale), destroyed Tokyo and Yokohama in both the tremors and the fires following ⁴. There were around 142,000 victims, dead or missing, and the homes, completely or partially destroyed, either by the shakes or the fires following, totalled more than 700,000 ⁵.

Not so very long ago, on 17 January 1995, the city of Kobe was shaken by “Great Hanshin”, which reached 7.3 degrees in magnitude, leaving a desolate panorama: more than 6,000 dead or missing; more than 40,000 injured; more than 240,000 homes were completely or partially destroyed and another 6,000 burned down or were seriously damaged by the fires following the quakes ⁶. 300,000 people were left homeless, and there was major damage to services (power, water, gas, telephone, etc.) and to road and port infrastructures. Total economic losses far exceeded USD 100 billion, of which insurance took up something over USD 3 billion ⁷. The catastrophe would have been greater had a tsunami been added to the seismic tremors and resulting fire, the



¹ Kikugawa, H. and Bienkiewicz, B.: “Wind Damages and Prospects for Accelerated Wind Damage Reduction in Japan and in the United States”. 37th Joint Meeting. Panel on Wind and Seismic Effects. May 16-21, 2005. (www.pwri.go.jp/eng/ujnr/joint/37/paper/41bienki.pdf).

² Tatano, Hirokazu: “Natural Catastrophe Risk Management Policy in Japan”. Global Conference on Insurance and Reinsurance for Natural Catastrophe Risk: The Role of Public-Private Partnerships. December 8-9, 2005. (www.tsrbs.org.tr/NR/rdonlyres/6C35A7CA-872C-48F8-B38D-E85CBB33FA61/2016/335_344.pdf).

³ Non-Life Insurance Rating Organization of Japan (NLIRO): *Earthquake Insurance in Japan*. Tokyo, March 2003; p. 7.

⁴ Abbott, P.L.: *Natural Disasters*. Dubuque, WCB Publishers, 1996.

⁵ Non-Life Insurance Rating Organization of Japan (NLIRO): *Op. cit.*; p. 18.

⁶ *Ibidem.*; p. 35.

⁷ OECD: “Japan Earthquakes”. *OECD Studies in Risk Management*. OECD, Paris, 2006; p. 16.

absence of which may be attributed to the fact that the movement of the tectonic plate leading to the earthquake was solely horizontal⁸.

The Kobe quake may have been the most damaging of the last seventy years, but it has been forgotten that there were four others of significance, in the two previous years, and of even greater magnitude: Kushiro-Oki, magnitude 7.8 (15 January 1993), Hokkaido-Nanseni-Oki of the same magnitude (12 July 1993), Hokkaido-Toho-Oki, of magnitude 8.1 (4 October 1994), and Sanriku-Haruka-Oki, of magnitude 7.5 (28 December 1994). The Hokkaido-Nanseni-Oki earthquake was the most devastating, producing more than two hundred victims, basically as a consequence of the tsunami it caused and which affected particularly the island of Okushiri, where waves reached heights of between 5 and 10 metres, and as high as 30 metres in some areas⁹.

As to atmospheric phenomena, experience shows that there is an average of twenty-nine typhoons every year in the area of the Pacific, three or four of which reach Japanese shores. Of these, the most devastating until now in economic terms was clearly that named "Mireille" which landed on Japanese territory on 27 September 1991. The typhoon left 61 dead and hundreds of injured in its wake, in addition to insured losses of more than USD 8 billion¹⁰. The Japanese, however, remember typhoon "Isewan", of September 1959, as especially tragic, taking the lives of more than 5,000 people¹¹.

Flooding is not as devastating in its effects as the natural hazards just mentioned, but is quite frequent and of varied origin: typhoons, torrential rain, river floods, seawater storm surge and, from time to time, tsunamis. The June 1990 Kyushu flood caused economic losses of USD 1.7 billion; and July 1995 flooding in Niigata and Nagano led to total damage estimated at USD 650 million¹². In the following decade the floods caused by Typhoon Songda (September 2004) were particularly noteworthy and generated insured losses worth USD 3.58 billion (including damage in South Korea), as well as those inflicted by Typhoon Tokage (October 2004), with insured losses totalling USD 1.12 billion (including damage in the North Pacific)¹³.

2. Natural Risk Cover

Natural risk cover is implemented in Japan by means of additional clauses for the extension of guarantees in ordinary policies, with an extra premium. This is the case for risks of volcanic eruption, flood and storm, the same as for earthquakes in industrial risks and other risks in general, other than households. Household earthquake cover has its own special features, described below. With this exception, other covers are granted systematically by private companies, without the intervention of the Public Administration, and the risks assumed are then distributed in international reinsurance.

⁸ WIR522 (1995): 6 October; 1995; p. 91. See also Swiss Re: *The Great Hanshin Earthquake: Trial, Error, Success*. Swiss Re, Zurich, 1995.

⁹ Yamazaki F., Meguro, K. and Tong, H.: "General Review of Recent Five Damaging Earthquakes in Japan". *Bulletin of Earthquake Resistant Structure Research Center*, No.28, Institute of Industrial Science, University of Tokyo, 1995; pp. 7-23.

¹⁰ SwissRe: "Natural catastrophes and man-made disasters 2006: low insured losses". *Sigma*/2, 2007.

¹¹ OECD: "Japan Floods". *OECD Studies in Risk Management*. OECD, Paris, 2006; p. 9.

¹² SwissRe: "Floods: an insurable risk? A market survey". Zurich, 1998; p. 22.

¹³ SwissRe: "Natural catastrophes and man-made disasters in 2004: more than 300,000 fatalities, record insured losses". *Sigma*, n.º 1/2005.

2.1. Storm and Hail

This cover is generally included in standard fire insurance policies, for simple and for commercial and industrial risks¹⁴. However, some properties integral to industry and warehouses (provisional constructions, installations and equipment under construction outdoors, docks and dams, raw materials and automobiles) are not included, and additional cover can be contracted for them. Rating is done on an individual basis, and a deductible is applied. Both covers, for storm and hail, can be underwritten separately.

MAJOR EVENTS INDEMNIFIED FOR TYPHOONS

Name Date	Indemnification paid (JPY billion)
“Mireille” 26-28 Sept. 1991	567.9
“Songda” 4-8 Sept. 2004	387.4
“Bart” 21-25 Sept. 1999	314.7
“Vicki” 22 Sept. 1998	160.0
“Tokage” 20 Oct. 2004	138.0

Source: GIAJ¹⁵.

2.2. Flood

For simple risks, flood is generally excluded from a fire policy. However, multi-risk policies include cover for water damage arising from typhoons, torrential rain, overflows, etc., with 70% indemnification of losses if these are in excess of 30% of the insured sum¹⁶.

Flooding is excluded from standard fire policies for commercial risks, although this may be covered by an extension of guarantees. It is included in multi-risk commercial policies. Flood cover can be included in industrial risks—unless caused by a tsunami—in an additional cover to fire insurance policies¹⁷. Premiums are established by following the guidelines and criteria of the *Non-Life Insurance Rating Organization of Japan*, and a deductible is normally determined as an equivalent of 2% of the sum insured, with a ceiling of JPY 100,000 per event¹⁸.

¹⁴ Saito, Katsura: «Catastrophe Risks and Reinsurance in Japan». Financial Services Agency, Japan; 29 October 2004; pp. 13-15 (www.oecd.org/dataoecd/35/0/35272239.pdf).

¹⁵ Chart prepared on the basis of GIAJ data (General Insurance Association of Japan): www.sonpo.or.jp/en/news/2006/06_10_01.html.

¹⁶ SwissRe: “Floods: an insurable risk? A market survey”. Zurich, 1998; p. 23. Also, OECD: “Japan Floods”. *OECD Studies in Risk Management*. OECD, Paris, 2006; p. 15.

¹⁷ The penetration of flood insurance in the Japanese insurance market would be situated between 35.4% (fire insurance for household property) and 49.2% (fire insurance for dwellings). *Vid.* Paklina, Nina: “Flood Insurance”. OECD, October 2003; p. 6 (www.oecd.org/dataoecd/51/9/18074763.pdf).

¹⁸ SwissRe: “Floods: an insurable risk? A market survey”. Zurich, 1998; p. 23. Also, Saito, Katsura: “Catastrophe Risks and Reinsurance in Japan”. Financial Services Agency, Japan; 29 October 2004 (www.oecd.org/dataoecd/35/0/35272239.pdf).

2.3. Earthquake in Industrial Risks and Other Non-Household Risks

Earthquake cover in the case of industrial and commercial risks exists since 1956 and is provided on an optional basis as an extension of guarantees supplementary to the main fire insurance policy. The high vulnerability with respect to the danger of earthquakes in extensive areas forced insurance companies to make an exact assessment of the risks to be assumed, with a tendency to be very restrictive in the terms and conditions and ceilings stipulated in the cover provided. Similarly, policy holders found little motivation for purchasing cover which, together with those restrictions, was overly expensive. This is the reason for the traditional low penetration of this insurance. Nevertheless, with the deregulation process undertaken in the Japanese insurance market, the terms and conditions offered for this cover have improved ¹⁹.

Rating has been normally applied on an individual basis, depending on the basic estimate for the building's structure (five types) and the location according to degree of exposure (seven levels), ranging from 1.1 per thousand (minimum risk: class A building, level 1 location) to 18.6 per thousand (maximum risk: class E building, level 7 location).

Adverse-selection was always an important problem and, to facilitate reinsurance, the country was divided into twelve risk zones, according to which maximum indemnification limits were introduced as a percentage of the sum guaranteed for fires. Consequently, in five of these areas, there is no cover ceiling, in six cover is 30% (as in the case of Kobe region) and in one, which includes Tokyo and represents the greatest risk density, it is 15% ²⁰.

With the insurance market deregulation process, new less-restrictive possibilities of cover were opened up and now operate basically through two channels: as co-insurance policies with the insured (where the indemnification is a percentage of the damages included in the policy), or through the method of a first-risk policy ²¹.

Cover for business interruption resulting from an earthquake was historically ruled out by the non-life market. This cover did however make headway following market deregulation and is now being gradually implanted in Japanese firms ²².

2.4. Stabilisation Reserves

Aside from other technical provisions for specific purposes, Japanese legislation includes the compulsory establishment of three kinds of reserves, which are of the nature of equalisation reserves:

- a) One is a general reserve, called the 'Catastrophe Reserve', the aim of which, despite its name, is not necessarily tied to natural disasters —except for the special case that will be mentioned for fire insurance-, but rather, on a more general basis, to abnormal deviations in the loss ratio.
- b) Another refers exclusively to compulsory motor third party liability insurance.
- c) Finally, there is a specific reserve for household earthquake insurance, which, in this country, operates under a special scheme with the intervention of a private reinsurance

¹⁹ Benfield Group: "Earthquake Insurance Business in Japan"; p. 4 (www.benfieldgroup.com/NR/rdonlyres/D5AD434C-69E1-4A66-B4A6-08CC4122E597/0/EarthquakeInsuranceBusinessinJapan.pdf).

²⁰ *Ibidem*: p. 3.

²¹ Nowakowski, Piotr and Kawamura, Yuji: "Le système d'assurance Tremblement de Terre au Japon". *Regards*. (SCOR), n.° 8; December 2003.

²² Benfield Group: *Op. cit.*; p. 5.

platform with public backing, the JER (Japan Earthquake Reinsurance Company). Obviously, this reserve is indeed a reserve tied specifically to a natural disaster risk.

a) **Catastrophe Reserve (General)**

In order to be able to meet their indemnity responsibilities in the event of deviations from the normal claims rate—more specifically, abnormally high claims, since the application of the reserve is linked to loss ratios that do not reach 100%—, insurers are required to establish a cumulative reserve (“*Catastrophe Reserves*”) for each Non-Life branch, except for the compulsory automobile insurance and the earthquake insurance for households. The amount of the compulsory endowment of this reserve, as well as the disposition of its funds, varies from one branch to another.

Furthermore, and specifically for the cover of risks relating to natural phenomena included in fire insurance policies, companies are required to create reserves for natural disasters, endowing them up to a limit equivalent to the estimated loss caused by a natural disaster with a 70-year return period²³.

In effect, under the Japanese scheme, a certain percentage of the premiums subscribed (classified for this purpose in eight groups) must go to an equalisation reserve (called a “catastrophe” reserve, as mentioned earlier), and the reserve must be applied whenever the loss ratio of the relevant branch exceeds certain percentages.

CATASTROPHE RESERVE

Branches	ENDOWMENT		Ratio of Balance %	Maximum accumulation rate %	Disposition of Reserves %
	Accounting Minimum %	Fiscal Maximum %			
GROUP A	3.0	3.0	50	250	80
GROUP B	3.8	3.0	35	160	50
GROUP C	2.0	3.0	35	160	50
GROUP D	3.2	—	15	160	50
GROUP E	3.2	—	15	160	50
GROUP F	3.2	—	15	160	50
GROUP G	50	50	—	—	Total compensation paid
GROUP H	24	—	—	24	100

GROUP A: Marine Hull and Aviation. **GROUP B:** Fire. **GROUP C:** Marine Cargo, Inland Transit, Windstorm and Flood, General Liability, Contractors' All Risk and Damages to Movable Property. **GROUP D:** Automobile (not compulsory insurance), personal accidents and others not included in this or other groups. **GROUP E:** Nursing Care Expenses. **GROUP F:** Surety Bonds. **GROUP G:** Atomic Energy. **GROUP H:** Life Reinsurance.

Source: GIAJ²⁴.

²³ GIAJ: “General Insurance in Japan”. Fact Book 2005-2006; February 2007, p. 80 (www.sonpo.or.jp/en/publication/pdf/fb2006e.pdf).

²⁴ Chart prepared on the basis of the General Insurance Association of Japan (GIAJ) publication: “General Insurance in Japan”. Fact Book 2005-2006; February 2007, p. 79 (www.sonpo.or.jp/e/index.html). See also GIAJ; “Underwriting Reserves” (Regulations), on: www.sonpo.or.jp/e/regulations/underwriting.html.

The minimum rate for endowing this reserve for each group is represented by a percentage of the net premiums, and such endowment will be considered a deductible expense for tax purposes up to a certain percentage of the premiums, as specified on the preceding chart. Above the minimum provisions, insurers may be authorised, through notification to the *Financial Services Agency* (supervisory authority for financial services, including insurance), to accumulate an extra amount. This extra accumulation notification is not necessary—in all instances with a 150% ceiling—if the percentage of the catastrophe reserve over the net premiums is below the levels shown on the table as the ‘Equilibrium Ratio’.

The disposition of reserves occurs whenever the loss ratio exceeds the relevant level established for each branch. The part of the indemnities in excess of these levels can be withdrawn from the reserves ²⁵.

b) **Automobile Insurance Reserve**

The specific regulations for this branch require the endowment of a compulsory reserve calculated as the sum of premiums plus financial revenues (for long-term contracts) less losses (paid plus provisioned), taken for the last five years.

c) **Household Earthquake Insurance Reserve**

In accordance with the regulations for household earthquake insurance, this reserve must be provisioned in an amount equal to the net premiums less operating expenses and plus financial revenues, and it will be used in order to meet the cost of losses (paid and provisioned) in each financial year. It must be kept in mind that, in this case, an accumulation of very significant reserves in the direct insurance companies is not necessary, as there is a reinsurance programme in place through JER, an institution to which reference is made below.

3. The Special Case of Household Earthquake Insurance

Earthquake insurance for this type of risk forms part of a governmental programme put into place as a result of the serious 1964 Niigata quake, in Law n.° 73 Relative to Earthquake Insurance, of 18 May 1966. This programme requires all policies to form part of a specific reinsurance scheme which combines public and private participation, in turn benefiting from reinsurance cover for “*excess of loss*”, granted by the Government. That Law was followed by others, with revisions introducing successive modifications into the system ²⁶.

The number of policies with household earthquake cover and the amount of the insured capital rose following the 1995 Kobe earthquake. Distribution and concentration of those policies varies according to region, in line with the risk perception ²⁷. The Tokyo region concentrates a large proportion of policies, however, the penetration figure for this cover does not exceed 31.8% (Aichi Prefecture) in any of the 47 Prefectures into which the country is divided, the national average being 20.8% at March 2007 ²⁸. At the end of 2005, the number of household earthquake insurance policies in force surpassed the 10-million barrier.

²⁵ GIAJ: “General Insurance in Japan”; *Op. cit.*, p. 79.

²⁶ Non-Life Insurance Rating Organization of Japan (NLIRO) and Kawachimaru, K.: “Disaster Risk Management in Japan”. *Catastrophic Risks and Insurance*. OECD. Paris, 2005; pp. 303-319.

²⁷ Tsubokawa, Hiroaki: “Japan’s Earthquake Insurance System”. *Journal of Japan Association for Earthquake Engineering*. Vol. 4, n.° 3, 2004 (Special Issue); p. 156.

²⁸ GIAJ: www.sonpo.or.jp/e/statistics/others/ownership_eq.html.

**MAJOR EVENTS INDEMNIFIED UNDER HOUSEHOLD
EARTHQUAKE COVER**

Earthquake	Date	Indemnifications paid (JPY billion)
Great Hanshin	17-1-1995	78.3
Geiyo	24-3-2001	16.9
Fukuoka	20-3-2005	16.7
Niigata	23-10-2004	14.8
Niigata	16-7-2007	7.8

Source: GIAJ ²⁹

3.1. Cover. Property and Damage

Cover is granted in a separate specific policy automatically offered by the insurer to an insured who contracts a household fire or multi-risk policy (as explained), including contents. The insured can reject the guarantee offered, formally and in writing. This is therefore a voluntary cover for the insured, but obligatory for the insurer if the insured wishes to take it. Although under a separate policy, this cover is always linked to another main fire insurance contract, covering the same as the latter, albeit with the specific exclusions referred to below.

This category of insurance covers damage to buildings and contents from fire, destruction, burial or washout as a direct or indirect consequence of an earthquake, volcanic eruption or tsunami ³⁰. All seismic movements registered in the 72 hours following the first tremor are considered to form part of a single event ³¹.

The properties covered by this insurance are homes and apartments used totally or partially as a dwelling, or jointly as a dwelling and business, both finished as well as under construction. This includes second homes, and the cover also extends to doors, enclosures, sheds, garages and other constructions attached to the main insured home; however, houses destined for renting by the insured are excluded. In turn, contents are insured as a whole, and no part thereof can be left outside the cover except for assets specifically excluded, such as precious metals, jewellery and art objects individually worth more than JPY 300,000, along with manuscripts, design drawings, cash, bank bonds and stamps. Nor do automobiles benefit from this guarantee ³².

Farmhouses and other agricultural buildings are also an exception to the household insurance system. These buildings are insured and reinsured privately in the context of a programme which, along with fire and liability, includes other covers, implemented through the agricultural welfare society “*Zenkyoren*” (National Federation of Agricultural Co-operative Welfare Insurance), not supervised by the Ministry of Finance like the other institutions but by the Ministry of Agriculture Forestry and Fisheries ³³.

There are household earthquake covers granted by insurance co-operatives, but they fall outside the framework of application of Law n.° 73 on Household Earthquake Insurance.

²⁹ Chart prepared on the basis of GIAJ data (www.sonpo.or.jp/en/statistics/claim/pdf/claims_paid_for_earthquake_insurance_on_dwelling_risks.pdf).

³⁰ JER.: “Japan Earthquake Reinsurance Co. Ltd. 2006”. December, 2006.

³¹ Non-Life Insurance Rating Organization of Japan (NLIRO): *Earthquake Insurance in Japan*. Tokyo, March 2003; p. 41.

³² Non-Life Insurance Rating Organization of Japan (NLIRO) and Kawachimaru, K.: “Disaster Risk Management in Japan”. *Catastrophic Risks and Insurance*. OECD. Paris, 2005; p. 313.

³³ Nowakowski, Piotr and Kawamura, Yuji: “Le système d’assurance Tremblement de Terre au Japon”. *Regards*. (SCOR), n.° 8; December 2003; p. 3. Also, Benfield Group: *Op. cit.*; p. 1.

3.2. Cover Limits

The limit on cover, selected by the insured, ranges between margins of 30 to 50% of the sum insured under the main fire insurance policy with a ceiling which, following the Kobe earthquake, was raised from 10 million yens to 50 million for damage to buildings, and from 5 million yens to 10 million for damage to contents³⁴. Nevertheless, from time to time the Japanese Parliament sets a total indemnity ceiling for all insurers and for all claims for household damage caused by a single earthquake. That ceiling is, since April 2005, JPY 5 trillion. This means that if claims exceed that ceiling, compensation payments would be reduced in the same proportion and, in any case, without discounting any deductibles.

Until 1 July 1980, the system dealt solely with claims arising from “total loss”. A mechanism was subsequently introduced under which payment was made up to 50% of the sums insured for losses between 20 and 50% of the real value of exposure (“medium loss”). Finally, since April 1991, the system also provides small payments for losses below the aforementioned limit (“partial loss”), with payment of up to 5% of the limit guaranteed in the policy for losses of between 3 and 20% of the exposed values (for buildings)³⁵.

HOUSEHOLD EARTHQUAKE INSURANCE DEFINITION OF THE SCOPE OF THE DAMAGE AND THE PERCENTAGE OF COMPENSATION

Definition of the degree of damage				Indemnification to be paid in relation to the sum insured
BUILDING			CONTENTS	
Damage to main structural parts	Area of floor burnt down or washed away	Flood		
50% or more of the current value	70% or more of the total floor area	—	80% or more of the current value	100% of the sum insured, up to the limit of the current value of the contents or dwelling
From 20% to less than 50% of the current value	From 20% to less than 70% of the total floor area	—	From 30% to less than 80% of the current value	50% of the sum insured, up to the limit of 50% of the current value of the contents or dwelling
From 3% to less than 20% of the current value	—	Above the floor level or more than 45 cm from the ground level	From 10% to less than 30% of the current value	5% of the sum insured, up to the limit of 5% of the current value of the contents or dwelling

Total loss

Half loss

Partial loss

Source: JER and GIAJ³⁶.

³⁴ Non-Life Insurance Rating Organization of Japan (NLIRO) and Kawachimaru, K.: “Disaster Risk Management in Japan”. *Catastrophic Risks and Insurance*. OECD, Paris, 2005; p. 316.

³⁵ GIAJ: “General Insurance in Japan”. *Fact Book 2005-2006*; pp. 53-54.

³⁶ Prepared on the basis of JER data: “Japan Earthquake Reinsurance Co. Ltd. 2006”. December 2006; p. 5. And GIAJ data also: “Earthquake Insurance on Dwelling Risk” (www.sonpo.or.jp/e/regulations/eq_ins_e.html).

The Japanese Household Earthquake Insurance system guarantees the insured 100% of the compensation to which the insured is entitled, in the event of bankruptcy or default of payment by the company with which the insured has contracted the basic fire insurance policy.

3.3. Premiums

The premium rate, applicable both for the building and contents, is determined in relation to two factors: location of the property (the territory divided into 4 classes, with the zones catalogued in terms of susceptibility to risk) and the type of construction (wood or reinforced).

PREMIUM RATES
(For every JPY 1,000 of amount insured)

Localitión	Structure		Localitión	Structure	
Zone	Non-wooden	Wooden	Zone	Non-wooden	Wooden
1	0.5	1.0	5	1.05	1.88
2	0.65	1.27	6	0.91	2.15
3	0.65	1.56	7	1.69	3.06
4	0.91	1.88	8	1.69	3.13

Source: JER ³⁷.

These rates, or the modifications to them, must be notified in advance to the Ministry of Finance, and they are subject to a 10% agent's commission (12% if paid by instalments).

In the revision of the system in 2000, as a measure to promote prevention, a premium discount was established for buildings for which measures were taken to enhance their earthquake resistance. This discount is applied according to a scale of those measures, defined on three levels: 30% ("Earthquake Resistance Class 3"), 20% ("class 2") and 10% ("class 1"). Moreover, if constructed after 1 June 1981, there is an automatic 10% discount on the premium, except in cases where one of the above-mentioned discounts for the reinforcement of the earthquake-resistance measures is applied ³⁸.

3.4. The Reinsurance System

There is a specific reinsurance system for household earthquake insurance, involving the following in a variety of ways: the Japan Earthquake Reinsurance Co. (JER), set up in 1966 by all of the Japanese direct non-life insurers; Toa Fire & Marine Reinsurance Co., a private reinsurer; the direct insurance companies as mentioned and the Government. International reinsurance does not usually participate in this.

The direct insurers cede all risks insured against earthquake for reinsurance to JER (Earthquake Reinsurance Treaty "A"). It then retrocedes them in two excess of loss treaties complement-

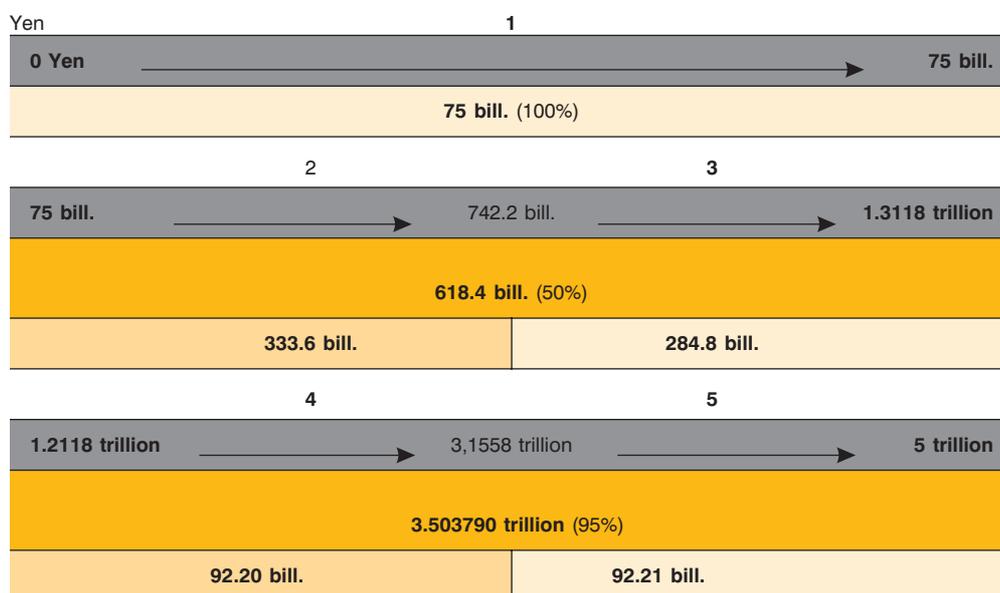
³⁷ Chart prepared on the basis of JER data: *Annual Report 2007*; p. 6 (www.nihonjishin.co.jp/disclosure/2007/en_disclosure.pdf).

³⁸ Tsubokawa, Hiroaki: "Japan's earthquake insurance system". *Journal of Japan Association for Earthquake Engineering*. Vol. 4, n.º 3, 2004 (Special Issue); pp. 154-160.

ing each other: one charged to the original private reinsurers and TOA RE (Earthquake Reinsurance Treaty “B”), and the other taken on by the Administration (Earthquake Reinsurance Treaty “C”). Thus, the higher the loss tranche is, the greater the protection taken on by the Administration, and the lower the protection to be taken on by private insurers. As already pointed out, the total ceiling of compensation payable by all the insurers and the government to those insured for a single event is JPY 5 trillion. Should claims exceed that limit, the indemnifications would be reduced proportionately ³⁹.

The following table shows the distribution (in yens) of the risk between the Government, JER and the private companies.

REINSURANCE STRUCTURE HOUSEHOLD EARTHQUAKE INSURANCE



Source: JER ⁴⁰.

JER's liability: 75 + 284.8 + 92.21 = 452.01 billion
Non-Life insurers' liability: 333.6 + 92.2 = 425.8 billion
Government liability: 0.6184 + 3.50379 = 4.12219 trillion

Reference has already been made to the low rate of penetration for this cover, despite the Government's backing through the above reinsurance scheme and the efforts insurers are making in favour of this kind of insurance targeting homes. The reason would appear to be obvious: the high-risk zones are clearly identified, and there is clear geographical adverse-selection, as a consequence of which thought has even been given on occasions to making this insurance compulsory.

³⁹ JER.: "Japan Earthquake Reinsurance Co. Ltd. 2006". December 2006; pp. 9-10.

⁴⁰ Chart prepared on the basis of JER data: JER: *Annual Report 2007*; p. 12 (www.nihonjishin.co.jp/disclosure/2007/en_disclosure.pdf).

4. Earthquake Fire Expense Insurance

Since 1984, the standard fire policy and other multi-risk policies covering mainly homes but which can also apply to hotels, businesses and small industries (excluding warehouse policies) provide automatic cover against the risk of fire following an earthquake, volcanic eruption and tsunami, with no additional surcharge. This differs from the real cover for fire caused by earthquake, which is acquired with other types of earthquake policy, and its aim is not for the recovery of damaged properties but rather it is a financial contribution for costs caused by fire. In fact, the indemnification ceiling is 5% of the sum insured under the fire insurance policy, to a maximum of JPY 3 million for households and general risks, and 20 million for small industries⁴¹.

This cover was taken up by the Earthquake Fire Expense Reinsurance Pool, comprised by the Japanese non-life insurance companies and managed by TOA Re, until March 1996 when it was abolished. Since then, the companies have individually assumed this cover, taking reinsurance on the international market.

5. Other Financial Tools for Reconstruction

With respect to reconstruction following disasters, in Japan there is a range of financial assistance mechanisms established by a number of laws, such as the “Disaster Sufferers’ Tax Relief Law” (1947), which provides for the possibility of a moratorium and reduction of taxes for those affected by natural disasters; the “Public Infrastructure Restoration Law” (1951), for the reconstruction of public infrastructures; the “Law for Loan Rendering to Agriculture, Forestry and Fishery Workers Suffered from Natural Disasters” (1955), for credits aimed at the stabilisation of agricultural, fishery and forestry productions; the “Law concerning Special Financial Support in Large-Scale Disasters” (1962); the “Disaster Condolence Money Payment Law” (1973), and the “Sufferers’ Livelihood Recovery Support Law” (1998)⁴².

Finally, reference should be made to other instrument of disaster relief: the so-called *Livelihood rebuilding support system for victims*. This was established in 1998 as a result of the experience of the Kobe earthquake, and through this system, financial aid is granted for a maximum of one million yens to victims who, due to a natural disaster, have sustained losses above a certain level and, basically, when their homes have been completely destroyed. It is a system which operates as a fund with resources totalling JPY 60 billion, supported through contributions by the prefectures⁴³.

⁴¹ Benfield Group: “Earthquake Insurance Business in Japan”; p. 6 ([www.benfieldgroup.com/NR/rdonlyres/D5AD434C-69E1-4A66-B4A6-08CC4122E597/0/Earthquake InsuranceBusinessinJapan.pdf](http://www.benfieldgroup.com/NR/rdonlyres/D5AD434C-69E1-4A66-B4A6-08CC4122E597/0/Earthquake%20InsuranceBusinessinJapan.pdf)). Also, Guy Carpenter: “The World Catastrophe Reinsurance Market: New Capital Stabilizes Market”. 2007; p. 81.

⁴² Sanbongi, Kenji: “Legislative Arrangements of the Flood Management in Japan”. Legal and Institutional Aspects of integrated flood management. World Meteorological Organization and Global Water Partnership, August 2005.

⁴³ Non-Life Insurance Rating Organization of Japan (NLIRO) and Kawachimaru, K.: “Disaster Risk Management in Japan”. *Catastrophic Risks and Insurance*. OECD, Paris, 2005; p. 312.

MEXICO

1. Introduction ¹

Due to its geographical location, Mexico is exposed to a great variety of natural phenomena capable of causing major disasters, such as earthquakes, volcanic eruptions, hurricanes, forest fires, floods, landslides, drought, and the like.

In the face of natural disaster, the response of the Federal Government, as well as of the state and municipal governments, made it necessary to redirect their annual budgets in order to apply the resources necessary for repairing the damage to the physical infrastructure and for providing relief to the population affected by the disaster.

This situation meant that ordinary public works programmes, such as the expansion and maintenance of infrastructures or new construction works, had not been implemented or were severely reduced in their scope on account of a lack of resources, as such resources were needed for the reconstruction of infrastructures damaged or destroyed by a natural event.

In order to increase the capacity of Mexico's Federal Government to deal with the effects of natural disasters, and with the aim of putting the annual budget in order and to have available sufficient resources to enable the Government to meet the costs of damage caused by natural phenomena without altering the results of the public finances and their ordinary programmes, the Fondo de Desastres Naturales (FONDEN - Natural Disaster Fund) was created in 1996 within the framework of the Federal Budget. This was a new programme, whose main objective was to meet the costs of the damage caused by natural catastrophes to the uninsurable infrastructures of the Federal Government and of the state and municipal governments.

Although with the establishment of FONDEN, the problem associated with avoiding the absorption of resources from federal and local programmes was on the way to a solution, as the authorities were able to use fresh resources for attending to emergencies and disasters, there was no legal regulation in place that could provide proper control of the resources granted or ensure appropriate transparency in the use of funds.

This was the reason for the issuance in 1999 of the first FONDEN Operating Rules, which regulated the mechanisms, requirements, procedures, stages and time limits to be complied with by the federal secretariats ² and the Mexican states for accessing FONDEN resources in order to attend to the damage caused by natural disasters.

With this new legal regulation, the Government's intention was for assistance to be granted in a truly transparent manner, without political conditions or favouritisms of any kind in the granting of resources. Thus, the result was that such resources would be managed by a trust fund.



¹ This chapter has been prepared by Rubem Hofliger Topete (FONDEN).

² Equivalent to ministries.

As a consequence of this, the idea of a “Federal FONDEN Trust Fund” arose alongside the “FONDEN Trust Funds” of the 32 states, instruments which are explained below.

Although the procedure to provide FONDEN resources through the trust fund has remained unchanged over the years, the legal regulation of FONDEN has undergone a number of substantial modifications in order to ensure that the procedures for granting relief and funds to the victims and for the infrastructures damaged in the event of natural disasters would be implemented as efficiently and effectively as possible.

2. The Purpose and Genesis of FONDEN

FONDEN is a financial tool comprised by several instruments and with a number of agencies of the Federal Government participating in its operation. It has as its purpose the provision of funds to the 32 states and the federal agencies (which are responsible for the federal infrastructure) for dealing with the damage caused by an unforeseeable natural event of a catastrophic magnitude exceeding their capacity to respond with their own budgets.

This is a federal programme which grants assistance on a subsidiary and complementary basis with respect to the resources originally earmarked for dealing with natural disasters. Therefore, for the approval of such assistance, the states and the federal agencies wishing to request support must provide evidence that the disaster exceeds their financial capacity, due to a lack of sufficient resources in their ordinary programmes for repairing the damage caused by the disaster.

In the case of damage to the infrastructures of a federal agency, 100% of the funds will be charged to the FONDEN resources, provided that it has been fully shown that the agency concerned lacks the resources in its ordinary programmes for dealing with the disaster.

In the case of damage to the infrastructures of the Mexican states and their municipalities, the relief offered by FONDEN is complementary and is granted in accordance with the following percentages:

Type of Public Infrastructure	FONDEN Resources %	State and Municipal Resources %
1. Motorways, bridges, ports, airports • State • Municipality	50 30	50 70
2. Hydraulic works (dams, potable water infrastructure and reorganisation, protection work, etc.) • State • Municipality	50 40	50 60
3. Education and health (schools, universities, clinics, hospitals, etc.) • State • Municipality	50 30	50 70
4. Main roads	20	80
5. Fisheries, basic aquatic and breeding grounds • State • Municipality	50 30	50 70
6. Forestry resources	50	50
7. Protected natural areas	50	50
8. Coastal areas, rivers and lakes	70	30
9. Dwellings	70	30
10. Artistic and historical real estate	30	70

3. Natural Events Included in FONDEN

The natural events causing natural disasters and eligible for FONDEN assistance are:

A) Geological:

- a) Earthquakes
- b) Volcanic eruptions
- c) Seaquakes
- d) Wash-out

B) Hydrometeorological:

- a) Drought
- b) Cyclones (tropical depressions, tropical storms and hurricanes)
- c) Intense rainfall
- d) Snowstorms and hail
- e) Floods
- f) Tornados

C) Others: Forest fires

Damage caused by any other natural event may also be eligible for FONDEN assistance.

4. FONDEN Instruments

Three instruments are integrated in FONDEN:

- a) **Revolvable Fund:** Instrument designed to provide funds for the purchase of aid supplies in emergency and disaster situations for the purpose of immediately meeting the people's urgent needs generated by a natural event and relating to life, health, food, medical care, clothing, temporary accommodation, as well as the evacuation of people from risk areas.
- b) **FONDEN Program:** The purpose of this programme is to provide economic aid for the repair and reconstruction of infrastructures damaged by a natural disaster to be effected on the three levels of government (federal, state and municipal); for the damaged homes of low-income families who are unable to secure any kind of public or private insurance and for the restoration of forestry resources, protected natural areas, coastal areas, rivers, lagoons, etc.
- c) **FONDEN Trust Fund:** The purpose of the fund is to grant resources against its assets in order to undertake the actions included in the FONDEN Programme, as well as for the contracting of insurance and risk transfer instruments (catastrophe bonds).

5. Who Has Access to FONDEN Resources?

The following have access to FONDEN resources:

- a) The governments of the states which have found that their financial and operational capacity is not sufficient to deal with the damage generated by a natural disaster. Municipalities cannot request FONDEN assistance directly and must take appropriate action in order to apply for aid through the states.
- b) The governmental agencies of the Federal Government, whenever a federal infrastructure is affected. In this case, such agencies must show the lack of resources in their ordinary programmes in order to meet damage costs.

6. Procedure to Access FONDEN Resources

The procedure to be followed in order to access FONDEN resources is explained below, starting from the occurrence of the disaster through to the approval of the funds.

6.1. Stage One. Procedure for Assessing and Quantifying Damage

Step one: Immediately following the occurrence of the natural event, the state or federal agency must request one of the three specialised federal departments, depending on the kind of natural event involved (geological, hydrometeorological or forest fire), to corroborate the existence of the disaster.

Step two: Within a period of four days, the appropriate specialised federal department will notify the state of the existence of the disaster. The state will then proceed immediately to set up a committee to assess and quantify the damage caused by the disaster to all kinds of infrastructures.

This committee is comprised by the federal and state agencies responsible for the infrastructures damaged.

Step three: Within a period of ten days, a meeting of the committee will be called, at which the federal and state agencies will submit their evaluation results on the damaged infrastructures from the standpoint of the various sectors affected and the amount of the funds required for reconstruction. In regard to state infrastructures, the state may request an advance of up to 50% of the amount to be provided by FONDEN in order to start reconstruction work immediately.

6.2. Stage two. Procedure for Approving the Resources Necessary to Cope with Damage

Step four: Within the next five days, the Secretariat of the Interior will receive the applications for funds from the states and federal agencies and will publish a statement of natural disaster in the Federal Official Newspaper. Parallel to this process, the Secretariat of Finance and Public Credit will approve the amount requested in advance by the state, through the FONDEN Trust Fund.

Step five: Within the following two days, the Secretariat of the Interior must take charge of the following aspects:

- a) Verify that there is no duplication of actions to be undertaken between the federal and state agencies.
- b) Verify that the funds requested are not for the reconstruction of losses unrelated to the natural disaster.
- c) Verify that the infrastructure damaged has not received any other aid through FONDEN previously. In this case, the Secretariat must request and include in the case file documents proving that the infrastructure has been insured (see heading 11).
- d) Draw up and submit for approval by a joint panel a list of all of the resources requested, including its evaluation on the content of the case file and whether the case file conforms to relevant legal provisions.

Step six: During the following days, the joint panel will meet to discuss the approval of the funds requested. In this case, it will recommend that the resources be authorised and granted by the FONDEN Trust Fund, taking into account the following aspects:

- a) In the case of a federal infrastructure, the funds authorised will be paid directly by the FONDEN Trust Fund to the contractor.
- b) In the case of a state or municipal infrastructure, the funds authorised will be deposited by the Federal FONDEN Trust Fund in the relevant State FONDEN Trust Fund, once the state government has deposited its part for the reconstruction payments to be met.

The process described above extends over a period of approximately 23 days, as from the occurrence of the disaster and up to the authorisation of the funds.

7. Implementation of the Resources Authorised

- a) When the funds are to be used for the reconstruction of the state or municipal infrastructure affected, the Secretariat of the Interior will inform the state about the total amount

of resources approved by FONDEN, broken down by affected sector. This sum will be deposited in the relevant State FONDEN Trust Fund, once the state government has deposited its part, in accordance with the percentages indicated under heading 2 and with the contributions schedule submitted by the state itself to the State FONDEN Trust Fund.

In this regard, any matter relating to the reconstruction work and actions and the use of the resources approved will be settled directly by the Technical Committee of the State FONDEN Trust Fund.

- b) When the funds are to be used for the reconstruction of a federal infrastructure, the Federal FONDEN Trust Fund will provide the contractor with the funds approved, once the federal agencies have approved the advance for the reconstruction work and actions.

8. Federal FONDEN Trust and State FONDEN Trust

8.1. Federal FONDEN Trust

This Fund was established in 1999 and its assets originate from the annual fiscal surplus from the budgetary resources of the FONDEN Programme, from the interest generated by all of the federal funds deposited in each of the 32 State FONDEN Trusts and from the surpluses from the reconstruction programmes concluded.

Its principal purposes are:

- a) To provide federal agencies with the funds approved for the reconstruction of federal infrastructures affected by a natural disaster.
- b) To deposit in the State FONDEN Trusts the funds authorised as subsidies for the performance of construction works and actions for the reconstruction of the state and/or municipal infrastructure damaged.
- c) To hand over to the federal agencies and deposit in the State FONDEN Trusts temporary resources until the relevant insurance reimbursements are obtained, which must be deposited in the Federal FONDEN Trust Fund once they have been recovered.

8.2. State FONDEN Trust

Like the Federal FONDEN Trust, the State FONDEN Trusts were established in 1999, one for each Mexican state. Their subscribers are the local governments of each state, and all have the same trustee, that is, the National Development Bank, which is also the case with the Federal Trust.

Their assets are formed with the contributions from the Federal FONDEN Trust and from contributions by the states and their respective municipalities.

The main purposes of the Funds are:

- a) To manage the resources received from the Federal FONDEN Trust and from the Governments of the states and their municipalities.

- b) To pay for the work and actions for the reconstruction of the state and municipal infrastructures affected, according to the percentage of payment indicated under heading 2.
- c) To return to the Federal FONDEN Trust, within the first five days of each month, the financial interest generated on the federal funds deposited in the State FONDEN Trusts for the reconstruction of the infrastructures damaged by a disaster.
- d) To receive donations to be used solely for the objectives of the trust fund.

At the end of a specific natural catastrophe reconstruction programme, if there are still surplus amounts, due to the cancellation of work and actions or because the programme has not concluded completely, such surplus amounts must be returned to the Federal FONDEN Trust and to the state government in the proportions contributed by each according to the percentages established for each kind of infrastructure

On the contrary, if the natural disaster reconstruction process has finalised completely, and there are surplus amounts as a result of having obtained better prices (with respect to those initially estimated) in the procurement of materials and in construction costs, such surplus amounts may be used for setting up a State Natural Disaster Fund.

9. Statistics

Since the very beginnings of the written history of mankind, there have been reports of major natural catastrophes. Others go back to prehistoric times and have come down to us through myths and legends, which have often been confirmed by means of the discovery of physical evidence in recent archaeological studies.

Even in the more developed countries, it is an extremely difficult task to obtain reliable and accurate information on the losses caused by disasters. This is still more difficult in developing countries such as Mexico, where there is little practical experience in quantifying property and losses. These are the reasons why the statistics available present large margins of error, particularly with respect to economic damage and the loss of life.

Due to this, only a few general statistics on major natural catastrophes occurring in Mexico in the eighties are included, and only those considered useful in order to appreciate the significance of certain basic factors.

The increase in the number of disasters in recent years is attributed principally to population growth and human settlements in areas particularly exposed to natural events that turn into disasters, in addition to the environmental degradation of Mexican soil, mainly due to deforestation problems.

MAIN CATASTROPHIC EVENTS (1980-2005)

Year	Event	State	Population affected	Damage (USD)
1980	Hurricane	Tamaulipas	25,000 victims	10 million
1982	Hurricane	Sinaloa	257,000 victims	450 million
1985	Earthquake	D.F.	4,287 fatalities and 37,300 victims	4.0 billion
1985	Rain	Nayarit	48,000 victims	420 million
1988	Hurricane Gilbert	Yucatán, Q.Roo, Campeche, Tamaulipas, Coahuila, Nuevo León	250 fatalities and 15,000 victims	750 million
1990- 1991	Floods	Sonora, Baja California Sur, Sinaloa and Chihuahua	40,000 victims	53 million
1993	Floods	Baja California Sur	10,000 victims	63 million
1995	Earthquake	Colima and Jalisco	34 fatalities and 1,000 victims	7 million
1997	Hurricane Pauline	Guerrero and Oaxaca	228 fatalities and 50,000 victims	800 million
1998	Rain	Chiapas	407 fatalities and 28,753 victims	N.A.
1999	Rain	Puebla, Hidalgo, Veracruz, Tabasco and Oaxaca	329 fatalities and 295,000 victims	1.0 billion
2002	Hurricane Isidore	Campeche, Chiapas, Yucatán and Quintana Roo	448,000 victims	250 million
2002	Hurricane Kenna	Jalisco and Nayarit	319,000 victims	48 million
2003	Hurricanes Ignacio and Marty	Baja California Sur	20,000 victims	43 million
2005	Hurricanes Stan and Wilma	Hidalgo, Puebla, Oaxaca, Guerrero, Veracruz, Chiapas, Yucatán and Quintana Roo	98 fatalities and 2,200,000 victims	3.80 billion

10. FONDEN's Main Strengths and Weaknesses

10.1. FONDEN's Main Strengths

The FONDEN's strong points are as follows:

- a) Existence of an exclusive federal programme for dealing with natural disasters, including aid to the population in the face of any emergency situations as may be generated in the wake of a natural event.
- b) Transparency in the delivery of funds, either for reconstruction or for attending to the survival and health of the population in case of emergencies.

- c) Availability of resources at any time of the year, as, since they are deposited in a Trust Fund, they are not subject to being returned to the Federal Treasury at the end of the fiscal year.
- d) A guarantee that the resources will not become exhausted, since, by law, the Secretariat of Finance and Public Credit has a mandate to take the budgetary steps necessary in order to ensure that there are sufficient funds available at any given time and in the face of any natural disaster whatsoever, regardless of the amounts required.
- e) The possibility that on rebuilding the infrastructure damaged by a disaster, additions and technical improvements may be added, in order to reduce the likelihood that the infrastructure could be damaged in a subsequent natural event.

10.2. FONDEN's Weaknesses

These could be identified in the following manner:

- a) The extreme poverty of some regions of the country. This is a situation which, when a natural event—even of a low or medium magnitude— occurs, determines that such an event will become a natural disaster of major proportions due to very weak and poorly constructed infrastructure. Moreover, there are a large number of dwellings located in high-risk areas (on hills, on riverbanks, on ground not suitable for housing, etc.).
- b) Delay in the reconstruction of the infrastructure damaged and of the dwellings affected, as a consequence of the large number of legal provisions which must be observed.
- c) The absence of aid for the replacement of household effects for people who have lost the contents of their homes as a result of a natural disaster.
- d) Lack of necessary infrastructure maintenance, on account of the lack of budgetary resources in the state governments and in the federal agencies, which means that when a natural event occurs, the damage is much greater.

11. Challenges and Outlook for FONDEN

11.1. Change from a Reactive System to a Preventive System

One of the main goals of the Mexican Government is precisely that of transforming a reactive system in the face of natural catastrophes into a preventive system.

The strategy of prevention establishes three basic steps:

- a) Ascertain the dangers and threats to which we are exposed, by means of the study and knowledge of natural phenomena.
- b) Identify and establish, from a national, state and municipal perspective, the characteristics and current levels of risk, understanding risk as the result of multiplying the danger by the exposure and by the vulnerability.
- c) Design actions and programmes in order to mitigate and reduce these risks in the event of natural phenomena, through the reinforcement and adaptation of the infrastructures and by preparing the population so that individuals will know what to do before, during and after a disaster.

In order to achieve the aforementioned goals, more resources must be invested in the prevention of disasters. For this reason, an attempt is made each year to allocate sufficient amounts in the Federal Budget Expenditure in order to attain these ends and succeed in avoiding the large-scale disbursement of funds for remedying the damage caused by major natural disasters.

At the present time, the Federal Government has two programmes in place for the prevention of natural disasters: 1) the Natural Disaster Prevention Fund, and 2) the Preventive Trust Fund, which can be used by the federal agencies as well as by the states requiring resources for the performance of work, actions or procurement of specialised equipment for disaster prevention.

11.2. Create Natural Disasters State Funds

In line with an eminently federal spirit, the intention in the medium-term is for all of the states to have their own natural disaster relief programmes, in order to decentralise this attribution and avoid a situation where the natural disasters occurring in the country would continue to be dealt with using federal funds.

11.3. Eradicate the Extreme Poverty in Some Regions of the Country, as well as the Vulnerability of the Majority of the Dwellings and of the Infrastructures in Those Regions

One of the principal aims of the Mexican Government is to succeed in substantially reducing the levels of social exclusion and in eradicating extreme poverty in the country.

It is in this direction that more resources are planned to be earmarked for assisting the extremely poor population, as the majority of natural disasters occur in those regions on account of the very vulnerable structures and foundations.

11.4. Implement Electronic FONDEN (E-FONDEN)

The Mexican Government is making an ongoing effort in order to introduce innovations and to be in the vanguard in the prevention and relief fields with regard to natural disasters.

The E-FONDEN project is oriented towards transparency and the reduction of the time used in the procedure for the approval of funds for dealing with natural disasters, by complying with the requirements and procedures through electronic means, ensuring quick analysis and monitoring.

The principal aspects of the project are:

- a) The system will have the capacity to show the information and the progress of the procedure by means of signals that will enable the user to identify failures in the process.
- b) There will be electronic data files that will avoid errors in the configuration of the manual files.
- c) The security system will enable the user to define level of access policies.
- d) The procedure for access to FONDEN resources will be able to be monitored electronically at any time by any federal agency or by the states.

The main advantages are: an increase in productivity; reduction of the time needed for each step of the process; simplification of the processes; qualitative improvement of the service; greater

efficiency; reduction of costs and errors; promotion of transparency; enhanced security and reduction of work.

11.5. Insurances and Risk Transfers

Another of the Federal Government's goals is for all of the federal agencies and the states to have their infrastructures appropriately insured, in such a way that, whenever a major natural disaster occurs, they will be capable of avoiding the enormous disbursement of funds which disasters of this kind bring with them. The idea is that the funds originating from FONDEN for dealing with natural disasters can be gradually reduced, with insurance and other risk transfer instruments meeting the payment of losses.

It is for this reason that the legal regulation of FONDEN intends to promote a culture of insurance, by forcing the federal agencies and the state governments to commit themselves to incorporating in their forthcoming annual budgets and programmes sufficient funds for insuring the infrastructure damaged by a natural disaster, to be rebuilt with FONDEN resources, prior to receiving the aid for reconstruction. This would preclude a situation in which, if the infrastructure is damaged again in the future by a fresh natural event, FONDEN would have to provide further funds.

At the same time, the Federal Government has been working intensely in order to insure the assets of the FONDEN Trust Fund, through the transfer of risks by contracting insurance policies or a catastrophe bond (cat bond) for cases of natural disasters of major proportions.

Insurance policies or cat bonds are financial instruments which can solve political/economic problems, on account of the following reasons:

- 1) The need for funds in case of a catastrophe is enormous and volatile, which is the reason why it is neither possible nor recommendable to use budget resources directly. One frequent solution is "self-insurance", through the creation of trust funds.
- 2) However, in years with low tax revenues, there are few incentives for contributing resources to the trust fund, originating its exhaustion.
- 3) The expenditure on natural disasters of major proportions is highly unpredictable and tax resources are not sufficient to cover it.
- 4) The new scheme is based on insurance or cat bonds, which have two major advantages:
 - a) **It increases the resources of the trust fund.** The payment of the insurance premium is covered with the resources in the trust fund. If a disaster occurs the trust fund receives a large quantity of resources. It would have been much more difficult to mitigate the disaster completely solely on the basis of fiscal resources.
 - b) **It solves the problem of economic policy.** This is so because it creates a framework of incentives which encourages a renewal of coverage on a regular basis.

Consequently, this scheme is oriented towards contracting catastrophe cover in order to transfer the risk of earthquake and protect the resources existing in the trust fund.

This kind of scheme enabled the State to finance a potential disaster on a permanent basis, as the liability for not renewing the catastrophe insurance would be enormous, considering that interrupting the contribution to the trust fund during one year represents a relatively lesser liability.

The first risk transferred from the FONDEN Trust Fund to the financial markets is the risk of earthquake, since:

- Although it is the least recurrent risk, it is also the risk that could occasion the most significant disasters.
- In Mexico there are sufficient data on this risk. The country has first-class specialists on this subject.

In May 2006, the Mexican Government subscribed the first issue of a catastrophe bond (cat bond) for the amount of 160 million U.S. dollars through Deutsche Bank and Swiss Re, acting as financial agent.

This bond is part of a programme of broader parametric insurance coverage against earthquakes within Mexico's territory and is backed up by Swiss Re for a total sum of 450 million U.S. dollars, securing protection for the assets of the FONDEN Trust Fund.

This transaction involves a premium with a cost of 26 million dollars for a period of three years, with a total cover of 450 million dollars against earthquakes. This is the first cat bond issued in Latin America and the first in the world issued by a sovereign government under the parametric scheme.

This instrument encompasses three basic points: 1) independence between payment by the financial institution to the FONDEN Trust Fund in relation to a disaster covered by the financial underwriting scheme and the verification of the losses and expenses of the Trust Fund; 2) timeliness in payment, in the sense that access to the funds is given immediately after the disaster occurs; 3) guarantee of payment, in the sense that confidence exists in the financial instrument created in order to back its commitments to the FONDEN Trust Fund, thereby minimising the risk of a lack of credit.

In addition to the earthquake cover which has already been launched, the Mexican Government is working on the creation of other risk transfer instruments, such as:

- Parametric insurance against hurricanes;
- Excess of loss coverage to protect the assets of the FONDEN Trust Fund.

The objective in the medium-term is for most of the FONDEN budget to be used to cover the premiums of the cat bonds and other risk transfer instruments created and to retain only a small sum for more recurrent and less destructive natural disasters.

In this way, FONDEN will have an enormous capacity in order to deal with major catastrophic events without impacting on public finances.

THE NETHERLANDS

1. Natural Disasters ¹

Flooding and cyclonic phenomena are the main hazards affecting the Netherlands. Storms and the fact that 55% of Dutch territory and 60% of its population are below mean sea level ² provide a mix which helps to make flooding a serious danger to this country, of which it has been said with no little reason that its history has been defined by the struggle against water. Without the protection of the structural measures (dikes, dams, etc.) around two thirds of the country would be flooded by waters from rising seas or rivers ³.

Of particular devastation were the floods which covered the southwest of the Netherlands in February 1953, submerging an area of 1,650 km², killing 1,835 and causing damage of close to € 1 billion. Three thousand homes were completely destroyed, and 43,000 were damaged ⁴. While not reaching those levels of loss, in the last decade of last century there were also high waters on the rivers Rhine and Meuse in 1993 and 1995. The dikes withstood the high water levels, although some urban areas outside the dike ring areas were affected.

It is calculated that the financial value of properties exposed to flood risk doubles every thirty years ⁵. The current potential losses in the coastal Netherlands are estimated at € 300 billion. The problem in relation to this danger is likely to worsen, as climate change is confirmed ⁶. It is estimated that by 2100 the sea level in the Netherlands will rise between 20 cm (low-impact predictions) and 110 cm (high-impact predictions) ⁷.



¹ This chapter has been prepared with the especial contribution of Laurens M. Bouwer (IVM/Institute for Environmental Studies - Vrije Universiteit Amsterdam).

² Balfourt, H.: "Adaptation to climate change in The Netherlands"; Florida, 19 December 2007 (www.commentmgr.com/projects/1148/docs/NetherlandsWaterClimate.pdf). About 70% of The Netherlands' gross domestic product is created in areas which are below sea level or that of the normal flow of the rivers (Kok, M.; Vrijling, J.K.; Van Gelder, P.H.A.J.M. and Vogelsang, M.P.: "Risk of flooding and insurance in The Netherlands". In Wu *et al.* (edit.), *Flood Defence*. Science Press, New York, 2002; pp. 146-154 (hydr.ct.tudelft.nl/vbk/public/gelder/paper100c-v10203.pdf). And also, Kabat, P.; Van Vierssen, V. and Veraar, J.: "Climate proofing the Netherlands". *Nature*, vol. 438/17 November 2005; pp. 283 and 284).

³ Jorissen, R.; Litjens-van Loon, J. and Méndez Lorenzo, A.: "Flooding risk in coastal areas". Directorate General of Public Works and Water. December 2000.

⁴ Swiss Re; Floods: an insurable risk? A market survey. Zurich, 1998.

⁵ Vis, M.; Klijn, F.; De Bruijn, K.M. and Van Buuren, M.: "Resilience strategies for flood risk management in the Netherlands". *The International Journal of River Basin Management*. Vol.1, n.º 1, 2003; pp. 33-40.

⁶ Botzen, W.J.W and Van den Bergh, J.C.J.M.: "Insurance against climate change and flooding in the Netherlands: present, future and comparison with other countries". *IVM Working Paper*, I.06/09; December 2006 (www.ivm.falw.vu.nl/images_upload/257A5F66-D43E-1024-CB7634A9FE96CA45.pdf).

⁷ Kabat, P.; Van Vierssen, V. and Veraar, J.: "Climate proofing the Netherlands". *Nature*, vol. 438/17 November 2005; pp. 283 and 284.

The exact flood risk in the Netherlands due to dike breaches is being evaluated in the Floris project⁸. Current studies into flood risks have indicated that the legal safety standards are currently not met, and that risks may be equal to or larger than other external risks (chemicals accidents, airports, LPG stations) in the Netherlands⁹. As in other parts of northwest Europe, winter storms create the largest natural hazard risk in the Netherlands, apart from floods. Recent major winterstorms Daria and Vivian in 1990 caused insured losses of € 1 billion and 400 million (2004 values), respectively.

No importance was attributed to seismic risk in a country considered to be relatively safe from this hazard until, on 13 April 1992, there was a 5.8 magnitude tremor (Richter Scale), with its epicentre in Roermond, and which also affected areas of Germany and Belgium. There was € 100 million in economic damage.

Extreme rainfall in September and October 1998 led to local flooding in the southwest and northeast Netherlands. Economic Losses amounted to a total of € 400 million, of which 80% was due to agricultural losses. In 2000, the Dutch Association of Insurers advised its members that losses due to local extreme rainfall could be insured for households. Flooding due to dike breaches of primary and secondary flood defences (dikes) is however still not covered.

Insurance protection —always optional— against these risks is, when available on the market, provided solely by private entities, with no intervention in the cover by the State which does however, particularly on the occasion of extremely intense catastrophes, usually provide “ad hoc” aid depending on each case.

It must be mentioned that the Dutch association of insurers has inaugurated a system for the combined processing of claims among the insurance companies affected in the event of a severe catastrophe.

2. Storm Cover and Exclusion of Flood and Earthquake

It can be said in general that the market only offers protection against the risk of storm (wind speeds of 14 metres per second or more) the cover for which, taking up both direct material damage and consequential loss, is available from virtually all insurers under property damage policies, with payment of an additional premium of some 0.15 per thousand of the insured capital, and a deductible of about 2 per thousand of that sum. Exceptionally, buildings and content in simple and agricultural risks (greenhouses) can combine storm cover with that for hail, on payment of a 0.05 per thousand additional premium. Likewise, it is also common to find cover for lightning, hail and rainwater damage in these policies.

On the other hand, risks of flood (by sea or river water), earthquake, volcanic eruption, avalanches, meteorites, frost, subsidence and earth slips are normally excluded from property insurance policies in the Netherlands. The only exception is in the automobile and construction all-risk branches, which do cover damage from any natural phenomenon, because the degree of exposure is much less.

⁸ www.projectvknk.nl. Also, www.tawinfo.nl/engles/downloads/FloodRisksandSafety.pdf.

⁹ MNP; “Dutch dikes and risk hikes: a thematic policy evaluation of risks of flooding in the Netherlands”. Report 500799002, Netherlands Environmental Assessment Agency, Bilthoven, 2004. And also, Bouwer, L.M. & Vellinga, P.; “On the flood risk in The Netherlands”. Chapter 24 in: Begum, S., Stive, M.J.F. & Hall, J.W. (eds.). *Flood Risk Management in Europe: Innovation in Policy and Practice*. Springer, Berlin, 2007; pp. 469-484.

For flood and earthquake risks, the Dutch insurance market decided in the fifties to withdraw its cover, which it considered could not be taken on technically, given the high potential loss and the problem of adverse-selection¹⁰. This decision was in particular made in response to the experience of the storm surge disaster of 1953. The lack of flood cover offer could have gradually gotten worse because of the increase of the vulnerability with regard to this risk over the years¹¹.

The (successful) efforts by the national government to have the risks of losses due to extreme precipitation covered by the private sector fit within its goal to reduce its own liability. The national government has in the recent past also repeatedly hinted at a commercial insurance for flood risks due to dike breaches.

In this context, and as already mentioned, in January 2000 the Dutch Insurers Association took the initiative under its property policies to cover homes and content against damage caused by flood as consequence exclusively of heavy rainfalls. With reference to the damage covered, these rainfalls can be “direct precipitations” (water entering the building unforeseen as a result of heavy rains, snowfall, hail or thaw), or “indirect precipitation”¹² (water entering the building as a result of flood caused by “heavy local rainfall”¹³). Damage caused by flood as a consequence of the collapse of dikes or structural protections against flooding is not included in this coverage.

In view of the lack of cover offer, it has been sometimes suggested an active public intervention in the flood risk insurance solutions, as it is the case in other European countries¹⁴. In that respect there have been some proposals regarding a government intervention in the compensation tools as insurer of last resort¹⁵ and the possibility of setting up a compulsory cover in order to avoid the adverse selection¹⁶. At the same time, some objections in relation to the public aids system (see paragraph 3) have been pointed out, i.e. the lack of clear criteria delimiting its implementation; the impact of these public aids discouraging insurance cover and prevention measures, and the criteria of political opportunity which can be applied by the government of the moment in the supply of these aids¹⁷.

3. “The Calamities Compensation Act” (1998)

The Calamities Compensation Act was published in January 1998, under which, in certain circumstances, the State will pay compensation to those suffering losses the market does not insure or which cannot be compensated by other means, and originated by earthquake and flood-

¹⁰ Faure, Michael and Hartlief, Ton.; “The Netherlands”. In Faure, M. and Hartlief, T. (eds.), *Financial Compensation for Victims of Catastrophes. A Comparative Legal Approach*. Tort and Insurance Law, vol. 14, Vienna/New York. Springer, 2006; pp. 195-226. Also, Faure, M.: “Financial compensation in case of catastrophes: a European law and economics perspective”. METRO Institute; Maastrich University; 18 March 2004; pp. 9 y 13 (www.hertig.ethz.ch/LE_2004_files/Papers/Faure_Financial_Compensation_Catastrophes.pdf).

¹¹ Bouwer, L.M.; Huitema, D. and Aerts, J.C.J.H.; “Adaptive flood management: the role of insurance and compensation in Europe”. 2007 Amsterdam Conference - Conference on the Human Dimensions of Global Environmental Change; Amsterdam, 24-26 May 2007; p. 9 (www.2007amsterdamconference.org/Downloads/AC2007_Bouwer.pdf).

¹² Kok, M.; Vrijling, J.K.; Van Gelder, P.H.A.J.M. and Vogelsang, M.P.: *Op. cit.* p. 153. Also, Comité Européen des Assurances (CEA)-Property Insurance Committee: “The Insurance of Natural Events on European markets”; AB 5050 (06/05), June 2005.

¹³ “Heavy local rainfall”: It takes place when precipitation occurs in or near where the damage was caused, with a minimum level of rainfall required: 40 mm in 24 hours; 53 mm in 48 hours, and 67 mm in 72 hours (*Ibidem*).

¹⁴ *Vid.* Bouwer, L.M.; Huitema, D. y Aerts, J.C.J.H.: *Op. cit.*; p. 29.

¹⁵ *Vid.* Botzen, W.J.W y Van den Bergh, J.C.J.M.: *Op. cit.*; pp. 3 y 13

¹⁶ *Vid.* Faure, M.: *Op. cit.*, p. 13.

¹⁷ *Ibidem*: pp. 6-7.

ing¹⁸. This is a system of financial aid funded and managed by the government, with a maximum annual commitment of € 450 million.

In principle, the aid is not applicable to catastrophic damage caused by seawater. In fact, the compensation terms make no specific mention of loss from erosion or flooding in coastal zones. However, in case of national-scale catastrophe caused by seawater flood, the scope of the Act would be enlarged in a Royal Decree¹⁹.

4. Equalisation Reserves

This kind of provision can be endowed, tax-free, with 1.35% of premiums or 22.5% of profit calculated as a percentage of premiums (for natural phenomena) whichever is lesser, both net of reinsurance.

The maximum figure of this provision is 22.5% of premiums or the result of calculating equity less corporate capital and less fiscal provisions, whichever is lower²⁰.

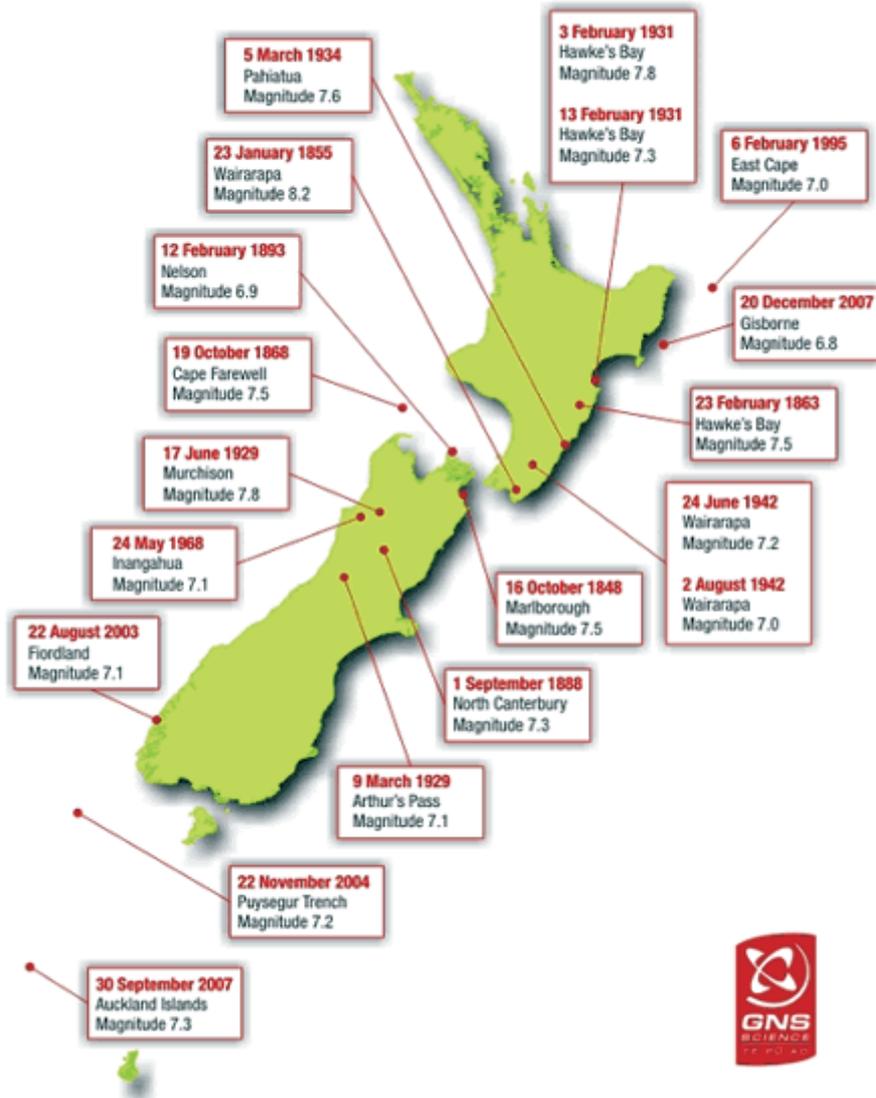
¹⁸ Faure, Michael and Hartlief, Ton: "The Netherlands". In Faure, M. and Hartlief, T. (eds.): *Financial Compensation for Victims of Catastrophes. A Comparative Legal Approach*. Tort and Insurance Law, vol. 14, Vienna/New York. Springer, 2006; pp. 195-226.

¹⁹ Ministerie van Verkeer in Waterstaat: Risicobeheersing in kustplaatsen. 29 July 2005.

²⁰ CEA: "The insurance of natural events on European markets: Reinsurance equalisation provisions". ABI 5051 (06/05), June 2005.

Large New Zealand Earthquakes

Notable shallow (generally less than 30km deep) earthquakes since 1848



Source: GNS Science⁶.

⁶ Image kindly provided by GNS Science, New Zealand (www.gns.cri.nz).

The largest city in New Zealand, Auckland, is built on a potentially active volcanic field of some fifty cones. Events occur, on average, every 1,000 years. The last, and largest, eruption occurred 750 years ago.

There is evidence, also, of tsunamis striking the shores of New Zealand in both North and South Islands. The last damaging tsunami occurred on the north east coast in 1947.

Along with volcanic and seismic activity, landslips and slides are also notable. Among these, mention can be made of the Falling Mountain rock avalanche provoked by the 1929 Arthur's Pass earthquake, and which scattered 55 million m³ of rock over distances of up to 4.5 km. Closer in time was the rock fall in 1991 on Mt. Cook, the country's highest peak, which lost 15 metres from its summit.

Finally, mention can be made of other natural disaster risks, such as great snowfalls (in Canterbury in 1992 and 2006), cyclones ("Bola" in 1988 and "Drena" in 2003), and the frequent floods which annually cause damage to towns, farming communities and transport networks.

2. Origins and Trends in Cover: the 1944 Act and its Subsequent Amendments

The 1942 Wairarapa earthquakes were the catalyst that led to the conversion of the War Damage Fund, unexpended at the end of World War II, to the Earthquake and War Damage Fund by regulation in 1944 called the Earthquake and War Damage Act.

Under this act, cover against both risks (earthquake and war) was compulsorily included in all fire insurance, financed with a surcharge the insurance companies had to collect and deposit into the Earthquake and War Damage Fund. This was administered by a Commission created for this purpose and which began to operate in 1945. This Commission (the *Earthquake and War Damage Commission*), set up as a government agency, was chaired by the Finance Minister, and its funds, invested entirely in the country's public notes, were controlled by the Treasury Office. The Commission, originally managed by personnel from the State Insurance Office, had from the first a state guarantee. Thus any Fund shortfall in payment of claims would be assumed by the state.

Application of this system was extended in 1950 to extraordinary flood and storm risks, combined from 1954 with volcanic eruption and landslide⁷. Likewise, in 1967, the Commission was authorised to insure against geothermal activity, on a voluntary basis.

A revision of the legal framework in March 1984 excluded the risks of storm and flood, thenceforth only included in limited cover for land, called "Land Cover", introduced in June that year.

In 1988 an amendment to the Earthquake and War Damage Act made the Commission autonomous, acting as a commercial entity with the form of a Statutory Corporation. At the same time, it assumed control of and responsibility for its own funds and the personnel in its service, no longer subject in these areas to the respective control of the Treasury and the State Insurance Office. The Commission continued to be exclusively publicly owned, run by a Board of Directors whose members are nominated by the Government, and which reports to the Minister of Finance⁸.

⁷ Slip risk was not covered automatically, but was only accepted if the Commission decided so. This cover was financed through a Special Disaster Fund which received 10% of additional premiums collected through a guarantee of natural disaster risk. From July 1970, this risk was covered automatically, without additional premium payment.

⁸ The Commission's capital is 1.5 billion New Zealand dollars, subscribed and paid up in full by the Government, through the Treasury.

3. The Reforms Introduced in the 1993 Act

As already pointed out, the system operates with a state guarantee, so that all losses will be met by the State after the depletion of the funds and reinsurance treaties negotiated by the Commission. Concern about the enormous potential of these risks provoked fundamental changes in 1993 to the system of Natural Disaster Insurance. The Earthquake Commission Act, 1993 had the fundamental aims of reducing the government's exposure to losses and allowing commercial interests to make their own decisions about insurance protection. For residential property owners, the essential characteristics of low cost, universal cover and compulsion, were retained.

The modifications made involved principally the exclusion of non-residential properties from the government system and the introduction of maximum cover for residential properties. That exclusion was however applied progressively over three years (1994-1996). On the other hand, war was eliminated from the risks covered. From then on, the Commission would be named the *Earthquake Commission* or, in abbreviation, the EQC.

The new EQC cover system was put in place from 1 January 1994. Properties within the scope of the state guarantee, i.e. residential properties, are covered against natural disaster risks (see below), compulsorily and automatically with the subscription of a fire insurance policy (if a property is not insured against fire, there is no EQC cover). As payment for this cover, with the premium for the policy the insurers collect a surcharge which is deposited in the Natural Disaster Fund administered by the EQC. EQC takes on the indemnification obligations and receives the claims, either directly or through the insurance entities.

The following section describes more widely the elements configuring the existing New Zealand system of natural disaster cover⁹.

3.1. The Properties Insured

The following are the categories of properties affected by this system of cover, provided that they are secured with a fire policy and are located in New Zealand:

- Residential buildings (i.e. a building more than 50% used as dwellings). For the purpose of this cover a dwelling is any construction with a toilet, bathroom, kitchen and a bedroom, used as a household. This includes homes, flats, apartments and holiday homes. Separate buildings forming part of the dwelling (sheds, garages, greenhouses, etc.), and other services (water and gas piping, electric cables, the telephone line, etc.) owned by the insured and up to 60 metres from the building are covered. Crops, plantations and unstored harvests are excluded from cover, as are swimming pools, outdoor water systems and tennis courts.
- Personal effects and dwelling contents, with some exclusions such as pets, livestock, motor vehicles, boats, aircraft, jewellery, artworks and documents.
- The land under the residential building and in the immediate environs (up to 8 metres), along with its main accesses and containing walls (not fences and enclosures), although with some limits: up to 60 metres from the house.

From 31 December 1996, EQC ceased insuring non-residential property. In this connection, it must be pointed out that most insurance companies operating in New Zealand offer disaster cover for non-residential properties and assets.

⁹ See: *Householders' Guide to EQCover*. Wellington, Earthquake Commission, November 1994.

3.2. The Risks and Damage Covered

The following are the types of natural disasters included in the system:

- Earthquake, tsunami, natural landslides, volcanic eruption and hydrothermal activity.
- Storm and flood, in the case of residential land.
- Fire caused by any of the above risks.

For the purposes of EQC cover, the following is considered **“earthquake damage”**:

- a) Damage occurring as a direct consequence of an earthquake, or a fire caused by it.
- b) Accidental or other damage which is a direct result of measures taken by the competent authority to avoid the spread or mitigate the consequences of any damage.

The following are understood to be **“damage from volcanic eruption or geothermal activity”**:

- a) Damage caused as a direct result of such events, excluding damage from landslide, subsidence or sea erosion.
- b) Accidental or other damage which is a direct result of measures taken by the competent authority to avoid the spread or mitigate the consequences of such damage.

Finally, **“landslides”** are understood as the collapse or slippage of a substantial mass of earth (hills, embankments, slopes, cliffs or land or rock surfaces which formed an integral part of the surface prior to the movement), and the following are considered **“landslide damage”**:

- a) Damage arising as a direct result of a landslip.
- b) Accidental or other damage which is a direct result of measures taken by the competent authority to avoid the spread or mitigate the consequences of landslides.

Damage caused by earth movement arising from carelessness on the part of the owner, such as reckless excavations, inadequate retention walls or insufficient drainage, is excluded, as is damage caused by subsidence and such phenomena as settlement, land shrinkage, compacting or erosion.

Reasonable costs incurred by the owner in protecting his or her property and reducing damage may be indemnified. However, consequential damage such as loss of profit or loss from robbery, vandalism etc., fall outside the indemnification.

3.3. Tariff

EQC cover is funded with the application of a 5 cent surcharge for every 100 New Zealand dollars of capital insured per annum (0.5 per thousand) which, taking account of the upper limits of the cover referred to below, represents a maximum per policy of NZD 67.50 (including VAT) per dwelling and personal property/contents. The land cover is provided at no additional premium.

3.4. Claims

Damage for claims covered by this system must be notified to the EQC either directly or through the private insurance company concerned. Claims must be filed within the 30 days follow-

ing the date of the loss (EQC has the discretion to extend this time limit in individual cases to three months).

Indemnification is paid directly by the EQC once independent experts have valued the amount of damage. There is provision however to bypass the assessment formalities if the value of the damage is very reduced. EQC may also elect to repair, reinstate or relocate a building by way of settlement of a claim. Settlements greater than an agreed amount must be paid to a mortgagee, where a property carries a mortgage.

3.5. Indemnification and its Limits

As already pointed out, aside from the exclusion of non-residential properties from the cover, the 1993 Act established some limits on the cover, generally to the effect that homes and personal effects are insured for their repair or replacement value—or for the insured sum if lower—with the following maxima:

- For dwellings, NZD 100,000 plus 12.5% G.S.T (Goods and Services Tax - V.A.T.), a total of NZD 112,500.
- For personal property, NZD 20,000 plus G.S.T., i.e. NZD 22,500.

Cover can be acquired on the private market to secure indemnification for damage exceeding those limits, for such further amount as may be required.

In general, personal property is insured on the same terms as in the private fire insurance policy sustaining the cover for natural risks.

3.6. Deductibles

EQC cover carries the following deductibles:

- For damage to a residential building, with or without personal property, the deductible is NZD 200 (multiplied by the number of dwellings involved), or 1% of the indemnification figure for the whole building, if higher.
- For damage to personal property alone, the deductible is NZD 200.
- For damage to land, the deductible is NZD 500 if the claim is NZD 5,000 or less, and 10% of the damage if that figure is exceeded. The deductible in such cases is never more than NZD 5,000.

3.7. The Natural Disaster Fund

The EQC administers the Natural Disaster Fund (formerly the Earthquake and War Damage Fund), made up of the premiums collected by the Commission through insurers as part of the fire policies they issue or renew, plus the returns on the investments of the Fund. The Fund is designed to meet claims for damage caused by natural disasters and, on 30 June 2006, reached a total figure of NZD 5.42 billion. The Fund's resources are invested under the control of the "Statement of Investment Policies, Standards and Procedures" approved by the Ministry of Finance.

The EQC has, since the end of 2001, been able to invest in overseas equities (stocks and shares), to increase the diversification of the Fund's investments in order to ensure the availability of resources should a major disaster affect New Zealand.

3.8. Reinsurance

The EQC also has a reinsurance programme which protects the Fund against payment liabilities which, following a serious natural disaster, exceed NZD 1.5 billion ("attachment point"). This reinsurance provides cover of up to NZD 4 billion. Should another disaster occur within the remaining period of a three-year agreement, which represents a cost of more than NZD 3.5 billion, another reinsurance cover is activated with a NZD 1 billion attachment point.

The reinsurance is negotiated through international brokers, and about forty reinsurance companies on the international market are involved.

3.9. State Guarantee

As already indicated, the EQC has an unlimited State guarantee, which takes up all losses once the Natural Disaster Fund and the capacity of the reinsurance programme subscribed by the Entity are exhausted. The guarantee may be met in the form of a grant or a loan, at the government's discretion. In return for this guarantee, the EQC pays the Government an annual charge. Although EQC is not taxed and does not currently pay a dividend to the government, the Earthquake Commission Act provides for the payment of amounts to the government in lieu of tax or a dividend, should the government require. It has not done so since the mid 1990's.

NORWAY

1. Natural Disasters ¹

Storms and floods are the main natural risks affecting Norway, but others such as landslides and avalanches must also be taken into account.

The last large scale disaster caused by flooding happened in June 1995 in the southeast of the country, when the Rivers Glomma and Laagen breached their banks. The event was described as a “hundred year flood”, and in living memory it is the largest disaster that has ever happened in that area, causing insured losses of some 1 billion Norwegian Kroner (NOK). The same area had previously experienced serious flooding in 1967 and 1968. Nevertheless the largest event in the *Norsk Naturskadepol*'s history is the “New Year Hurricane” 1st January 1992 on the northwest coast of Norway, which caused insured losses of some NOK 1,2 billion.



THE MOST IMPORTANT DISASTERS, 1980-2006 (AS OF 31 JULY 2007)

Date of Loss	No. of Losses	Paid NOK	Outstand NOK	Incurred NOK	Type of Loss
16.10.-17.10.87	12,680	514,750,356	0	514,750,356	Storm, storm surge, flood
22.12.-23.12.88	3,608	103,919,575	0	103,919,575	Storm
01.01.-01.01.92	29,619	1,210,892,570	0	1,210,892,570	Storm
31.01.-02.02.93	3,509	119,300,105	0	119,300,105	Storm
23.01.- 23.01.94	7,122	173,995,052	0	173,995,052	Storm
31.05.- 06.06.95 *	6,302	850,664,624	0	850,664,624	Flood
12.10.-13.10.96	3,697	176,729,693	0	176,729,693	Storm
30.10.-01.11.00	4,479	229,132,180	1,374,470	230,565,650	Storm, storm surge, flood
12.01.-13.01.05	3,230	112,630,960	7,534,909	120,165,869	Storm, storm surge, flood
17.01.-24.01.06	2,497	115,745,329	78,024,952	193,770,281	Storm

* Losses within reinsurance period.
Source: Norsk Naturskadepool.

¹ This chapter has been prepared with the special contribution of Gunn Eide (Statens Naturskadefond) and Knut Nordskog (Norsk Naturskadepool).

2. Natural Risk Cover: the Norwegian Natural Perils Pool (Norsk Naturskadepool)

Until 1980, and following the commencement in 1961 of the operation of the Norwegian National Fund for Natural Damage Assistance (*Statens Naturskadefond*) — a body discussed in the next section — this was the sole mechanism for compensation for natural disasters. From 1 January 1980, as a consequence of the amendments made on 8 June 1979 to the Act on Natural Damage and the Act on Insurance Contracts, the private companies have been and continue to be responsible for the assumption of the insurance cover of natural disaster risks, by means of a mandatory clause included in all fire policies. They do so through a national Pool, *Norsk Naturskadepool*, to which all insurers authorised to insure against fire in Norway must belong. On 1 July 1990, the provisions on natural disaster insurance came into effect and remain in force under the Act No. 70 of 16 June 1989.

The Pool is run by an eight-member Council and is responsible for several duties: presenting the annual report on this insurance activity, proposing premiums, negotiating reinsurance treaties, supervising claims, appointing the Claims Committee, etc.

The Pool's General Management is held by the Norwegian Financial Services Association, which also distributes claims among the member companies according to their market share.

The Claims Committee, made up of five representatives of the insurers, supervises the claims reported to the Pool and also coordinates the work for the assessment of damage caused by natural disasters when several companies are involved in a single claim. The Claims Committee acts as the channel for relations between the Pool and the Norwegian National Fund for Natural Damage Assistance.

2.1. Hazards and Assets Covered

According to Section 1 of Act No. 70, “in Norway, property insured against fire is also insured against the damage caused by natural events, provided that the damage to the property in question is not covered by some other insurance”.

The guarantee covers risks of flood (including that of marine origin), storm and tempest (wind speeds from 75 km/h), landslide, avalanche, earthquake and volcanic eruption, with the exclusion of other risks such as lightning, drought, frost, rainfall, snow and ice.

Cover offered as mandatory by the Pool provides protection against direct material damage to buildings and content covered in the policies. In addition, up to a given limit, indemnification is available for demolition costs, removal of rubble and property rescue, and for the cost of salvage and the temporary storage of property.

This system does not provide indemnification for damage to the following property: forest or standing crops, goods in transit, motor vehicles or motor vehicle trailers, aircraft, ships or small boats as well as their contents, fishing gear on vessels or in the sea, equipment in the sea for production of fish, fish in cages, nets or dams, equipment for extracting oil, gas or other natural resources on the seabed. Moreover, the company is not liable for loss or damage solely affecting aerials or signs etc. If the insured item is a dwelling or holiday home, the insurance also covers natural damage to garden, gardening instruments or farmyard not exceeding 0.5 hectares, including that part of any access road lying within the garden, gardening instruments or farmyard.

For buildings, indemnification can be reduced to the extent that the damage arises from flaws in construction or a lack of maintenance.

2.2. Management of Premiums, and Indemnification of Damage

An additional premium is applied at a rate of 0.11 per thousand of the sum insured in the base policy, without distinction of geographical zone, class of risk or type of property.

The Natural Perils Pool is a loss pool and not a premium pool. All premiums allocated from original policies for Natural Perils are retained by the member companies. In the event of a natural peril event, the member companies pay claims on the original policies in excess of a deductible (currently NOK 8,000), and cede the remaining loss amounts into the Pool. The total Pool loss from the event is then shared among the member companies according to their market share (calculated by the aggregate sums insured for Fire policies). If the accrued premium exceeds the company's share of the compensation payments that are made through the Pool and the claims reserve for unsettled claims, then the difference shall be allocated to a special disaster fund in the company. This fund shall be used exclusively to cover future natural disaster claims.

Member companies must report to the Pool on all claims received before the fifth day of the following month after the damage occurred.

Indemnification is for the value of reconstruction, repair or replacement. The cost of demolition, removal of rubble and rescue can be indemnified up to a maximum of NOK 300,000, and for storage of property, up to NOK 40,000. If a building is insured for its full value, indemnification is the equivalent of the cost of reconstruction or repair, and if insured up to a given sum, indemnification for reconstruction or repair is reduced by the corresponding amount if the valuation of the building prior to the event was greater than the capital insured (under-insurance). For other assets, the indemnification is applied for the cost of restitution, with the corresponding deduction for under-insurance, if applicable.

The insurer may in any event choose either to indemnify the loss in a cash settlement, or to repair, reconstruct or restore the assets damaged.

The absolute overall limit of indemnification per event is NOK 12.5 billion (since 1 January 2006), and the damages are distributed among the companies according to each one's market share. If that limit is exceeded, indemnification is reduced according to the relation between that overall amount and the total damage caused.

Should two months have elapsed from the time when the insured notified the claim to the company, the company must pay the claimant interest in arrears of 11.5 per cent of the indemnification to which the claimant is entitled.

The Norwegian Natural Perils Pool takes reinsurance on the international market with an "excess of loss" programme.

NATURAL PERILS LOSSES 1995-2006
Indemnities (million NOK) and N. Claims

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total Serie
Indemnities													
Flood	905	4	25	7	17	99	47	27	47	59	133	143	1,513
Storm	112	180	142	45	67	255	188	45	140	56	161	261	1,652
TOTAL (*)	1,047	204	190	73	97	537	241	92	200	129	419	435	3,664
N. Claims													
Flood	7,189	98	531	161	354	1,224	441	474	567	629	1,561	1,019	14,248
Storm	3,742	4,516	5,138	1,530	2,637	6,807	3,710	1,491	3,503	1,409	4,986	4,100	43,569
TOTAL (*)	11,221	4,789	5,960	1,863	3,225	10,291	4,483	2,137	4,221	2,270	8,139	5,427	64,026

(*) Other perils included.

Excl. Settlement costs.

Source: Norwegian Financial Services Association - Natural Perils Pool statistics ².

² Table prepared on the basis of Norwegian Financial Services Association data (www.fnh.no/fullstory.aspx?m=1694).

3. The Norwegian National Fund for Natural Damage Assistance (Statens Naturskadefond)

The Norwegian National Fund for Natural Damage Assistance was created in an Act dated 9 June 1961, to compensate damage caused by natural disasters. It came into operation nearly 20 years prior to the startup of the system for the insurance cover for natural disasters.

The Fund is financed with resources from the State budget, and structurally forms part of the Ministry of Agriculture and Food. It is regulated by the Act already mentioned, of 16 June 1989, and by Act No. 70 of 25 March 1994 on protection against natural risks and the indemnification of the damage they cause.

3.1. Purpose and Coverage

The Fund's function is to grant aid in case of natural disasters³, compensating damage to property which is located in Norway and whose owner (a private person or company) lives or works in that country, and which cannot be insured against such risks because that property is excluded from the regime of mandatory cover defined by the law, as indicated in the previous paragraph. Compensation is not provided when damages are covered by insurance or when, uninsured, it was possible to contract cover against such damage through normal and ordinary insurance⁴.

Natural perils, the potential damage from which is susceptible to indemnification under this system, are the same as those covered in the regime of natural disaster insurance, with the same hazards excluded in both as already indicated⁵. The Fund may however, in very special circumstances, indemnify damage to property not usually included within its indemnification framework, and for events listed as excluded.

Those suffering damage must, in a maximum period of three months following the disaster, deliver their claim to the provincial governor or district court, who will assess the damage (they manage the expert's assessment). If the Fund or the claimant finds the damage assessment insufficient, one can file an appeal to the local court, and, if necessary, appeal to higher courts, in order to achieve a correct damage assessment.

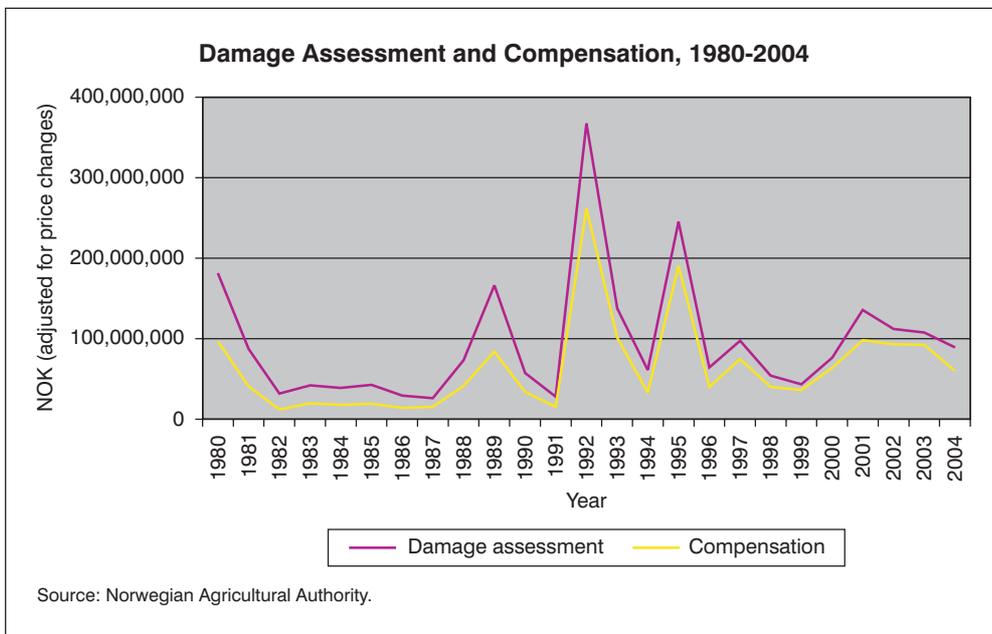
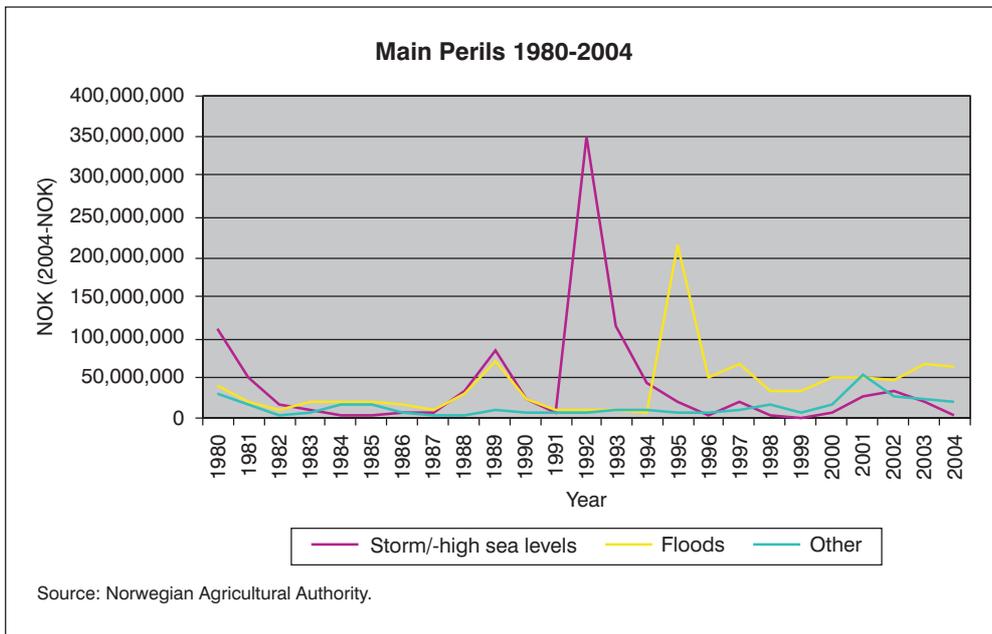
The damage assessment and the related report is sent to the Fund, which will determine the extent of the indemnification, to a limit of 85% of the damage, with a deductible of 10,000 NOK to be applied on the resulting sum.

If the claimant considers that the Fund's indemnification is insufficient, or improperly denied, he or she may file an appeal with the National Fund Appeal Commission, which also resolves appeals filed against insurers in questions related to the real causes of the losses (natural or not) or to the criteria applied for a reduction of the indemnification.

³ Section 1 of Chapter One of Act N.º 7 of 25 March 1994 provides as follows: "The following is the purpose of the 'Statens Naturskadefond': 1) to provide compensation for natural damage in cases where the insurance against such damage was not available in ordinary insurance contracts; 2) to promote protection against natural damage; and 3) to provide support for protective measures. The Fund does not provide compensation if the damage was at that time covered by an insurance policy".

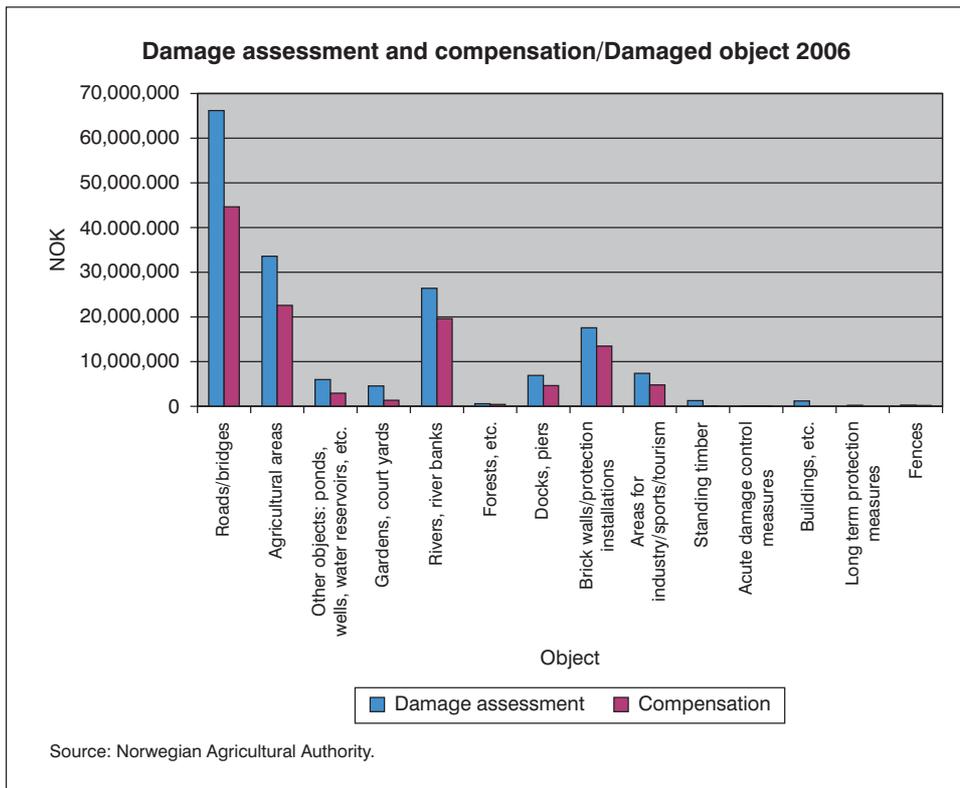
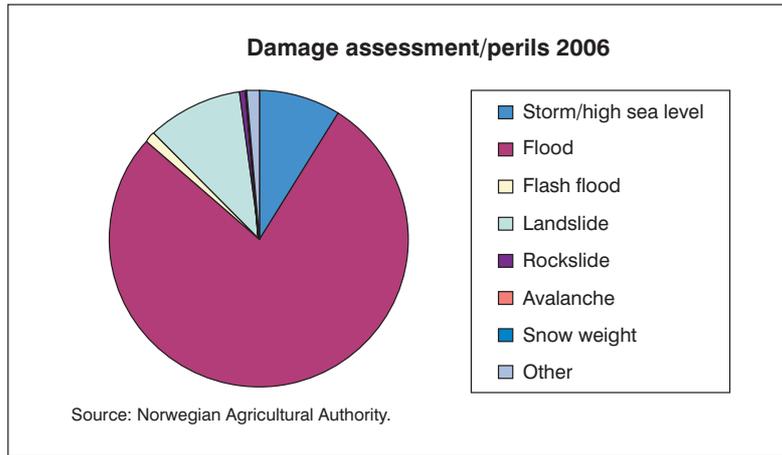
⁴ See C. van Schoubroeck: "Legislation and practice concerning natural disasters and insurance in a number of European countries". *The Geneva Papers on Risk and Insurance*, n.º 83, April 1997; p. 248.

⁵ According to Section 4 of Chapter Two of Act No. 7 of 25 March 1994, "for the purposes of this Act, 'natural damage' means damage directly caused by natural disasters such as landslide, storm, flood, storm surge, earthquake, volcanic eruption, etc."



3.2. Payments, Perils and Claims

1,497 claims were indemnified in 2006, to a total of 114,8 million NOK. The average number of claims over the last ten years has been about 1.200.



Compensation is paid when the damage is confirmed as repaired, no later than three years after the compensation is granted. The compensation can be paid in portions, based on documentation of partial repairs. The annual payments from the fund are therefore a function of both current and previous natural disasters compensations. The annual compensation payments from the Fund have the last years varied between 90 and 120 million NOK.

3.3. Revision of the Act

The Norwegian Agricultural Authority (SLF) acts as the secretariat for the Fund. The Ministry of Agriculture and Food has asked SLF to revise the Act (which was designed in the 1950s), and put forward the framework for a new Act suitable for the future. The new framework is to be presented by the end of 2007, prior to administrative and political considerations, as well as a public consultation with all relevant private, municipal, regional and national bodies. A new Act will be decided on in 2009 at the earliest.

SLF has had its main focus on the following topics:

- Compensation regulations suited to future climatic changes.
- Adjustment of regulations according to changes in habitation patterns (urbanization, etc.) and increased living standards.
- Cost and time efficient administration.

ROMANIA

1. The Romanian Catastrophe Insurance Scheme: PRAC. The Background ¹

1.1. Introduction

Romania is troubled by several natural perils, including earthquake, flood and landslides. To provide cover against these to owners of dwellings, the government is now setting up a compulsory insurance scheme which should commence operations in 2007. The scheme, called “PRAC” after its Romanian initials (*Programul Roman de Asigurare la Catastrofe*), is built on principles similar to several other national catastrophe insurance schemes, but with special features of its own including an important role for the insurance industry, and local authorities strongly involved in ensuring compliance.



This chapter is based on the scheme as it was approved by the Government in August 2007. Changes may of course be made as PRAC legislation (the *Law*) passes through the Parliament.

1.2. Perils

Earthquakes, floods and landslides all affect Romania. Earthquakes, which cause nearly all the damage, are unusual in that they are centred in one specific zone - the Vrancea zone. Floods come both from the Danube River which forms the southern boundary of the country for 1,075 km from Serbia to the Black Sea ²; and from flash floods in smaller rivers and streams as well. Landslides are a much less significant hazard but may cause damage on a local scale.

Quake risk in Romania is higher than in most European countries. The Vrancea earthquake zone, within which about 95% of the seismic energy is released, accounts for over 90% of earthquake losses. Vrancea lies in the mid-east of the country, about 140 km NE of Bucharest. The earthquakes are at what seismologists describe as “intermediate” depth, with the larger events mostly from 75 to 160 km in depth.

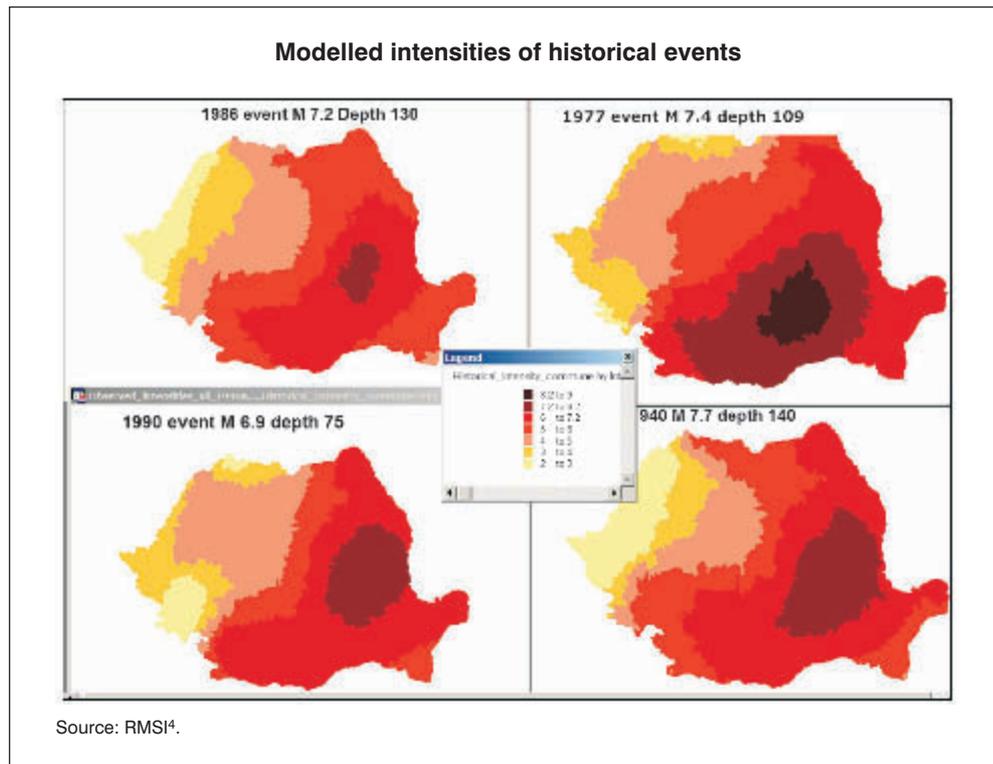
The zone appears to be a block of tectonic plate under the continental crust that has broken off but may now have stopped subducting ³. While there are some similarities with one or two other seismic zones, the Vrancea zone is quite different from earthquake sources in say Turkey, California or New Zealand.

¹ This chapter has been prepared by Radu Popescu (Romanian Catastrophe Insurance Scheme-PRAC, Ministry of Administration and Interior, Romania).

² www.aboutromania.com/geography.html.

³ RMSI: p. 22.

While over the centuries large earthquakes have occurred quite frequently, with nine in the past 200 years with a magnitude (Mw) estimated at 7 or over, many of those are deep enough not to cause severe damage. The most recent major event was in 1977 and caused considerable damage to Bucharest, estimated by the World Bank to amount to USD 2 billion at the time.



The Danube River has flooded when upstream countries were also affected, with major floods in 2006. In addition, high-intensity rainstorms cause “flash floods” in other smaller rivers or streams. “Dam burst” is another possible source of flooding, but is a very much less likely source of loss.

The largest losses in the past 25 years were reported at € 171 million for dwellings in 2005, and an annual average loss over that period of time is estimated at about € 18 million.

The areas of greatest landslide risk lie in the South Western part of the Carpathian Mountains, and the average annual loss has been estimated to be about 2 orders of magnitude less than that of flooding at about € 125,000.

⁴ RMSI (figure 23): This chart, and the charts and tables which follow, are drawn primarily from the unpublished RMSI report for the Government of Romania Integrated Disaster Risk Management Study (AC6). The substantial contribution made by RMSI in understanding Romanian risk is gratefully acknowledged.



1.3. Origins of the Scheme

Until 1995 there was a compulsory scheme for insurance of dwellings against earthquakes. After the loan to establish the Turkish scheme TRIP was approved in 1999, the World Bank sought to stimulate a similar scheme in Romania. Leading proponents in the Bank were the late Piotr Wilczynski and Eugene Gurenko.

A World Bank project, the Hazard Risk Mitigation & Emergency Preparedness GEF Project, was approved by the Bank in 2004. This was a broad project with a range of components, and included funding for the planning and implementation of a catastrophe insurance scheme. The Romanian Government responded in 2005 with a proposed scheme, but agreement was not reached with the World Bank on the structure suggested at that time.

In 2005 Radu Popescu was appointed by the Government to plan a scheme, in response to his strong advocacy the Government decided to implement a scheme urgently. Successive years of flood losses helped provide an impetus.

A resident catastrophe insurance adviser was appointed in 2006 and consultancies contracted. The first, coded as AC6, was titled an Integrated Disaster Risk Management Study and was executed by RMSI; and the second, coded as AC9 and titled Development of Guidelines on Risk Management, Assets Allocation and Operation, is being executed by the Willis Group. Work on the Law to establish a scheme was commenced in mid 2006 and the approval required by several Ministries and other official bodies was delayed somewhat by the effects of changes in the Government early in 2007.

⁵ RMSI (figure 40); p. 68.

However the Law was approved by the Government for submission to Parliament for consideration under emergency procedures on 29 August 2007.

1.4. Romanian Conditions

Romania has a population of about 21 million ⁶ and about 8,250,000 dwellings ⁷. The dwellings are of various types as follows:

RC* Frames with some Shear Walls.	8.7%
RC* Large Prefabricated Panels.	7.9%
RC* Frames with Unreinforced Infill Masonry; and Reinforced Load Bearing Masonry.	14.9%
Masonry with Rigid floors	18.5%
Masonry with Flexible floors	16.7%
Wood	8.5%
Adobe	24.9%

* Reinforced concrete.

Source: RMSI ⁸.

The reinforced concrete buildings are mostly in the cities and towns, and the adobe in smaller towns and villages. Most of the reinforced concrete buildings were built (or commenced) in the communist era, and take the form of blocks of apartments, typically 4 to 8 storeys in height. Those built before the 1977 earthquake were built to inadequate earthquake codes, and those from 1977 to 1992 were built to better codes, but perhaps not taking into account the long-period shaking of some Vrancea earthquakes.

The adobe dwellings are of various types of traditional construction and vulnerable to earthquake, but perhaps less so in territories where earthquakes are rare. They are vulnerable to damage from flooding especially when partially submerged for some time.

Few dwellings are insured against natural catastrophes, and indeed less than 5% are believed to be insured against fire ⁹.

On the other hand, commercial properties are usually insured. The Romanian insurance industry is largely owned by foreign insurers and although it is well managed it is not heavily capitalised.

In the absence of post-disaster insurance, the government provides quite substantial welfare relief, including the rebuilding of modest houses in some cases.

⁶ The estimate of population in 2004 is 21,673,328. Romanian Statistical Yearbook (www.insse.ro).

⁷ RMSI projection based on Roman Statistical Yearbook and Census.

⁸ Derived from RMSI, table 14.

⁹ Source: Axco 2005.

2. Present Stage of the PRAC Scheme

As of 29 August 2007, the Law has been approved by the Government and awaits consideration by Parliament under an emergency procedure.

The consultancy by RMSI has been completed and their report at the time of writing awaits government approval. It is a firm basis for estimating the risk of the scheme.

The Willis consultancy goes well beyond the drawing up of guidelines for ALM, reinsurance and operations as was originally planned in the World Bank Project three years ago, and it will also provide the modelling tools to optimise the total risk and return of the Natural Disaster Insurance Pool (PAID) —the entity operating the scheme— as well as design the detailed linkages between the insurers and PAID.

A most significant step in building the scheme was the acceptance of an offer by reinsurance brokers to assist in the preparations for reinsurance. A consortium of the four major firms in the world was appointed, led by AON with Benfield as lead modeller, and also including Guy Carpenter and Willis. The assistance provided by the consortium was invaluable, not only with planning and design of reinsurance but also with high level technical support in other areas.

3. The Proposed PRAC Scheme

In the design of the PRAC scheme the objective was to learn from the experience of schemes around the world, both the features to embody and the problems to deal with. PRAC has been designed as a simple scheme and as inexpensive as possible.

In summary:

- The perils covered against are earthquake, flood and landslide;
- Property covered is dwellings only, and all dwellings must be insured;
- The scheme uses “community rating”;
- Cover is on a replacement basis up to limits which should rebuild a modest dwelling;
- Insurers issue policies, and assess and settle claims;
- All risk is reinsured with the pool company PAID, and then transferred to world markets;
- The entity operating the scheme (PAID - the Natural Disaster Insurance Pool) is to be a joint stock company owned by qualifying insurers;
- Local government will assist with enforcing the compulsion to insure, with an incentive to do so;
- The Government will fund reinsurance premiums in early years, and act as lender of last resort in the event of overwhelming losses.

The World Bank involvement in the project has consisted of the funding of consultancies and high-level technical advice.

4. The Policy

The policies issued under the scheme go by the name “PAD”.

PAD policies will cover dwellings only - no annexes or outbuildings, nor contents nor accommodation costs. All dwellings must be insured, including those owned by individuals and companies, and government and public agencies. No insurer may issue cover within the coverage of PAD except by participating in PAID and issuing PAD policies.

The losses covered include not only direct losses from earthquake, flood and landslide, but also indirect losses arising from causes generated by those perils.

For the purposes of the scheme, dwellings are divided into two classes:

- Type A -with reinforced concrete frames, metal, or with outside walls made of burnt brick, or made of wood,
- Type B -with outside walls made of unburnt bricks or other forms of adobe.

The limits of the cover are € 20,000 for Class A and € 10,000 for Class B. Premiums are € 20 for Class A and € 10 for Class B, payable annually. There is to be provision for a deductible, to be set by subsidiary legislation (“norms”). All these limits and rates may be varied annually.

The PAD policies are first loss policies and issued on an annual aggregate basis, so that the amount for which a dwelling is insured is reduced by the amount of any claims paid in the same year.

A condominium association may contract a single insurance policy for its members’ building, but in other cases there will be one dwelling covered by each PAD.

5. The Pool

The entity to manage the Pool is a joint stock company to be formed (PAID), with participating insurers as shareholders. The Insurance Supervisory Commission will approve insurers as qualifying to participate. Each will be required to contribute a minimum amount of capital with none having more than 15%, and there will need to be 5 at least for the scheme to start. PAID will pay dividends from profits as they arise.

PAID will be governed by a Board of Directors within which the only outside member will be from the Insurance Supervisory Commission. In addition an advisory board comprising representatives of central and local government and housing associations will be set up.

PAID will operate as a reinsurer and to some extent as an insurer as well (for a special category of subsidised policy-holders, as discussed below).

PAID is required to set up a Natural Disaster Risk Fund in order to provide the financial resources needed for the payment of claims over the years. It will purchase reinsurance on world markets, to a level of protection yet to be determined. Strong interest has been shown by reinsurance markets since the Romanian earthquake risk is not correlated with any other significant exposure around the world.

PAID will be subjected to supervision by the Insurance Supervisory Commission in a similar way to the supervision of other insurers.

6. Role of Insurance Industry

The PRAC scheme is unusual internationally in that the insurance industry will play a central role, and the Government will not be involved in the governance of the scheme in the way that governments are in schemes in most other countries.

The company at the heart of the scheme —PAID— will be owned and controlled by private sector insurers, though subject to a special law and norms. As in many other countries, insurers will be responsible for distribution, including policy issue and premium collection. The commission rate is set at 10% by the draft Law. They will also settle claims, but will retain no risk themselves except that which flows to them through their ownership of PAID.

Where dwellings are covered by facultative insurance at the time PAID commences operations, such policies will run-off to expiry, for up to a year, and then be replaced by PADs.

The adjustment and settlement of claims after a major catastrophe is still to be planned. The Willis consultancy is required to produce a high-level plan, together with the terms of reference for future work.

The establishment of PAID offers a significant opportunity for insurers to up-sell cover against other perils such as fire, as well as offering cover against natural disasters in excess of the PAD. It is hoped that this will lead to a community better protected by insurance.

7. Role of Local Government

Local government will play an unusually important role in enforcing the compulsion under PRAC. In designing this, close attention was given to the issues faced by other pools in gaining the level of penetration they desired.

Local authorities have records of all dwellings in their territory, and will be required to send copies of these to PAID. These will be checked against dwellings insured under a PAD, and a list of uninsured dwellings returned to the local authority. After reminders to the property owners, a fine may be levied by the local authority on those who do not take out or purchase a PAD. Since they will retain the fine there will be a good incentive to enforce the law on compulsion. PAID will also provide to insurers, for a fee, a list of properties not insured to assist them in marketing.

The premium for people on social welfare benefits will be subsidised by central government, but using local authorities as the channel for payment of the premium. The policies will be issued by PAID, and in this role it acts as an insurer rather than a reinsurer. Where claims are made by such insureds they will be submitted directly to PAID, which is expected to appoint a company to undertake this task.

8. Role of Insurance Supervisory Commission

The Insurance Supervisory Commission will have an important role, not only in exercising prudential supervision, but also in being represented on the Board of PAID.

It will draft and issue the norms regulating PAID and providing for such annual changes in premiums or limit as may be made. It will also be responsible for approving insurers who wish to

participate in PAID, and in enforcing the laws regarding the issue of PAD policies as they affect insurers.

9. Role of Central Government

Central Government has been responsible for the design of the scheme, the drafting of the Law, and will be responsible for its submission to Parliament.

Central Government will provide funding of subsidies to welfare beneficiaries, will pay all of the first year's reinsurance premium, and also supplement premiums over the following four years as it deems necessary. In the event of major disasters exhausting all of PAID resources the Government is required to top-up the Risk Fund to enable the liabilities to be met.

After PAID is established, the government will no longer be required to provide relief relating to damage to dwellings, neither for those who had a PAD nor for those who have failed to purchase cover.

10. Conclusion

The PRAC scheme is nearly ready to begin life. While major logistical challenges lay ahead, the large amount of solid technical work that has been done is an excellent foundation.

The Government's boldness in seeking to move ahead rapidly will hopefully bring the benefits of insurance coverage before the next major disaster hits Romania.

SPAIN

1. Natural Disasters

1.1. Flood Hazards

Flooding is the natural event that causes the most disaster damage in Spain. This has been the case over time, particularly in the river basins where rivers have not only channelled the flow of water but also have become a cultural reality, containing in their names a tribute to the flow of life that they bring with them, as well as a reminder of their history of flood events. Landforms and climate combine to favour situations in certain regions and seasons of the year in which the destructive forces of the waters are unleashed. Human behaviour and activities often contribute to these disasters when a preventive perspective is lacking, basically with respect to territorial development, town planning and environmental management.



Taking as a reference the losses from natural disasters paid by the *Consortio de Compensación de Seguros* (that is, insured damages) in the period between 1987-2006, we find that the indemnifications paid for property damage totalling € 2,472.6 million, 93.5% of which was due to floods. It is significant to note that the flood damage was concentrated in specific areas of the country, with payments for this contingency accumulating in Andalusia, the Basque Country, Catalonia and the Community of Valencia. Perhaps the greater frequency with which these regions are confronted with events of this kind has led us to overlook the element of erratic behaviour which is a general characteristic of natural disasters. Becoming aware of this can be at times a tragic experience, and there we have, as examples, the floods in Yebra and Almoduera (Guadalajara) in 1995, and in Badajoz in 1997, places that were statistically irrelevant in light of the experience of past losses.

**AMOUNTS PAID BY THE CCS FOR LOSSES FROM NATURAL DISASTERS
Property Damage (1987-2006)**

Cause	Amounts Paid (In Euros updated)	
Flood	2,312,579,332	93.5%
Earthquake	29,634,977	1.3%
Storm	130,292,800	5.2%
Meteorites	87,623	0.0%
TOTAL	2,472,594,732	100%

Source: CCS.

If to the aforementioned payments for losses from natural disasters we add the payments relating to political/social events included in the extraordinary risk cover, we arrive at a total amount of 2,765.10 million Euros for the period referenced. Of this amount, 83.6% refers to floods and 8.3% to terrorism.

The most significant catastrophic losses paid by the *Consortio* occurred in the eighties, and all of them were caused by floods, according to the following chart:

YEARS WITH A PARTICULARLY HIGH INSURED LOSSES PAID BY CCS (Floods)
(In Euros updated)

Year	Premiums	Indemnification	Payments Combined ratio
1982	125,452,293	355,046,092	283.0%
1983	125,362,494	821,460,312	655.3%
1987	133,845,219	322,421,547	240.9%
1989	201,794,419	262,122,952	129.9%

Source: CCS.

1.2. Other Natural Hazards

However, floods are not the potentially most damaging hazard. This classification would apply more aptly to earthquakes or tsunamis, which do not occur very often in Spain—a country considered to be on a moderate level with respect to seismic activity— although these hazards do represent a threat which should not be underestimated, considering that in the historical past, earthquakes with an intensity rating of IX have actually occurred. The last earthquake of such intensity affected the town of Arenas de Rey in the province of Granada at Christmas 1884, with close to 800 fatalities and significant property loss.

The most recent seismic manifestations worthy of note took place in the region of Murcia. One of these occurred in February 1999 in the area of Mulas, with a magnitude of 4.8 and an intensity of VI-VII. Subsequent to this event, the area of Bullas was affected by a 4.6 degree earthquake in August 2002, and another with magnitude 4.8 earthquake in January 2005. Among the three earthquakes, the compensation payments made by the *Consortio* totalled close to € 23 million (updated).

Insofar as tsunamis are concerned, Spain's coasts have also experienced catastrophic events in the historical past. The last major tsunami occurred in the aftermath of the 1755 Lisbon earthquake and affected the province of Cadiz particularly, where more than one thousand people lost their lives.

With respect to wind, Spain is not a country where hurricane strength winds are particularly frequent, although gusts of up to 200 km/h have been known to occur. There have also been occasions during which the impact of high winds on lives and property has been relevant. This happened in the case of the cyclonic phenomenon that wreaked havoc in Madrid on 12 May 1886, with winds of up to 140 km/h, taking 24 lives, seriously injuring 78 people and leaving considerable property loss in its wake¹. In 1941, a fire fanned by a strong windstorm with gusts exceeding 180 km/h swept through the centre of the city of Santander.

¹ Nogues, A.F.: "Le cyclone du 12 mai à Madrid". *La Nature. Revue des Sciences et de leurs Applications aux Arts et à l'Industrie*. No. 679, 1886; pp. 1 to 3.

Lastly, tornadoes are not uncommon in Spain, but they have usually had little economic impact. Nevertheless, in recent years, damages as a result of tornadoes have become more frequent and severe. They are now covered by the *Consortio*.

2. The Cover of Natural Hazards. From its Origins to the Legal Statute of the *Consortio de Compensación de Seguros*

The present system of cover of natural disasters has its origins in the era immediately following the Civil War, with a development closely tied to *Consortio de Compensación de Seguros* (Insurance Compensation Consortium) which, up to the approval of Act 21/1990, of 19 December 1990, held the monopoly on the cover of this kind of risk.

The provisional nature with which it was conceived at the start (1941) as the *Consortio de Compensación de Riesgos de Motín* (Riot Risks Compensation Consortium), in order to provide a response to the needs for compensation arising from the war (1936-1939), was transformed in 1954, when the *Consortio* became a permanent institution. This is how what we know today as the *Consortio de Compensación de Seguros* came to be, not without first having served, circumstantially, to cover other major events, such as the Santander (1941), Canfranc (April 1944) and Ferrol (May 1944) fires, in addition to the mining explosion in Cadiz (August 1947) and the explosion of a powder depot in Alcalá de Henares (September 1948).

Since 1954, the *Consortio* has been closely linked to the cover of the so-called “extraordinary risks”, which encompasses both natural hazards and those of a political/social nature (terrorism, riot, civil commotion, etc.), appearing as the central figure in the system of compensation of losses from such risks. Moreover, in its historical trajectory, it was to progressively take on other functions in a range of areas in the Spanish insurance industry (crop insurance, export credit insurance, compulsory automobile insurance, etc.). Recently it has added yet another activity related to the promotion of prevention.

Although there are several instances in the course of its history which have established landmarks in the evolution of the *Consortio*, the most important development was the passage of the above-mentioned Act 21/1990, which approved its Legal Statute. This Statute constitutes the legal framework of the Spanish system for the cover of the said extraordinary risks and, when that legislation went into force, the *Consortio* lost its insurance monopoly with respect to those risks. The Statute stipulates the minimum insurance protection that must be provided with respect to risks included in the system (“extraordinary risks”) to those who take out insurance as specified later in this document. The *Consortio* acts here by assuming the cover on a subsidiary basis.

Without losing sight of the fact that the Spanish system of “extraordinary risk” cover is designed to be applied both to certain natural hazards and the social risks mentioned earlier, this chapter is centred exclusively on the former, although, on occasion, it may use the general term of “extraordinary risks”.

3. The *Consortio de Compensación de Seguros* in the Cover of Natural Disaster Perils

In virtue of the Legal Statute, the *Consortio* became a government institution, among those classified as a “public business entity”, attached to the Ministry of Economy and Finance. The

Consortio has its own legal personality and full capacity to act; it has its own assets separate from those of the State and its activity is subject to private law. This last characteristic mentioned means that the new company, just like the rest of the private insurance companies, is subject to the rules contained in the legislation establishing the legal regulation and the supervision of private insurance, as well as that governing insurance contracts.

As explained below, the cover of extraordinary risks is compulsorily included in personal accident policies, life insurance and some branches of property damage. If such cover is not expressly assumed by the insurance company issuing the standard policy in any of the aforementioned branches of insurance, the *Consortio de Compensación de Seguros* must necessarily provide such cover on a subsidiary basis. The *Consortio* will also pay the relevant indemnification when the extraordinary risks are expressly covered by an insurance company and the latter is unable to meet its payment obligations due to bankruptcy, suspension of payments or winding-up. In practice, the *Consortio* is the sole institution that assumes the cover of the extraordinary risks in all circumstances.

The *Consortio* is governed by a Board of Directors, chaired by the Director General for Insurance and Pension Funds, whose members are appointed by the Minister for Economy and Finance on an equal basis between senior managers of private insurance companies and representatives of public institutions. The operation of the institution is the responsibility of the Management bodies, whose basic structure consists of a General Management and managerial departments answering to it: Finance, Operations, Technical and Reinsurance, Systems and Information Technologies, in addition to a General Secretariat. Furthermore, the *Consortio* has a rationalised structure based on the principle of decentralisation, which is embodied in its 18 regional delegations and in a network of independent professionals designated for adjusting losses.

4. The Basic Principles of the Cover

The pillars supporting the Spanish natural disaster cover system are the principles of “compensation”, “solidarity” and “cooperation”. The first of these principles takes the form of a multidimensional compensation, as it applies to:

- a) All of the hazards covered in general: risks compensation.
- b) All of the geographical areas of the national territory, independently of their varying vulnerabilities to the range of natural hazards covered: geographical compensation.
- c) A period of time which, given the nature and behaviour of catastrophic natural risks, should be considered from a broad technical/insurer perspective: compensation time frame.

Under the principle of “solidarity” all of the insured (in the branches included in the system) contribute, in proportion to their respective insured capital, to the endowment of a common fund available to those of the insured who may be affected by the natural hazards covered.

The principle of “cooperation” refers to the understanding and cooperation between the private market and the *Consortio* in the development and application of the system of cover.

5. Objective of the System, Perils Covered and Compensable Losses

With respect to the cover of the extraordinary risks, the objective of the Spanish system is to compensate for losses produced by extraordinary events occurring in Spain and causing damage to people or property located in the country. Personal injury from events occurring abroad is also covered.

What events are covered? As noted, such events can be of two kinds: those relating to natural perils and those of a political/social nature (terrorism, etc.). The Spanish system is characterised by legally defining the dangers it covers and it does so by considering the enormous potential of loss that such events are capable of generating in terms of their nature and behaviour insofar as frequency and intensity. That is, the nature of the event and not the amount of the damage caused is taken into account. This means that protection is not conditioned on the occurrence of events that affect a large number of insured, or to a minimum of territorial extension, nor to the fact that such an event would involve heavy losses. In this way, even if an event only affects a single insured, that insured, independently of the extent of the damage, will be entitled to compensation.

Neither is it required for the authorities to make an official declaration of a “disaster” or a “disaster area”, whereby cover is automatic for the hazards covered once the event has occurred, provided that the insurance terms and conditions are met by the party affected.

Within the scope of natural disasters, the perils covered by the Spanish system are: extraordinary floods, earthquakes, tsunamis, volcanic eruptions, atypical cyclonic storms and fall of meteorites.

As mentioned earlier, the most important risk in terms of the volume of damages caused is flooding. To the effects and purposes of insurance cover, a flood is understood to be the inundation of the terrain caused by rainfall or melt water; by water from lakes with a natural outlet, from estuaries or rivers, or from natural watercourses on the surface whenever they overflow their normal channels. Also included is the dashing of sea on land, even without waterlogging. However, this concept of flooding does not include the rain falling directly on the risk insured, or the rainwater collected by slanted or flat roofs, the property’s drainage network or its patios, nor does it include the flooding caused by the breakage of dams, canals, sewers, collectors and other artificial underground channels, unless breakage occurs as a direct consequence of an extraordinary event covered by the *Consortio*.

The concept of an atypical cyclonic storm includes, among others, tornadoes and extraordinary winds (gusts of over 135 km/h.), in accordance with the Extraordinary Risk Insurance Regulation.

To the effects and purposes of the cover provided by the *Consortio*, losses mean direct damages caused to people or to property, as well as business interruption as a consequence of such property damage when this circumstance alters the normal outcomes of the insured’s business activity, derived from the interruption, suspension or reduction of the production or business processes concerning such activity.

6. The Cover. Branches to Which it Applies

The protection being described is necessarily linked to the underwriting of an insurance policy in certain branches of insurance (or combined modalities of such branches), as set out below:

- a) In property insurance: fire and natural events, land vehicles (damage to the vehicle, not liability), railway vehicles, other property damage (theft, plate glass, machinery breakdown, electronic equipment and computers) and business interruption.

- b) In insurance of persons: life and accident insurance (even if contracted additionally to another type of insurance, or in the framework of a pension plan).

The fact of taking out one of these policies brings with it the obligation to cover the same property or persons to which such policies refer and for at least the same amounts insured against the natural hazards included in the system.

In order to be entitled to compensation for damages derived from natural disaster events, the insured must be current with payment of the premium receipt of the policy. This premium receipt of the policy includes (expressly mentioned) a compulsory surcharge for the *Consortio de Compensación de Seguros*.

7. Cover Exclusions

The cover provided by the system will not be implemented and, therefore, there will be no entitlement to compensation, whenever any of the following circumstances occur:

- a) With respect to the base policy: if losses or injuries are not insured or the insurance policy belongs to a branch not covered by the system (if so, the company does not collect surcharge for the *Consortio*). This would be the case of insurance policies covering goods carriage, construction and assembly work, liability, health, legal defence, travel, multi-peril crop insurance, etc.
- b) With respect to the direct cause of the claim: if not included among the extraordinary events mentioned in the perils covered. Thus, cover is not extended to damages derived from:
 - Direct rainfall on the risk insured or rainwater collected by roof or roofing, drainage or courtyard.
 - Hail, the weight of snow and non-extraordinary winds (below 135 km/h.).
 - Leaks, filtrations or dampness.
 - Breakage of dams, sewers or artificial canals (unless the breakage occurred as a consequence of an extraordinary event).
 - Elevation of the water table, landslides, slips or settling of land, falling rocks and similar phenomena, except if provoked by the action of rainwater having produced in the area a simultaneous extraordinary flooding.
 - Ordinary waves or currents whenever they affect property completely or partially submerged on a permanent basis.
 - The mere passage of time or the lack of maintenance of the property insured.
 - Events which, on account of their magnitude and extreme gravity, are classified by the Spanish Government as a “national disaster or calamity” (this classification has never been declared in the history of the *Consortio*, despite the major losses caused by a number of catastrophic events).
- c) With respect to the property damaged: if the damage has occurred as a consequence of a defect in the property concerned.

- d) With respect to the kind of damage: this exclusion refers to indirect damages or any kind of losses derived from direct or indirect damages other than the business interruption delimited in the Regulation. For example, damages caused by irregularities in the supply of any kind of energy are not covered. Also excluded is the business interruption as a consequence of damages suffered by other goods or by those of physical or legal persons other than the insured, on account of, among other reasons, the goods or services which such persons should and are unable to supply to the insured as a consequence of the extraordinary event.

8. The Price of the Cover: the *Consortio*'s Surcharge

The *Consortio*'s surcharge must compulsorily be included on the receipts of all insurance policies for the mentioned branches, both when the policy stipulates that the cover of the extraordinary risks is provided by the private insurance company as well as does not assume such cover (in which case the *Consortio* will assume it).

The justification of the compulsory nature of this surcharge is based on the principles of compensation and solidarity which, as mentioned earlier, characterise the Spanish system, as without the application of such principles it would not be possible to cope with the natural adverse selection. In fact, if the surcharge was solely applied to the risks voluntarily choose to be covered by the *Consortio*, only those with an appreciable degree of exposure would be willing to join the system, which would render it unfeasible from the start.

The rate applied by the *Consortio* for covering the extraordinary risks is, at the present time, its own rate applied to the capital insured. Although there are special rules for specific cases, the general level of the annual rate is as follows:

- a) For property insurance:
- Housing and housing owners condominiums: 0.09 per thousand.
 - Offices: 0.14 per thousand.
 - Business, shopping centres, warehouses and other simple risks: 0.18 per thousand.
 - Industrial risks: 0.25 per thousand.
 - Motor vehicles: a fixed amount according to the kind of vehicle (for private cars, 5.41 euros per vehicle).
 - Civil works: various rates according to type of construction, ranging from 0.34 per thousand for motorways, roads, railways, and piping, through to 1.95 per thousand for non-recreational harbours.
- b) For personal injury (life and accident insurance):
- General rate of 0.005 per thousand, except for special cases.
- c) For business interruption:
- Dwellings and owners' associations: an additional rate of 0.005 per thousand, which will be applied to the capital insured for material damage.

- Rest of risks: a rate of 0.25 per thousand, which will be applied to the capital insured for business interruption.

The surcharges of the *Consortio* are collected by the insurance companies together with their premiums and are credited on monthly basis to *Consortio* after retaining a 5-percent collection fee (plus the relevant VAT).

9. Marketing and Management of Policies and Claims

The marketing of the standard policies which serve as the basis for the cover of extraordinary risks, the collection of the surcharge and the deposit thereof with the *Consortio* are tasks performed by the insurance companies issuing such policies, independently of which party assumes the cover, the insurance companies or the *Consortio*.

Claims for compensation of losses are made to the relevant company in cases where the company expressly provides the cover of the extraordinary risks. If the cover is assumed subsidiarily by the *Consortio*, claims may be lodged through the insurer who issued the policy (who will then forward it to the *Consortio*) or by submitting them directly to the *Consortio* at the relevant regional delegations.

Claims must be lodged within a time limit of seven days following the occurrence of the loss.

In order for an insured to be entitled to compensation, it is an indispensable requirement that damages must be previously assessed by the adjusters designated by the *Consortio*.

10. Scope of Compensation, Supplementary Expenses and Deductibles

Starting from the fact that the cover of these risks must refer to the same properties or persons and, at least, for an insured value identical to that established for the other risks stipulated in the standard insurance policy, the indemnification, if any, to be paid by the *Consortio* will include the amount of the costs of the repair or replacement of the property damaged in relation to the amount appearing in the insurance contracted as the sum insured. Optional covenants included in policies will also be taken into account (“replacement value”, “first risk insurance” or “compensation threshold”, etc.).

It must be emphasised that, in the case of direct damage, the *Consortio* will apply the compensation of the amounts corresponding to building and content in a same policy.

In case of underinsurance, the proportional rule will be applied. Nevertheless, all capitals fixed for goods object of loss will be taken into account, even if stated in policies other than those where *Consortio* surcharge must be paid.

The compensation includes the costs of removal of mud, extraction of sludge, demolition, clearing of rubble and removal to an authorised landfill or waste treatment plant, with a combined limit of 4 percent of the amount insured. Excluded from these recoverable expenses are the cleaning and removal of mud from public watercourses, canals, artificial lake bottoms or shoulders of roads, dredging of sea beds; the costs of drainage works in infrastructures and those derived from the fees of the professionals designated by the insured to appraise the damages.

The terms of the cover in relation to the quantification of and compensation for business interruption will be those established in the standard policy.

In life and accident insurance, no deductibles will apply, while in property losses, in the case of direct damages, the deductible to be paid by the insured will be 7 percent of the amount of the compensable damages. Nevertheless, this deductible will not apply to the damages affecting vehicles insured under an automobile insurance policy, dwellings or owners' associations of condominiums.

In the case of business interruption cover, the deductible to be paid by the insured will be the same as that which is established in the policy, in time or in amount, for damages as a consequence of ordinary claims for business interruption. If there are several deductibles for the cover of ordinary business interruption losses, those established for the main cover will be applied.

The deductible will be applied for each loss and for each situation of risk in which the property covered is found.

The cover of extraordinary risks defined by Law is a minimum compulsory protection, whereby, if these risks are covered by an insurance company, a lower deductible may be applied, or no deductible at all. However, if the private policy does not cover these risks, and the *Consortio* is the party who takes care of the cover, then such deductible will always be applied. In this case, the insurance company issuing the base policy may, if it wishes, cancel its effect, by taking charge of the deductible, without this fact meaning that the private insurance company is covering extraordinary risks, or that there is scope for excluding the action of the *Consortio*.

11. Equalisation Reserve

In addition to the Technical Provisions and the Solvency Margin, the Law stipulates that the *Consortio* should set up an equalisation reserve. This is a reserve commonly used when certain types of risks are covered and is normal practice in the cover of disasters in many countries. It is a cumulative provision—in some cases up to certain maximum limits—and is usually exempt from tax.

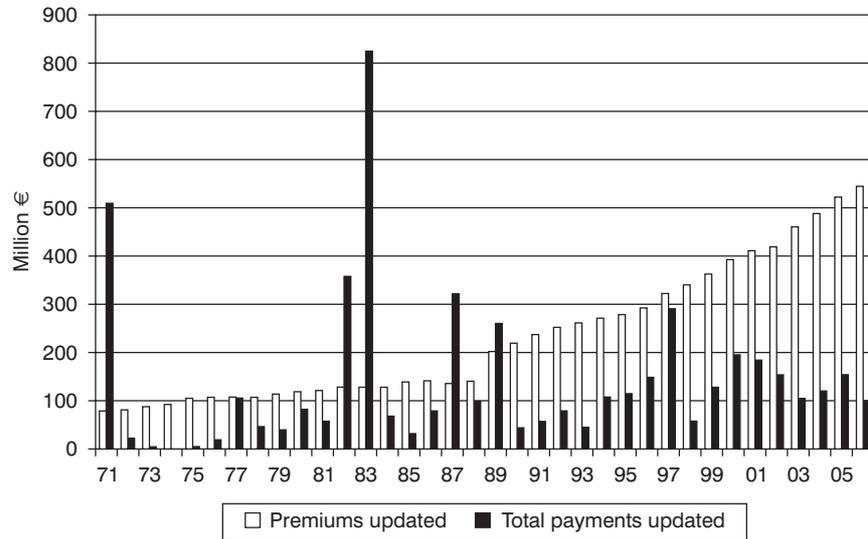
With respect to this coverage system, this is a reserve without cumulative limits. It is fiscally deductible up to a certain legally established limit.

As is well-known, the setting up of reserves of this kind for covering catastrophic risks is absolutely necessary regardless of the scheme applied, given the cyclic nature and lack of regularity of such risks. In other words, for events with return periods much longer than normal, insurance compensation can only be planned for lapses of time above one year. This requires a provision for the creation and accumulation of funds in a sufficiently high amount.

12. State Guarantee

Given the special characteristics of this activity and the particularly high loss potential, as well as the public nature of the *Consortio* itself, it is absolutely necessary for the *Consortio* to count on State guarantee. Nevertheless, the provision and adequate financial management of its resources have enabled it to meet the losses without having had to make use of this guarantee in the course of its existence.

Distribution of premiums and compensation payments (1971-2006)



Source: CCS.

SWITZERLAND

1. Natural Disasters ¹

Avalanches, landslides and particularly flooding are the dangers most repeatedly present in Switzerland.

Avalanches claim several lives each year in the Alps. The winter of 1998-1999 was one of the worst in recent times. Large snowfalls led to avalanches which not only buried skiers on the slopes, but also flattened inhabited zones and various infrastructures. 1951, 1968, 1975 and 1984 were also bad years in this respect. In a large proportion of cases, mountain sports are the triggering events.

Flooding, basically caused by precipitation and snow-melt do not cause as many deaths in Switzerland as avalanches, but are the source of most material damage caused by disasters.

The 1987 floods led to a thorough rethink of vulnerability to natural disasters in Switzerland, and placed questions related to prevention (investigation, environmental management, territorial planning, etc.) in a preponderant position in the political priorities of the public authorities. That was also seen in the scientific field, the insurance market, and public opinion in general. In that context, on 1 May, 1997 the Swiss Federal Council created the National Platform for Natural Hazards (PLANAT), entrusting it with the coordination of activities in the field of prevention ².

The most recent floods, with major losses, took place on the 21 and 22 August 2005, particularly because of the overflow of the Kleine Emme River. The resulting material damage, amounting to CHF 2.5 billion, led to total insurance indemnifications of CHF 2 billion in all (700 million from the cantonal building insurers, and 1.3 billion from private insurers). The damage was considered to be greater than the record losses of December 1999 caused by hurricane "Lothar".

Less frequent, yet representing the greatest potential hazard in Switzerland, are earthquakes, which have not been negligible during the course of Swiss history. In the last century and a half there have been more than twenty seismic events of intensity VII or more. A Richter Scale magnitude 5 or more shake can be expected in Switzerland every 10 years ³.

Historically, the greatest quake was in 1356; it destroyed the city of Basel, and was the strongest known to have occurred in Central Europe. Its magnitude is calculated at between 6 and 6.9 Mw, with an intensity at the epicentre of IX degrees on the MSK scale. A similar earthquake today would cause some 1,000 deaths, and losses in residential, commercial and industrial assets might reach CHF 80 billion or more ⁴.



¹ This chapter has been prepared with the special contribution of Andreas Moser (Interkantonaler Rück-versicherungsverband) and Mario Lampert (Swiss Re).

² CENAT: www.cenat.ch/index.php?&IID=2.

³ Swiss Re: "Aujourd' hui, les couvertures d'assurance sont insuffisantes. Et si la tere tremblait en Suisse?". 2000; p. 3.

⁴ OFEV: "Tremblements de terre: Couverture d'assurance" (www.Bafu.admin.ch). Also, Risk Management Solutions, Inc: "1356 Basel Earthquake. 650 Year Retrospective"; 2006.

If Switzerland is considered a country of a medium seismic level, the potential threat of such events, to persons and property, is worthy of consideration.

THE MAIN EARTHQUAKES IN SWITZERLAND

Year	Region	MSK Intensity
1295	Coire	VII
1356	Basel	IX
1375	Unterwald Canton	VIII
1601	Unterwald Canton	IX
1610	Basel	VIII
1755	Brigue/Viège	VIII
1774	Altdorf	VIII
1796	Rheintal	VIII
1855	Viège/Brigue	IX
1946	Sion/Sierre	VIII

Source: Swiss Re ⁵.

2. The Variety of Cover for Disaster Risks in Switzerland

According to Article 171 of the Swiss Federal Council Order on the Supervision of Private Insurance Companies ⁶, of 9 November 2005, insurers issuing fire policies (the fire and natural elements branch) for properties in Switzerland (moveable and real) must also cover the total value of damage caused by natural events ⁷. Under Article 173 of that Order, this damage must include that produced by flooding, storms, hail, avalanches, weight of snow, rock falls, falling stones and landslides, but not earthquake damage. Thus seismic risk cover is not mandatory and in fact most buildings in Switzerland are without earthquake cover ⁸.

Since 1953 in Switzerland, following the catastrophic experience of the winter 1950-1951 avalanches, private insurance entities have assumed guarantee against damage from natural events—except earthquake—, in association with fire cover and on payment of a premium ⁹. It must however be pointed out that there is a great diversity in the regulation of that cover according to canton, involving the various procedures of the cantons' monopolies and of private insurance entities.

⁵ Swiss Re: "Aujourd'hui, le couvertures d'assurances sont insuffisantes. Et si la terre tremblait en Suisse?", 2000; p. 6.

⁶ RS 961.011.

⁷ This Order contains and develops the terms of the Federal Insurance Company Supervision Act of 17 December 2004 (which came into force on 1/1/2006) whose Article 33 stipulates that "an insurance company may only conclude insurance contracts which cover damage caused by fire for risks situated in Switzerland if the contract includes cover against damage caused by natural events".

⁸ As a complement to fire insurance, some companies offer earthquake cover for buildings and content, with high deductibles (ASA/SSV: "Assurance contre les tremblements de terre". 2205. www.svv.ch).

⁹ As early as 1936 private insurance companies decided to take on guarantee against damage produced by natural events to buildings and movables, linked to fire cover and within certain limits, with no further premium (Schies, Bruno: "Conférence de presse: Inondations d'Août 2005"; www.svv.ch).

In relation to buildings, fire cover, and so the guarantee against natural events, is assumed by the 19 canton public insurance institutions —the oldest dating back to the beginning of the nineteenth century— which operate as monopolies in each of their territories (19 cantons)¹⁰. In 1903, these entities constituted the Association of Cantonal Fire Insurance Entities (AIEA). Of the nineteen cantonal insurers, only that in Nidwald enjoys State guarantee¹¹.

In the remaining seven cantons of Geneva, Uri, Schwyz, Tesino, Appenzell I.R., Valais and Obwald, private companies guarantee damage from fire and natural events, meaning that this cover is offered in a market open to free competition.

Content is covered by private entities except in Nidwald and Vaud, where this is done by the local monopolies, and in Glarus where content may be covered by both private and cantonal entities.

Away from the insurance field, in 1903 the Swiss Fund for Aid for Non-Insurable Damage caused by Natural Hazards was set up and remains in place today. This is a private aid institution dealing with the damage from unforeseeable natural events which could not be insured. The Fund's income is generated by management of its assets, a percentage of the annual gross takings of gaming houses, and donations¹².

3. Cover by the Canton Monopolies

3.1. Risks Covered and Conditions

Guarantee under fire cover by the cantons' property insurance monopolies extends to natural risks such as flooding, storms (winds of more than 75 km/h.), hail, landslides, falling stones, snow slides and weight, not including earthquake¹³. And although details vary from one canton to another, in general the cover does not include provisional and prefabricated structures, buildings in poor condition, vehicles, greenhouses and mountain railways, or damage from flooding caused by artificial water installations or reservoirs.

Premiums are fixed for natural perils covered in general and for all zones (without taking account of the level of risk) and are calculated so that there is no deficit in overall cover. Indemnification is assessed at new value, provided that the real value exceeds at least 50% of that. Demolition and repair charges are guaranteed up to a limit of between 5 and 25%.

The range of possible deductibles is also quite broad, oscillating between 10 and 15% of damage to homes and farming buildings, with a minimum of CHF 200 and a maximum of 2,000. For other buildings, the deductible represents 10% of the damage, with a minimum of CHF 500 and a maximum of 10,000.

¹⁰ Von Ungern-Sternberg, T.: "The limits of competition: Housing insurance in Switzerland". *European Economic Review*, n.° 40, 1996; pp. 1111-1121.

¹¹ VKF/AEAI: *Rapport de Gestion 2006*; p. 7.

¹² www.senat.fr/lc/lc29/lc29.html#toc2.

¹³ The cantonal building insurers cover 80% of the total capital secured in Switzerland for buildings, i.e. 1.75 billion Swiss Francs from a total of 2.1 billion (VKF/AEAI: *Rapport de Gestion 2006*; p. 7).

3.2. Earthquake, a Special Case

Provided that an earthquake is of a minimum MSK intensity of VIII, damage caused to buildings is covered by the cantonal building insurers. This is done through a Pool, the Schweizerischer Pool für Erdbebendeckung (SPE), which those entities founded in 1978 (except for that in Zurich which covers earthquakes independently)¹⁴. The Pool is managed by the Intercantonal Reinsurance Union (IRV).

This is not in fact insurance, nor is it indemnification, but rather a voluntary contribution by the canton insurers, through the Pool, to make it possible for the owners (the insured) of the buildings affected to recover. Indeed, they pay no additional premium, as the Pool resources are created through member entities' annual contributions. For that very reason, the owners (the insured) have no relation with the Pool nor do they receive compensation directly from it but rather from the insurers involved and the Pool's payments go solely to them, not to the owners¹⁵.

The amount of compensation depends on the Pool's resources which, since 1 January 2001, draw on available funds of CHF 2 billion, and a further 2 billion in the case of a second earthquake occurring in the same year. If those resources prove insufficient, the indemnifications are reduced proportionately. The deductible is in all cases 10% of the insured value, with a minimum of CHF 50,000¹⁶. The Pool reinsures with the IRV and other outside companies.

This protection includes damage caused by rubble, fire and explosion arising from earthquake. Damage in constructions which are technically poorly designed or not adequately maintained is excluded¹⁷.

Because the Zurich canton does not participate in this earthquake Pool, as already pointed out, the canton entity covers earthquake damage up to a limit of CHF 1 billion¹⁸.

3.3. Intercantonal Reinsurance and the IRG

For fire and natural event risks, the cantonal building insurers take reinsurance in a common account through a quasi-State entity: the Intercantonal Reinsurance Union (IRV) which, for fire, assumes the reinsurance in the category of loss excess, and in natural risks (except for earthquake) as stop-loss. The IRV offers individual cover under the big loss limit for each cantonal building insurer. The cantonal building insurers buy more or less individual cover depending on their risk appetite. The IRV in turn reinsures on the international market.

The IRV was created in 1910 by the cantonal building insurers. It is not an ordinary reinsurance company but rather an intercantonal public corporation pursuing an activity of general interest, exclusively for the cantonal building insurers.

In the area of damage caused by natural events, and for loss rates which reach disastrous proportions¹⁹, the cantonal building insurers and the IRV have agreed on a solidarity-based distribution of risks, focused on the Intercantonal Community for Risks from Natural Elements (IRG).

¹⁴ Swiss Re: *Op. cit.*; p. 2.

¹⁵ KGV: "Couverture sismique dès 2005", 23-05-2006 (www.kgvonline.ch/?mm=11).

¹⁶ *Ibidem*. Also, ACAB/KGV Fribourg: *Rapport Annuel 2006*; p.51. And also, Unirisc Group: "Tremblement de terre en Suisse?" (www.unirisc.ch/index.aspx?Theme=News&IDNews=259).

¹⁷ KGV: "Couverture sismique dès 2005" (www.kgv.ch).

¹⁸ OFEV: "Tremblements de terre: Couverture d'assurance" (www.bafu.admin.ch).

¹⁹ For a small cantonal insurer CHF 20 million is damage from natural events in one year may be a catastrophe. For a large insurer, the threshold would be around CHF 150 million (www.kgvonline.ch).

Created in 1996, the IRG consists of a system of reciprocal contribution obligations providing supplementary cover of CHF 750 million in case of natural disasters²⁰. It does not collect premiums for these purposes but rather, in case of disaster, the cantonal building insurers make their contribution on the basis of provisions previously and specifically created for the purposes²¹. This system has been brought on stream twice until now: with the storm “Lothar” in 1999, and the floods of August 2005.

A loss limit is fixed for each cantonal building insurer depending on the capital insured. If the loss of a cantonal building insurer exceeds its loss limit, the exceeding amount will be paid by the IRG.

In 2007 the capacity of the IRG was CHF 750 million distributed into three layers:

- 1) The first CHF 25 million would be paid by the IRV.
- 2) The next CHF 500 million would be paid by the cantonal building insurers.
- 3) The last CHF 225 million would be paid by the external reinsurers. The premium is paid by the IRV.

In addition to the IRG, the cantonal building insurers reinsure their natural risk on a stop loss basis by the IRV, as it has been mentioned.

4. Private Market Cover

4.1. The Swiss Insurance Association Pool

In the field of private insurance, damage from flood, storm (wind gusts exceeding 75 km/h), hail, avalanche, weight of snow, falling rocks and landslides are included in the cover for fire in buildings or for contents²². However, while the guarantee against fire—the main cover of the policy—is implemented individually by each entity, that for natural risks, with the exception of the special case of earthquake, is conceded through the Swiss Natural Hazards Pool (Schweizer Elementarschaden-Pool). This pool was set up in 1939, and virtually all Swiss insurer entities are members, in the framework of the Swiss Insurance Association (SVV).

Participation in the Pool depends on the market share in sums insured, specified as follows: all companies withhold 20% of the losses affecting them, on their own account; the remaining 80% is ceded to the Pool and redistributed among all member entities according to their percentage share (their quota-share in insured sums). This is ultimately a claim Pool, in which the insurers involved do not transfer premiums.

The premium is calculated overall for all events and for the whole of Swiss territory, without distinction of level of risk, as follows: 0.21 per thousand of the insured capital for home content; 0.35 per thousand for other content (commercial and farm property, stocks of merchandise), and 0.46 per thousand for buildings, whether simple or industrial risks²³.

²⁰ AVKF/AEAI: *Rapport de Gestion 2005*; p. 23.

²¹ *Ibidem*.

²² ASA/SVV: “Le pool pour la couverture des dommages causés par les forces de la nature”. 2007 (www.svv.ch).

²³ Approbation de tarifs d’entreprises d’assurance privée (art. 84 de la loi du 17 décembre 2004 sur la surveillance des assurances; RS 961.01). *Feuille fédérale* (www.admin.ch/ch/f/ff/2006/8812.pdf).

Indemnification is at new value, although an overall maximum limit for indemnificatory liability is set per event by the private insurance market: CHF 1 billion for buildings and a further CHF 1 billion for content (furnishings, commercial assets, stocks of merchandise).

The maximum limit per event and policyholder is CHF 25 million (also for buildings and content, separately), although private companies may, in the area of industrial risks, grant building guarantees above that limit, via supplementary insurance.

The deductibles are set at CHF 500 per event for domestic content, and 10% of the amount of the losses for other damage, with minimum and maximum limits depending on insurance categories according to the following table ²⁴:

Insurance category	Minimum (CHF)	Maximum (CHF)
Home and farm buildings	1,000	10,000
Commercial and other buildings	2,500	50,000
Farming assets	1,500	10,000
Other content (commercial assets and stocks of merchandise) mercancías)	2,500	50,000

4.2. SVV Pool Reinsurance

This private entity Pool reinsures by stop-loss in a common account, with 20 tranches of which eleven (the top eight “tranches of 100 mn” and the bottom three “tranches of 50 mn”) are voluntary for Pool members wishing to operate in them; the remainder are mandatory. As of 1st January 2008 the Pool Members decided to reinsure only 80% (so far 100%) of the obligatory stop loss treaty. Some Pool members reinsure also the remaining 20% on a individual basis.

The following is the scheme used:

Tranche	Limits	Limits
1	1	Facultative Sublayer
2	750 xs 450	Obligatory
3	800 xs 1200	Facultative Toplayer

In Million CHF.

Following the abovementioned model for participation in the Pool, 80% of that recovered through reinsurance is distributed according to the percentage of the sum insured by each company in relation to the total sum insured by all Pool members, i.e. their participation share in it. The remaining 20% is distributed among the companies in proportion to the damage they have had to take on in each of their retentions.

²⁴ *Vid.* “Ordonnance sur la surveillance des entreprises d’assurances privées” (Ordonnance sur la surveillance, OS) du Conseil fédéral suisse. Modification du 18 octobre 2006. RS 961.011.

4.3. Earthquake and Private Insurance

Because private entities' policies exclude earthquake, to cover such risk they have created an Association of Interests, participation in which is voluntary, and which is designed to offer entities a system of reinsurance just for buildings, in the form of CHF 150 million in excess of 50 million (mandatory) and 30 million in excess of 20 (optional). This service, only in cantons with no monopoly, would be offered to insured for fire, without the counterpart of an additional premium, with a maximum indemnification limit of CHF 500,000 per building, and a 10% deductible of the loss, with a minimum of CHF 5,000. All that applies if EMS grade VII is reached.

For the time being however, this Association does not offer true cover but rather constitutes a possibility for development, with the aim of providing a clear response to the lack of minimum protection from earthquake in cantons where no public monopoly operates.

TAIWAN

1. Taiwan Residential Earthquake Insurance Fund (TREIF). Introduction ¹

Taiwan is located in the Circum-Pacific seismic zone, one of the world's three major seismic zones. Shakes occur frequently and are a constant nightmare to residents. As a natural peril, earthquakes are so unpredictable in terms of occurrence and magnitude that the destruction they cause to life and property is devastating, representing a harsh menace to the island. Nevertheless, the Taiwanese government is strongly committed to confronting the threat and clearly recognises the importance of risk management, taking the necessary mitigation measures against this natural disaster, promoting anti-seismic measures to protect buildings and properties from damage, and ensuring that emergency rescue and relief are in place and utilized. Even with all these steps, Taiwanese people do not consider the country to be immune from a destructive earthquake, particularly if it is a great and devastating event; hence the need for a national insurance programme to indemnify losses and secure the socioeconomic infrastructure.



2. Development and Implementation of the National Residential Earthquake Insurance Program

An earthquake measuring 7.3 on the Richter scale, known as the *Chi-Chi* earthquake or 921 earthquake, hit Taiwan on September 21, 1999; a tremor so powerful and destructive that it is still fresh in the mind of every Taiwanese resident. This quake immediately contributed to the establishment of an earthquake co-insurance scheme by the authorities, the consensus on the need to reinforce earthquake insurance facilities, and the inclusion of section 138 into the Insurance Law as the Draft of the Insurance Law Amendment Act, introduced in 1999, requiring mandatory cover for earthquake-related perils to be included under residential fire insurance, and a scheme to assume and spread the envisaged residential earthquake risk. The amendment was passed and the amended section went into effect on 9 July 2001, creating the National Residential Earthquake Insurance Program.

Under this program, all residential fire insurance policies issued by insurers must automatically be extended to cover residential earthquake risk with a maximum sum insured of NT\$1.2 million on every residence for a unified annual premium rate of NT\$1,459 (85% pure risk and 15% loading).

¹ This chapter has been prepared by Cynthia Po (TREIF, Taiwan).

This coverage, termed as basic coverage, includes perils of fire, explosion, landslide, land subsidence, land movement, land rupture, tidal wave, surge and flood caused by earthquake and resulting in actual total loss or constructive total loss (uninhabitable residence which must be demolished and rebuilt or whose repair cost exceeds 50% of the rebuilding value) to the insured residence. In addition, a Contingent Living Expense of NT\$180,000 will be paid to the insureds once the insured residence has been assessed as actual or constructive total loss.

In 2001, under Regulations Governing Taiwan Residential Earthquake Insurance Pool and Risk Transfer Scheme, a capacity of aggregate event limit of NT\$50 billion was provided for Taiwan's earthquake risks, and Central Reinsurance Corporation (*Central Re*), a commercial reinsurer previously owned by the government, was designated as scheme manager. One hundred percent of residential earthquake insurance underwritten by the insurance companies was required to be ceded to *Central Re*, which would in turn cede or allocate the business assumed among the Co-insurance Pool members, the TREIF, the local and foreign insurers and reinsurers, the capital markets, and the national government with varied limits as shown in the following diagram:



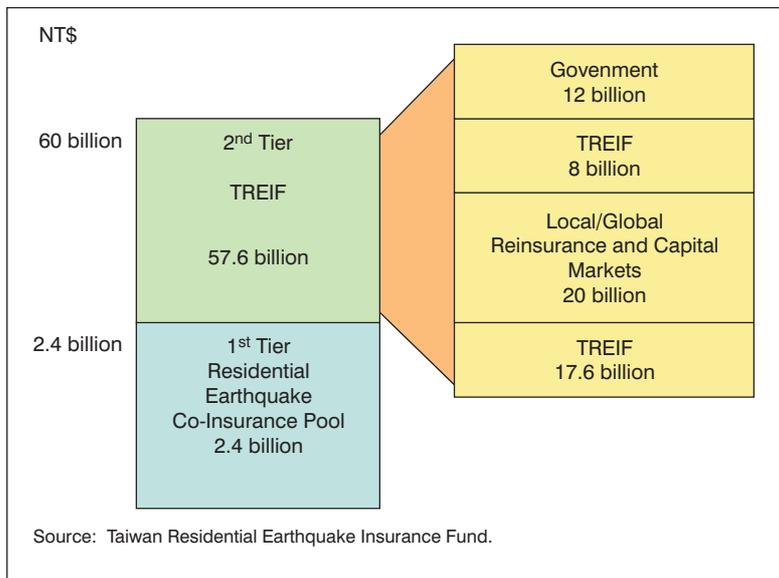
Source: Taiwan Residential Earthquake Insurance Fund.

The authorities revised the Regulations Governing Taiwan Residential Earthquake Insurance Pool and Risk Transfer Scheme and put them into effect on December 1, 2005, proclaiming the TREIF as the pivotal organization of the program to ultimately take up all the obligations and liabilities, and adjusting the entire Program from four tiers to two tiers. The limit of the 1st tier NT\$2 billion is still taken by local property insurers (including *Central Re*) as pool members, while the remaining NT\$48 billion, exceeding NT\$2 billion, is taken by TREIF first and then transferred to various risk takers.

The authorities revised again the aforementioned Regulations and put them into effect on January 1, 2007, increasing the limit of the scheme from NT\$50 billion to NT\$60 billion. The limits for each tier and risk taker are shown in the following diagram:

1st TIER	NT\$2.4 billion, taken by local property insurers (including Central Re) as pool members
2nd TIER	NT\$57.6 billion, taken by TREIF first and then transferred to various risk takers, i.e. (1) Up to NT\$17.6 billion, taken by TREIF (2) NT\$17.6 billion - NT\$37.6 billion, transferred to local and overseas reinsurers, and capital market (3) NT\$37.6 billion - NT\$45.6 billion, taken by TREIF (4) NT\$45.6 billion - NT\$57.6 billion, taken by the Government

Source: Taiwan Residential Earthquake Insurance Fund.



3. The Background of TREIF

To soundly lay the legal foundation for the National Residential Earthquake Insurance Program, the TREIF Contribution Memorandum, the TREIF Management Ordinance, and the Regulations Governing Taiwan Residential Earthquake Insurance Pool and Risk Transfer Scheme were promulgated on November 30, 2001 under section 138(1) of the Insurance Act. Subsequently, the relevant authorities agreed that the Taiwan Insurance Development Fund would contribute NT\$20 million to fund the initial stage of the establishment of TREIF as an office of *Central Re*, to initiate and administer the program under the direct supervision of the Executive Secretary and other staff secretaries.

4. The TREIF's Pivotal Role in the National Residential Earthquake Insurance Program

At the initial stage of implementing the National Residential Earthquake Insurance Program, *Central Re* was designated to manage the Regulations Governing Taiwan Residential Earthquake Insurance Pool, and to implement the Risk Transfer Scheme. Being in charge of all the business related to co-insurance management and reinsurance arrangement, *Central Re* with its experience, expertise and enormous effort, contributed to the establishment of guidelines for residential earthquake insurance underwriting and claim settlement, and of the procedure for reinsurance placement and securities election to safeguard the smooth operation of the program.

However, it is inevitable that there are reinsurers that might fail; and with no provisions under existing regulations prescribing that *Central Re* will assume such credit risk, the question arises as to who will assume the loss resulting from reinsurers' non-payment. Moreover, it was envisaged that for a national program, a government supervised not-for-profit organization would be more competent to serve as the key to fulfilling its mission.

The relevant authorities revised the Regulations Governing Taiwan Residential Earthquake Insurance Pool and Risk Transfer Scheme and put them into effect on December 1, 2005, proclaiming TREIF as the pivotal organization of the program to ultimately assume all the obligations and liabilities and to actively promote TREIF's independent operation.

As a result, TREIF became independent of *Central Re* on July 1, 2006. Thereafter, the scheme of spreading residential earthquake insurance risk, including insurance operation, establishment and amendment of the standard claim system process, co-insurance management, claim handling, reinsurance arrangement, business promotion, fund management and adjustor qualification training have been handled by TREIF.

Being the pivotal organization, not only does TREIF retain a big portion of the limit—NT\$25.6 billion—but also assumes the credit risk resulting from the non-payment of reinsurance securities.

5. The Structure of TREIF

TREIF is a not-for-profit organization, established officially on January 17, 2002, making it the third national residential earthquake insurance program in Asia, after those of Japan and Turkey.

TREIF is run by a Board of Directors which includes eleven Directors and a Supervisor engaged by the relevant insurance authorities under TREIF's contribution memorandum.

When TREIF was established, Mr. Chen Chong, deputy minister of the Ministry of Finance, was first appointed to serve concurrently as TREIF's chairman. Later, in July 2002, Ms. Chang Show-Lian, also deputy minister of the Ministry of Finance, and also serving concurrently, succeeded Mr. Chen as chairman. On July 1, 2004, the Financial Supervisor Commission (FSC) of Taiwan was established and became the TREIF's supervisory authority, replacing the Ministry of Finance in this role, and the FSC Commissioner, Mr. Ling Kuen Bao, was appointed to replace Ms. Chang as chairman of TREIF on September 30, 2005. Ms. Cynthia Po was retained as chairman from October 1, 2006, after TREIF became independent from *Central Re*.

TREIF is structured into two departments: Business and Administration. The Business Department is mainly responsible for both inward and outward business (including electronic data transmission and claim handling programs), in addition to local insurers' relevant business audit-

ing, promotion and training, research and IT development. The Administration Department is responsible for finance, accounting, personnel, administration and miscellaneous jobs.

6. Business and Finance of TREIF

TREIF's main income comes from pure risk premium allotments and management fees for doing National Residential Earthquake Insurance Program business. Under the TREIF management rules, at the end of every year, all income received from official operation after operational costs and operating capital should be withheld as a special reserve, to be used only to indemnify residential earthquake insurance claims.

Should a greater earthquake occur and the accumulated fund is inadequate to fully pay the claims, TREIF will apply to the Ministry of Finance, subject to Executive Yuan approval, for a Treasury guarantee in order to source additional funds to replenish the shortfall.

Since the first residential earthquake insurance policy was issued in 2002, Taiwan's residential earthquake insurance business has been growing steadily. Policies in force totalled more than 1,670,000 on December 31, 2006, with a take-up rate of 22% based on the number of residences in Taiwan, of 7,600,000. Written premiums for 2006 also increased substantially, to more than NT\$2.4 billion.

RESIDENTIAL EARTHQUAKE INSURANCE WRITTEN PREMIUM AND GROWTH RATE

Year	Direct Premium	
	Amount NT\$ 1,000	Growth Rate %
2002 (1 April - 31 Dec.)	661,231	—
2003	1,242,788	88
2004	1,702,959	37
2005	2,101,527	23
2006	2,425,076	15

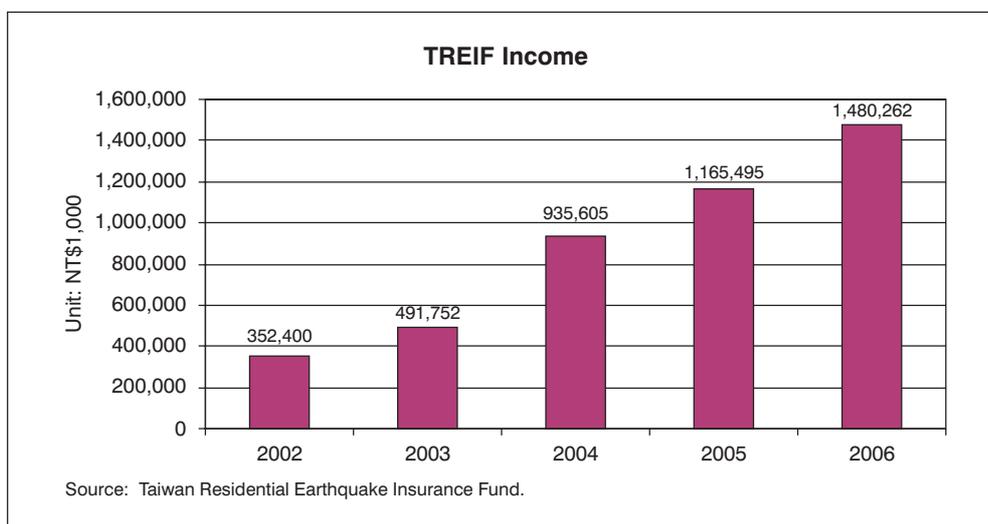
Source: Taiwan Residential Earthquake Insurance Fund.

Total TREIF income for 2006 (including premium income, management fees, and interest earned) was NT\$1.4 billion, representing an increase of 27.01% over the preceding year.

TREIF VARIOUS INCOMES AND THEIR GROWTH RATES
(unit: NT\$1,000)

Year	2002 (April-December)	2003	2004	2005	2006
Premium	334,525	450,749	879,201	1,078,720	1,342,886
Management fee	16,715	31,016	42,771	52,745	60,996
Interest earned	1,160	6,647	11,143	31,296	64,799
Other Income	—	3,340	2,490	2,734	11,581
Total	352,400	491,752	935,605	1,165,495	1,480,262
Growth rate	—	39.54%	90.26%	24.57%	27.01%

Source: Taiwan Residential Earthquake Insurance Fund.



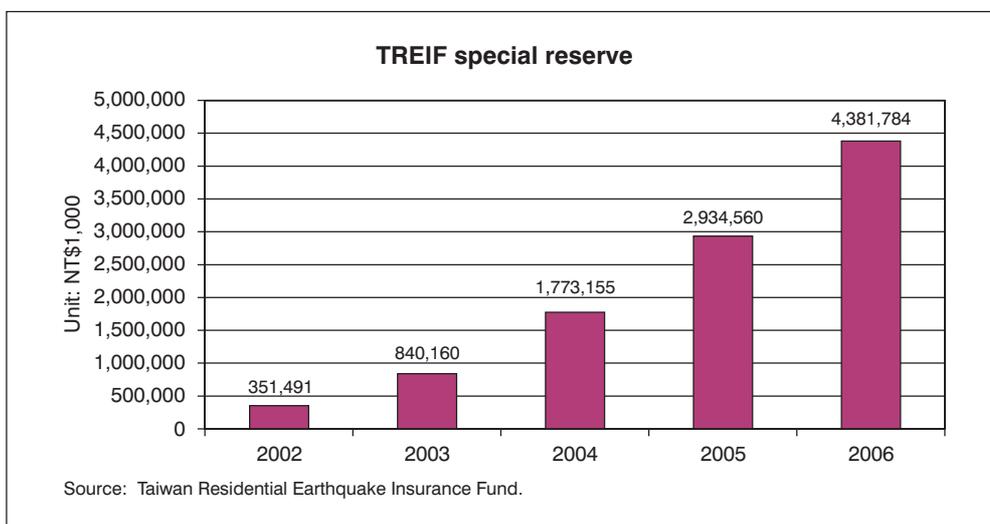
Source: Taiwan Residential Earthquake Insurance Fund.

TREIF's special accumulated reserve totalled NT\$4.38 billion at the year-end of 2006, representing a substantial increase of 49.32% over NT\$2.93 billion at year-end of 2005.

TREIF SPECIAL RESERVE ACCUMULATION

Year	2002	2003	2004	2005	2006
Special Reserve (NT\$1,000)	351,491	840,160	1,773,155	2,934,560	4,381,784
Growth rate	—	139.03%	111.05%	65.50%	49.32%

Source: Taiwan Residential Earthquake Insurance Fund.

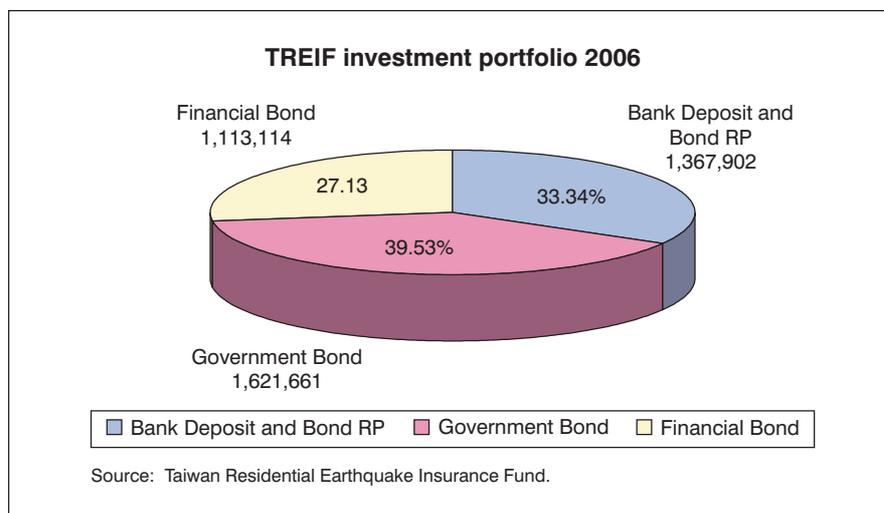


TREIF will manage its special reserve with the most prudent care, aiming at both minimizing investment risk and maximizing investment profitability. As of 2006, TREIF's available fund has accumulated a total of NT\$4.38 billion, which was invested in the money market as bank deposits, bonds RP, government bonds and financial bonds with an average investment yield of 2.029%.

TREIF INVESTMENT PORTFOLIO 2006

INVESTMENTS	Amount (NT\$1,000)	Ratio (%)
Bank Deposits and Bonds RP	1,367,902	33.34
Government Bonds	1,621,661	39.53
Financial Bonds	1,113,114	27.13
TOTAL	4,102,677	100.00

Source: Taiwan Residential Earthquake Insurance Fund.



7. TREIF's Future Perspective

Being the pivotal organization of the National Residential Earthquake Insurance Program, TREIF's business will prosper steadily in the short term. It is also expected that the take-up rate will increase through extensive education and active promotion to the public held under the auspices of local insurance companies. Moreover, TREIF is going to establish a standard residential earthquake insurance claim handling procedure for the local market to follow, and will be making timely adjustments to the risk-spreading structure as business develops. It is imperative that a comprehensive residential earthquake business database be established, together with the installation of an auxiliary backup scheme to handle TREIF business without interruption in the event of any contingency. In addition, it is hoped that Section 138 under the Insurance Act will be amended in order to qualify TREIF to accept residential earthquake insurance business directly from local companies instead of through a professional reinsurer. TREIF will endeavour to see this realized.

In the future, TREIF will be strengthening and extending its functions through cooperation with various domestic and overseas earthquake research organizations and institutes, and participation in attempts to establish a local earthquake risk evaluation model, an earthquake risk mitigation plan, and the catastrophic insurance actuarial model. Besides, TREIF will make every effort to secure treasury guarantees to cover any shortfall in the event of a major earthquake. Furthermore, to complete TREIF's goals, it will extend its functions to include typhoon and flood risk coverage under the National Residential Earthquake Program.

In addition to earthquake, typhoon and flood risk coverage, TREIF will try its best in the long run to extend the insurance coverage of the National Residential Earthquake Insurance Program to include other natural catastrophic risks. This, coupled with the constant promotion sponsored by TREIF and the insurance industry's interest to enhance the public's comprehensive understanding of the function and mechanism of the program in relation to risk-spreading, will minimize the economic losses to individuals and their families, and effectively restore social stability as quickly as possible following a major quake in Taiwan. And that is the grand mission that TREIF is committed to achieving.

Immediately after the devastating earthquake, on 27th of August, 1999, Law No.4452 on “Measures to be taken Against Natural Disasters and Authorization in Regards to Arrangements to be made in Overcoming the Damage Caused by Natural Disasters” was enacted giving three months of provisional authority to the Council of Ministers to organise and establish a legal framework against natural disasters. With this power of authority, Decree Law No.587, “Decree Law Relating to Compulsory Earthquake Insurance”, entered into force by being published on 27th of December, 1999, and it gave birth to the TCIP.

The tariffs and regulations were published on 8th of September 2000 and, as of 27th of September 2000, the TCIP began offering cover after a 9-month formation process following the decree law. The following year, on 27th of March 2001, earthquake insurance became compulsory for those dwellings subject to compulsory earthquake insurance as described in the decree law. Currently 24 accredited insurance companies and their agents are providing Compulsory Earthquake Insurance in the name and on behalf of the TCIP. This newly formed system proved very successful in a short time and has been proposed as a model solution for many countries by the international organizations.

2. The Purpose of TCIP

Compulsory Earthquake Insurance is a new insurance system created to ensure the compensation of material damages on dwellings caused by earthquakes. Following comprehensive research, this system was created with the cooperation of the World Bank, the Turkish Government and the insurance sector and its fundamental purposes are as follows:

- To give insurance protection against earthquakes for all residences subject to compulsory earthquake insurance, in return for an affordable premium.
- To provide a risk-sharing mechanism within the country, at the same time transferring the financial burden caused by earthquake damages to the international reinsurance and capital markets through the insurance system.
- To reduce the state’s financial burden caused by earthquakes.
- To use the insurance system as an instrument in increasing the quality of construction of houses.
- To ensure long term fund accumulation for compensation of earthquake damages.
- To contribute to the development of insurance awareness in the society.

With the application of Compulsory Earthquake Insurance, without relying on the budgetary means of the government, a concrete protection was provided by immediately compensating the material losses in residences. At the same time, public relations and affordable insurance increased public awareness on earthquake insurance. Until sufficient internal sources are accumulated, a significant portion of the risk is transferred to the international markets through reinsurance schemes. Because the financial burden incurred on the national budget as a result of earthquakes is reduced, potential additional taxes are prevented.

3. Structure of TCIP

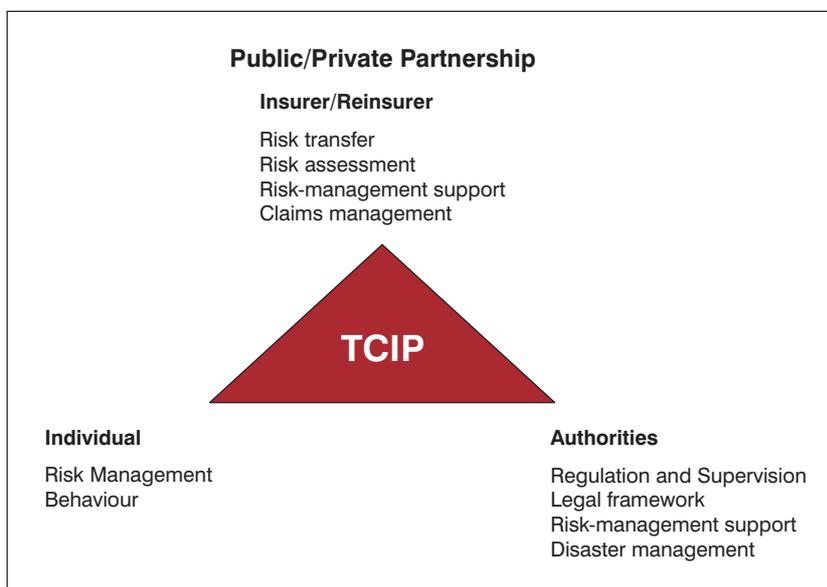
3.1. Board of Director

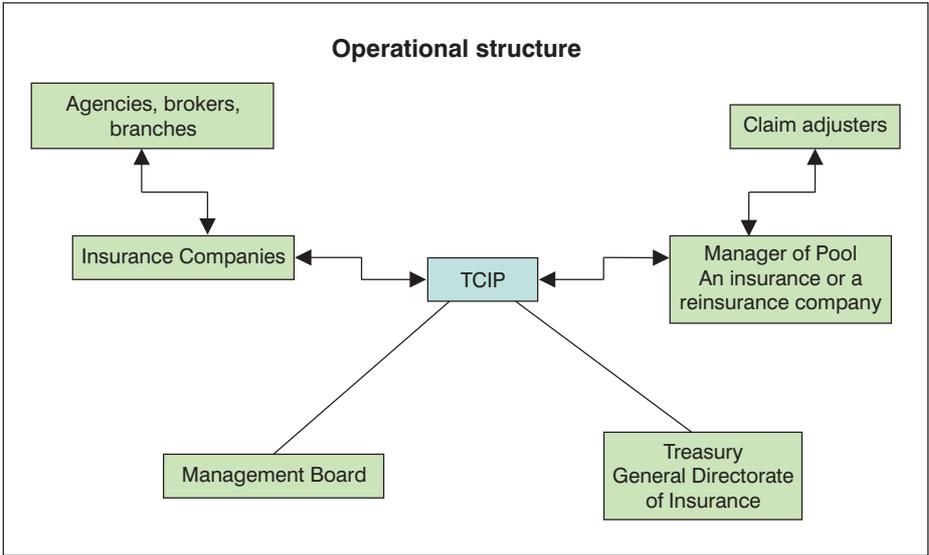
TCIP is administered by “Turkish Catastrophe Insurance Pool Board Of Directors” which consists of 7 members. The Board of Directors is comprised of representatives from: Prime Ministry, Undersecretariat of the Treasury, Ministry of Public Works and Settlement, The Association of the Insurance and Reinsurance Companies of Turkey, Middle East Technical University, Capital Markets Board of Turkey and General Manager of Garanti Insurance Company (Pool Management Company). Four members of the Board of Director are high level public officials who are experts in different subject matters, two of the members are private sector representatives and one of them is a university representative.

The formation of the Board of Directors and representation by all concerned parties are fundamental in successfully conducting the Compulsory Earthquake Insurance Program.

3.2. Pool Management Company

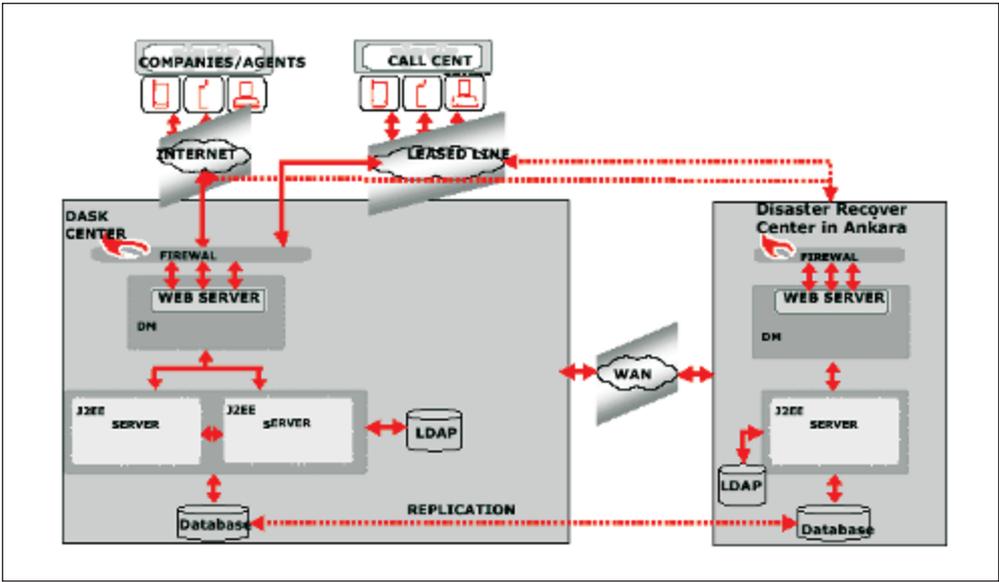
The government decided to outsource all operational tasks to private insurers. The decision meant engaging a manager to handle all technical tasks in the TCIP’s daily operations. The government appointed Milli Re as the Pool Management Company for five years until 2005. Since 2005 these tasks have been carried out by the Garanti Insurance Company in the capacity of Manager of Pool until year 2010.





3.3. IT Infrastructure

TCIP’s IT system enables real-time on line policy production, premium booking, claim management and reporting. Presently 13,500 agents throughout Turkey are able to access the central database and application software provided by TCIP’s premises via internet. However, those Insurance companies with high technical capacity may incorporate a policy production unit into their main application by using real-time data transferring function of TCIP system.



4. Details of Compulsory Earthquake Insurance

4.1. Insurable Property

Compulsory Earthquake Insurance constitutes a system of insurance that is basically intended for dwellings that remain inside the boundaries of the municipality. Buildings and dwellings subject to compulsory earthquake insurance are as follows:

- Building constructed as dwellings on privately owned lands having a registered title deed.
- Independent sections within the context of the Condominium Law No: 634.
- Independent sections situated inside residential buildings but used as a small business establishment, bureau and similar purposes.
- Properties built by the government or built by housing credit, as a result of natural disasters.

4.2. Uninsurable Property

The properties that fall outside the Compulsory Earthquake Insurance are as follows:

- The dwellings belonging to public entities and institutions.
- The dwellings built in residential areas of a village.
- The dwellings entirely used for commercial and industrial purposes (block of offices, business center, administrative service buildings, training center buildings etc.).
- Dwellings still under construction.
- Independent units and dwellings built after the 27th of December, 1999, without any construction permit granted within the framework of the legislation.

Compulsory insurance for the dwellings built in residential areas of villages is not anticipated because there are no municipal inspections and building inspection system, and because those who live in these areas are thought to have a low level of income. However, the homeowner residing in these areas may obtain earthquake insurance from insurance companies in the market, if he wishes to do so. Owners of commercial and public buildings are not required to buy earthquake insurance, but they can voluntarily purchase it from private insurance companies.

4.3. Scope of Cover

With the Compulsory Earthquake Insurance, earthquakes, fires following earthquakes, explosions as a result of earthquakes and landslides as a result of earthquakes, causing material damage to the insured buildings, are covered up to the sum insured by TCIP, including foundations, main walls, common walls separating independent sections, ceilings and bases, stairs, platforms, halls, roofs, and chimneys.

4.4. Exclusions

- Expenses in the removal of debris
- Loss of profit
- Loss of income
- Loss of Rent

- Alternative residence and work place expenses
- Financial liabilities and all other similar indirect damages incurred
- All sorts of movable goods, furnishings and others
- All personal injury including death
- Claims of damages for pain and suffering

4.5. Maximum sum Insured

The intent of the Compulsory Earthquake Insurance is to have a standard cover with a minimal premium. Consequently, TCIP grants cover in specified maximum sum insured determined by using unit cost of building construction. As of 22nd of February 2007 maximum sum insured amount granted by TCIP policies in all structure types is determined as NTL 110.000.

The sum insured is determined according to the size and type of structure however not exceeding the maximum total insured amount of the dwellings. If the value of the dwelling exceeds the total insured amount given by TCIP, the insured optionally can get additional cover for the exceeding amount from the insurance companies.

4.6. Tariff rates and premiums

The TCIP's premium tariff is determined by the Treasury Under-Secretariat and 3 factors determine the insurance premium amount:

- Location of the building according to earthquake risk zones,
- Construction type of the building
- Gross square area of the dwelling.

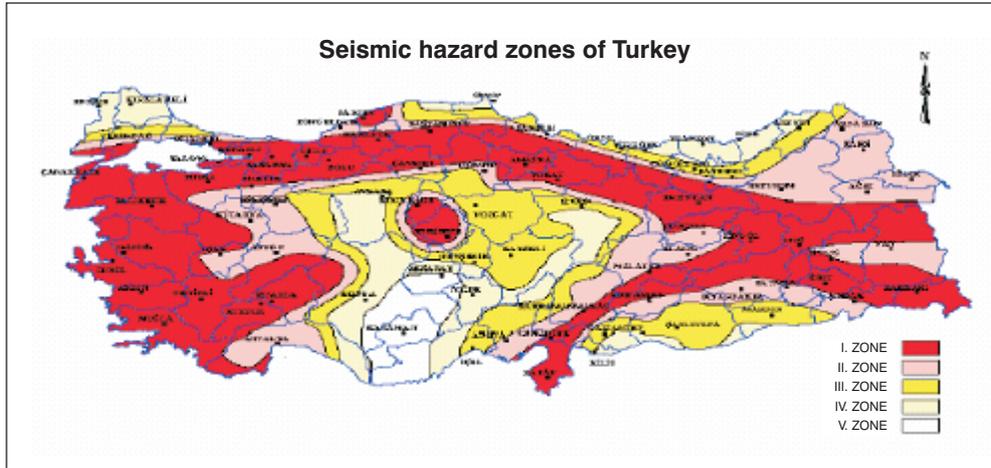
Descriptions of the structure styles that are indicated in the tariff are as follows:

- A) Steel, reinforced concrete frame structures: These structures are made up of steel or reinforced concrete bearing frames.
- B) Masonry stone structures: These are structures without frames having walls made by rubble stones, hewn stone, brick or filled, unfilled concrete briquette, in addition to floorings, stairs and ceilings made of concrete or reinforced concrete.
- C) Other structures: Structures that do not enter into the above mentioned groups.

There are 15 tariff rates determined according to 5 risk zones and 3 different construction types.

Region based rates according To construction type (‰)	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
A) Steel, Reinforced Concrete Frame Structures	2.20	1.55	0.83	0.55	0.44
B) Masonry Stone Structures	3.85	2.75	1.43	0.60	0.50
C) Other Structures	5.50	3.53	1.76	0.78	0.58

Allocation of the risk zones is based on the "Turkey Seismic Zones Map" which is prepared by the Ministry of Public Works and Settlement.



Policy sum insured is obtained by multiplying the unit square meter costs with the gross square meter area of the dwelling.

As of 22nd of February 2007, the unit square meter costs calculated according to structure type and used in the determination of the insurance compensation are as follows:

- A) Steel, reinforced concrete frame structures: NTL 450
- B) Masonry stone structures: NTL 320
- C) Other structures: NTL 170

The maximum sum insured for all construction type is determined as NTL 110,000.

The above indicated gross square meter values are used as a basis in calculating insurance compensation, and are determined annually according to changes in the ratios of the “Building Construction Cost Index” statements made by the State Institute of Statistics and announced in the Official Gazette.

Base policy premium is obtained by multiplying the sum insured with the tariff rate. Hence, there is fixed premium amount to be added to this base policy premium in order to reach the final policy premium. Fixed premium for risks in Istanbul is NTL 15 and NTL 10 for risks in other cities.

PREMIUM AMOUNTS ACCORDING TO THE RISK ZONES AND CONSTRUCTION TYPES (FOR ISTANBUL)

For istambul premium for 100 square meter residence (NTL)				
Construction Type	Sum insured	Risk zones and premium (NTL)		
		I	II	III
Steel, R. Concrct.	(100 s.meter × NTL 450) 45,000	114.00	84.80	52.40
Masonry Strn.	(100 s.meter × NTL 320) 32,000	138.20	103.00	60.80
Others	(100 s.meter × NTL 170) 17,000	108.50	75.00	44.90

**PREMIUM AMOUNTS ACCORDING TO THE RISK ZONES AND CONSTRUCTION TYPES
(OUTSIDE OF ISTANBUL)**

Other cities premium amount for 100 square meter residence (NTL)						
Construction Type	Sum insured	Risk zones and premium (NTL)				
		I	II	III	IV	V
Steel, R. Concrct.	(100 s.meter × NTL 450) 45,000	109.00	79.80	47.40	34.80	30.00
Masonry Stn.	(100 s.meter × NTL 320) 32,000	133.20	98.00	55.80	30.00	30.00
Others	(100 s.meter × NTL 170) 17,000	103.50	70.00	39.90	30.00	30.00

In the apartment buildings and housing complexes within the context of this regulation, group insurances taken out by the administrator which has at least eight independent sections are entitled to a 10% discount from the above mentioned tariffs. The minimum premium on TCIP policy is NTL 30.

4.7. Essential Information and Documents for Insurance Policy

Essential information is as follows:

- Name, address, telephone number and mobile phone number of the insured.
- Tax ID number and Turkish Republic ID number of the insured.
- Full address of the residence that is to be insured.
- Title deed information (block, plot, parcel, page number) (dwelling title deed or land title deed).
- Construction year of the building (1975 and before, between 1976-1996, between 1997-1999, 2000 and after).
- The construction type of the building (Steel, Reinforced Concrete Frame Structures, Masonry Stone Structures, others).
- Total number of floors in the building.
- The damage condition of the building (free of damage, slightly damaged, moderately damaged).
- Gross square meter (m²) of the dwelling (apartment).
- Type of usage of the dwelling (apartment) (residential home, business establishment, office and others).

4.8. Distribution Channels

Compulsory Earthquake Insurance policies are arranged through the accredited insurance companies and agents belonging to these companies in the name and on behalf of the TCIP. Currently 24 accredited insurance companies and their agents are providing Compulsory Earthquake Insurance in the name and on behalf of the TCIP.

The TCIP has contractual agreement with the insurance companies. Insurance companies are obliged to pay the total of monthly premium amount to the TCIP at the beginning of the following month.

5. Loss and Claim Payment

5.1. Notice of Claims

The citizens whose homes are damaged as a result of earthquake and those who have Compulsory Earthquake Insurance policy should consult one of the indicated options as soon as possible:

- TCIP Call Center.
- Website of TCIP.
- An insurance company or agent who issued the Compulsory Earthquake Insurance policy on behalf of TCIP.

5.2. Required Documents for Notice of Claims

In case of damage the documents and information to be forwarded to the TCIP:

- The claim form.
- A photocopy of the policy.
- A photocopy of the title deed.
- The full address of the damaged location in order for the expert to find the damaged location easily and to assess the damage.
- Telephone number or cell phone number to get in touch with the insured.

5.3. Assessment of Loss and Claim Payments

Loss adjustment is one of the most critical issues in the whole operation of the TCIP system. Accuracy, speed and homogeneity in calculation of loss increase public confidence. The basic task of a TCIP loss adjuster is to determine the cost of damage. TCIP retains loss adjusters already employed in the property insurance industry. TCIP offers a training program for individuals with professional civil engineering knowledge.

The TCIP is a first loss policy and the loss amount is determined on new construction value and there is a deductible of 2% of the total insured value. In claim adjustment, new construction cost of the building according to current market price is reckoned at the time and location of the earthquake. The claim, taken directly or through the accredited insurance companies, is evaluated by TCIP, who then opens claim files and employs a claims adjuster. After the assessment of the claim, claim payments are made as soon as possible usually within one month and in case of further assessment of damages advance payments are made to the insured.

6. Reinsurance

Risk charge depends primarily on the probable maximum loss (PML). In the case of the TCIP, the PML is defined as the largest likely loss to insured dwellings from an earthquake with a 150-year return period. Below is a table of reinsurance structure of TCIP for 2007 run by a panel of four international brokers. Protection limits are set after detailed study of various earthquake simulations.

REINSURANCE STRUCTURE

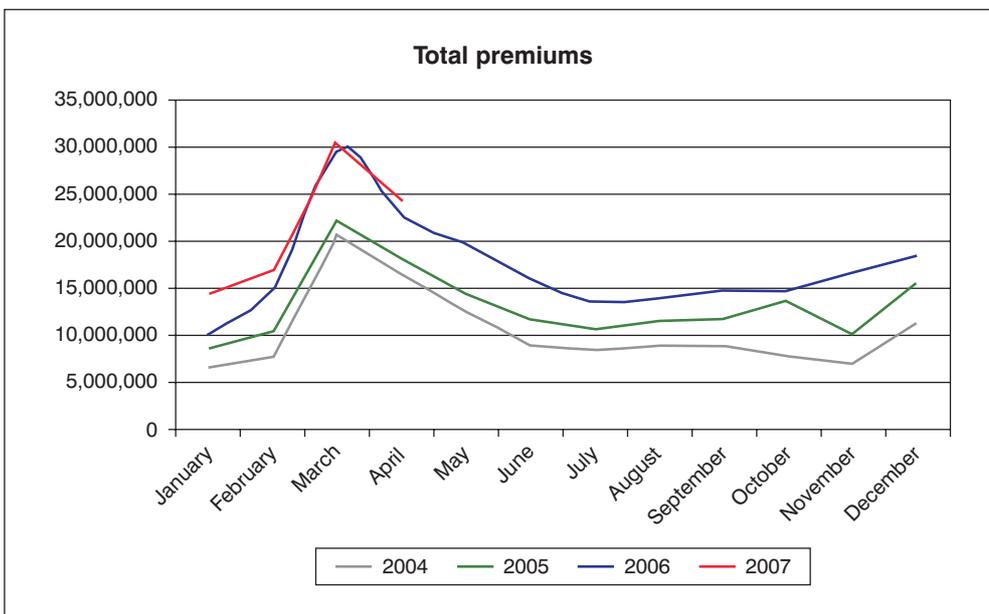
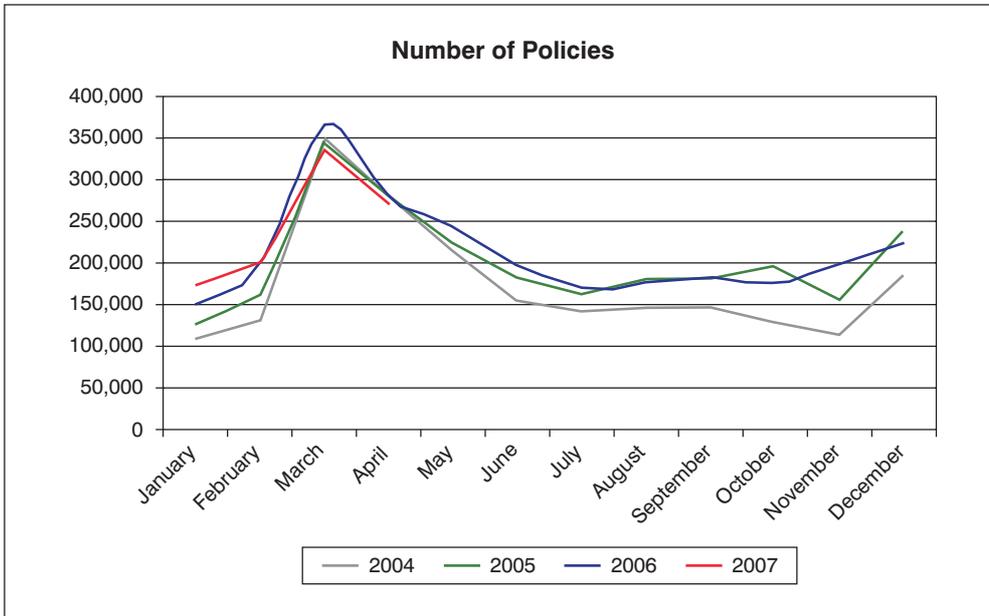
Limit of protection (Euros)	2006-2007
1,000,000,000	R/I
625,000,000	R/I
425,000,000	R/I
250,000,000	R/I
150,000,000	R/I
80,000,000	R/I
	Priority - TCPI

7. Stats about the Portfolio of the TCIP

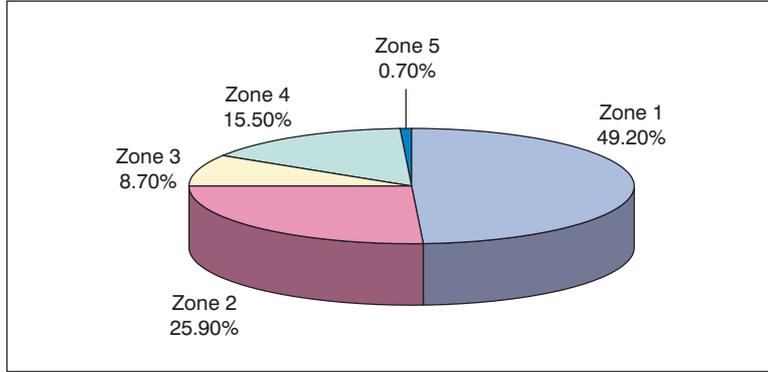
7.1. Basic Figures (April 2007)

Total n.º of policies	2,551,367
Total Sum Insured	NTL 114,382,586,620
Total Annual Premium	NTL 216,765,200
Avg. Sum Insured	NTL 44,832
Avg. Premium	NTL 85
Growth by number of policies	0.83%
Total number of Paid Claim Files	9,218
Total Claims Paid (from 2000)	NTL 18,016,723

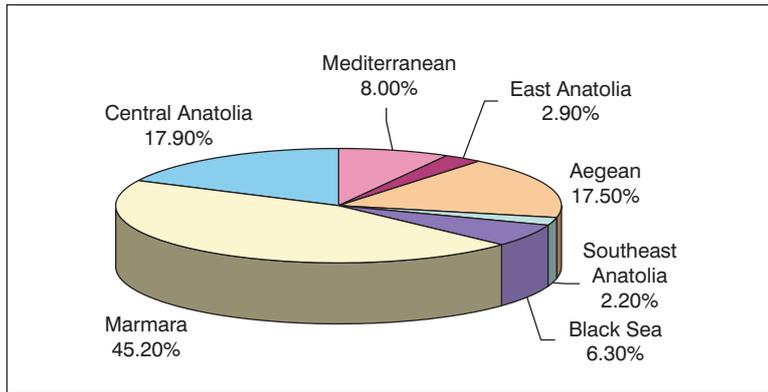
7.2. Number of Policies and Premium Production Tables (2004-2007)



7.3. Distribution of Portfolio by Risk Zones



7.4. Distribution of Portfolio by Geographic Regions



severe floods caused great damage, with insured losses to the order of GBP 3 billion, in 165,000 claims¹⁰.

Climate change is an important factor to be taken into account in forecasting flood risk because, among other things, it is probable that by 2040 the water level in the North Sea will have risen by 40 cm. Consequently, counting solely existing properties, those at risk would rise from 270,000 in eastern England (currently threatened) to 404,000, and with current defence levels, coastal flood losses would stand between GBP 7.5 billion and 16 billion. At present sea levels, this potential coastal flood loss is between GBP 2.5 billion and 6.2 billion¹¹.

Finally it must be indicated that earthquake risk is low, although it must be taken into account, as there have been shakes not so long ago of more than magnitude 5 like that affecting the Lley Peninsula in July 1984 (magnitude 5.4) and that recorded at Bishops Castle in April 1990 (magnitude 5.1). The 2002 Dudley earthquake was 4.7 and the one at Folkestone in April 2007 registered magnitude 4.2¹². A 100 year recurrence is estimated of shakes of magnitude 5.6.

2. Natural Perils Cover

The natural perils coverage is assigned in the United Kingdom to private entities which, in general, include it among the basic guarantees in commercial and household policies. The insurance companies reinsure these risks on the private market, with no State intervention in either direct insurance or reinsurance. In fact, in the realm of natural disasters loss compensation, more specifically in connection with indemnification arising from assurance, the United Kingdom's solutions have in general tended not toward a particular coverage system based on solidarity and underwritten by the public authorities but toward the path of the private market¹³.

There are two types of household policy: for buildings and for contents, which do not have to be acquired from the same insurer. Building policies, which are often taken as a means of obtaining a mortgage, cover the structure, installations (bathrooms, kitchen, etc.) and the home decorations, and in general also include garages and greenhouses but, depending on the type of policy, do not always cover walls, fences, doors, paths or swimming pools. The risks covered include not just the ordinary perils (fire, theft, etc.), but also earthquake, storm, flood, subsidence and landslides. Deductibles can be applied to all or some indemnifications, depending on the type of damage and its cause, as provided for in the policies, although a deductible is common to all in case of subsidence or landslide. Content policy cover takes in furnishings, kitchen utensils, food, drink, television, video, computers, musical equipment, clothing and personal effects, and items of value up to a given limit. The risks covered are the same as those in the building policy, and deductibles may be applied, according to the terms of the contracts. War and radioactive pollution losses are excluded from both types of policies¹⁴.

According to data from the Association of British Insurers (ABI), 90% of households across the United Kingdom have building insurance, and 75% have content insurance¹⁵.

It is a criterion of the English market, imbued with the spirit marking its special insurance tradition, that there is in principle no risk which cannot be insured, with the backing of adequate distribution

¹⁰ ABI: "Summer floods 2007: learning the lessons". November 2007; p. 19.

¹¹ ABI: "Coastal Flood Risk. Thinking for Tomorrow, Acting Today". November 2006; pp. 4 y 20.

¹² BGS: www.earthquakes.bgs.ac.uk/.

¹³ *Vid.* Huber, Michael and Amodu, Tola: "United Kingdom". En M. Faure and T. Hartlief (eds.): *Financial Compensation for Victims of Catastrophes. A Comparative Legal Approach*. Tort and Insurance Law, vol. 14, Vienna/New York. Springer; 2006; p. 261.

¹⁴ ABI: "Household and Property Insurance" (www.abi.org.uk).

¹⁵ ABI: "Summer floods 2007: learning the lessons". November 2007; p. 6.

via reinsurance. That has also stood for natural disasters, although in that respect some things, particularly related to flood cover, have been changing, fundamentally since the beginning of the nineties.

3. Flood Cover: a Special Case

Following the 1953 disaster, a private flood insurance scheme was inaugurated, the product of a gentlemen's agreement between the British Government and the insurance market¹⁶. This is an informal understanding whereby the insurers undertake to offer flood guarantee to the owners of homes and small businesses, even in risk-prone areas. This generated a private system for flood cover which some writers considered to be "*de facto*" obligatory because of its high degree of penetration, of between 75 and 95%. It must be remembered that all homeowners wishing to secure a mortgage credit, must take flood cover¹⁷.

As a result of the arrangement, and since then (the beginning of the sixties), with some modifications provoked by major catastrophic losses, the market has enjoyed an acceptable stability in flood cover, available to all those interested throughout the country, at standard prices¹⁸. The other side of the coin was the government's obligation to provide sufficient flood protection, with structural work to enhance defences and better plan land use.

The increased value of exposure, the concentration of people and property in certain risk areas¹⁹, the greater frequency and intensity of certain natural events, the forecast effects of climate change (among other things, rising sea levels), and the catastrophic experience of a number of major events, called the system into question as the insurers warned that it would be impossible for them to continue to offer cover if rising trends in losses were not matched by greater government intervention in reducing risks.

The likely impossibility of continuing to provide cover threatened to become a political problem which it was thought would lead to Government intervention to create a flood cover mechanism similar to that set up with the "Pool Re" for terrorism. It is an idea which is put on the table from time to time²⁰.

Following the Autumn 2000 floods, the Association of British Insurers (ABI) revised its position on flood cover²¹ and, as a result, in 2002 issued a Declaration of Principles in which the market undertook to continue to offer cover under standard conditions for households and small businesses with flood risk not in excess of one event every 75 years²², but at the same time identifying areas in which the Government must become involved in turn. These areas referred basically to increased investment in the enhancement of flood defences, more effective planning of land use to prevent the entry of properties into risk areas, and the rationalisation and reorganisation of the administrative bodies with jurisdiction in the matter²³.

¹⁶ Huber, Michael: "Reforming the UK flood insurance regime. The breakdown of a Gentlemen's Agreement. ESRC-CARR". *Discussion Paper* n.º 18, January 2004; p. 2.

¹⁷ Huber, Michael and Amodu, Tola: *Op. cit.*; pp. 272-274.

¹⁸ Insurance Day: "Questions for a stable market". November 23, 1995. Also, Berry, Dean: "UK catastrophe perils". In the meeting "National Catastrophe Risk Workshop", organized by Sedwick Payne Insurance Strategy Ltd. The Salish Lodge, Snoqualmie (Washington), 22-23 July, 1994.

¹⁹ Greater construction in risk areas has been one of the factors causing most distortion in insurance available to cover flood. In fact, 11% of new homes built in England between 1997 and 2000 are located in flood risk zones. *Vid.* Crichton, David: "Flood Risk & Insurance in England and Wales: Are there Lessons to be Learned from Scotland?". Benfield Hazard Research Centre. *Technical Paper*; n.º 1. March 2005; pp. 13 y 87.

²⁰ *Ibidem*: p. 125.

²¹ *Catastrophe Reinsurance Newsletter*; Issue 107, January 2002; pp. 6-9.

²² ABI: "Summer floods 2007: learning the lessons". November 2007; p. 6.

²³ ABI: News Release, 26 September 2002 (www.abi.org.uk).

A new adaptation of the gentlemen's agreement came into effect at the beginning of 2003 which, while maintaining the original objectives of providing cover to the majority of households and small businesses, introduced some changes in the way the market operated. A distinction was made between risk levels, with premiums varying according to the degree of exposure, and greater prevention commitments were demanded of the insured people than required under the public regulation in this field ²⁴.

In November 2005, the Association of British Insurers made changes to its Declaration of Principles, updating the gentlemen's agreement with a new version effective as of 1 January 2006. In this version, flood cover would continue to be offered to the owners of homes and small businesses in areas where flood protection is reduced to an annual probability of 1.3% (once every 75 years). Cover is also offered to owners exposed to significant risk but who, by means of protective improvements over a five-year term, according to government commitment, might reduce annual likelihood of flood to that figure of 1.3%. For the remaining properties in high-risk zones, the possibility for cover is made subject to case-by-base study. ABI nonetheless recalls that performance of its commitment will depend on the government's involvement in risk-reduction (structural defences, improved drainage, land-use planning...), also taking account of the effect of climate change ²⁵.

The latest episode in ABI claims for the government to become more involved in flood risk mitigation with substantially increased investment in structural flood protection occurred following the summer 2007 floods. The Insurers' Association openly criticised the government for failing to assign sufficient outlay in these defences, so defaulting on its part in the attempt to continue to make continuing flood cover possible ²⁶.

Following those floods, the government announced that flood defence investment would rise, from GBP 600 million per annum to 800 million between 2010 and 2011. The insurers considered these sums insufficient ²⁷.

Once more, in a document published in November 2007, the ABI demanded thorough and serious government involvement in flood risk reduction, seeking institutional reform of the bodies concerned, suggesting the design and development of long-term preventive strategic plans (to 25 years), the approval of new compulsory building codes etc. ²⁸. Also in this document, the ABI reported that the Declaration of Principles with the Government was under review, while stating the willingness of the insurance market to continue to offer accessible cover to the largest possible number of insured ²⁹.

4. Equalisation Reserves

British insurers have been required since 1996 to create equalisation reserves ³⁰, the amount of which is defined in each insurance branch in terms of a percentage of policies issued, net of reinsurance.

²⁴ Huber, Michael: "Reforming the UK flood insurance regime. The breakdown of a Gentlemen's Agreement. ESRC-CARR". *Discussion Paper* n.° 18, January, 2004.

²⁵ ABI: News Release. Friday, 11 November 2005. Ref. 118/05. And also, ABI: "ABI Statement of principles on the provision of flood insurance". Updated version, November 2005 (www.abi.org.uk/Display/File/Child/553/statementofprinciples2005.pdf).

²⁶ ABI: News Release, 9 October 2007; Ref: 97/07 (www.abi.org.uk).

²⁷ www.businessinsurance.com/cgi-bin/news.pl?newsId=11296.

²⁸ ABI: "Summer floods 2007: learning the lessons". November 2007

²⁹ *Ibidem*: p. 24.

³⁰ *Catastrophe Reinsurance Newsletter*, n.° 34, December 1995.

UNITED STATES

1. Natural disasters ¹

The vast territory of the United States has broad experience in almost all the wide variety of possible natural disasters. Added to the inherent virulence of natural phenomena is the great vulnerability of some zones because of their concentration of persons and property. The result is, since the beginning of the nineties, an overwhelming experience of disaster claims of a damaging force hard to imagine prior to the catastrophes of hurricane Andrew (1992) and the Northridge earthquake (1994), whose loss levels were amply exceeded by hurricane Katrina (August 2005), which caused insured losses of more than USD 68.5 billion (indexed to 2007) ². Hurricanes and earthquakes are, together with tornados and flooding, the dangers of greatest destructive capacity in the United States, while not ignoring other risks like volcanic eruption, subsidence, hail, avalanche, ice storms and major forest fires.



Of the ten most costly disasters in the United States, eight were hurricanes. The remaining two were the terrorist attack on the World Trade Center (2001) and the Northridge earthquake (1994). And in the last 20 years, disaster losses in that country were fundamentally climatic in origin, with hurricanes, storms, tornados, hail and flooding accounting for nearly 83% of those losses. Hurricanes stand out as the cause of 46.3% of damage ³.

2. Disaster Insurance in the United States. General features

2.1. Covers

It is widely-established practice in the United States, for both residential and commercial policies in property lines, to commonly provide cover, generally in all-risk form, for damage caused by fire and explosion, wind (hurricane and tornado), hail, volcanic eruption and riots. Flooding is part of exclusions from household insurance, although it is covered by standard motor vehicle policies, and some special commercial policies, and particularly by the federal cover system introduced through the National Flood Insurance Program, discussed below ⁴. For damage as a consequence

¹ This chapter has been prepared with the special contribution of Daniel Marshall (California Earthquake Authority-CEA), Anne Bert (Florida Hurricane Catastrophe Fund-FHCF) and Lloyd Lim (Hawaii Hurricane Relief Fund-HHRF).

² Swiss Re: "Natural Catastrophes and Man-Made Disasters in 2007: High Losses in Europe". *Sigma*, n.º 1/2008; p. 40.

³ Insurance Information Institute: "Catastrophe: Insurance Issues". The Topic; February 2008 (www.iii.org/media/hottopics/insurance/catastrophes/).

⁴ Insurance Information Institute: *Op. cit.* Also, Guy Carpenter: *The World Catastrophe Reinsurance Market: New Capital Stabilizes Market*. 2007 (September); p. 11 (gcportal.guycarp.com/portal/extranet/popup/insights/reportsPDF/2007/2007%20World%20Catastrophe%20Report.pdf).

of hurricane and tropical storm, a distinction must be made between those caused by wind and those from flooding which, as mentioned, are the object of different cover.

Earthquake risk is also excluded from cover under standard household or commercial policies, although it is possible in most states to contract this guarantee as an annex to such policies, or in separate policies⁵. Landslide is not insurable on the market, except if a consequence of earthquake or flood, where it is included in each of these covers.

There is one fact with a profound effect on natural disaster cover in the United States: US legislation, unlike that in many other countries, does not allow provision to be made for anticipated loss in dealing with claim-rate fluctuations at the time of future disasters. Moreover, any such reserve would be taxed. Modifications to this regime, demanded by many insurers, is a matter which, in the meantime, draws little support in the United States legislative Chambers⁶.

2.2. Public Participation in Natural Disaster Cover

In the United States, public involvement (the Federal Administration or individual States) in compensating loss as a consequence of natural disasters is by no means new, and has arisen fundamentally through the channels of direct aid, official soft loans and insurance cover. For the last of these, public action has, in general, to a greater or lesser extent, been implemented in co-operation with the private market which, in turn, according to state and risk, has offered cover for its own account for one or some natural disasters.

The major damage caused or foreseen to be caused in broad areas of the country by one natural event or another, and the impossibility for the private insurance market of taking them on, are the reasons justifying public intervention in natural disaster cover. The aim of such intervention is not merely to fill a gap in the insurance field, but also, by those means, to limit the preponderance of direct aid as an instrument of assistance for disaster loss. The collaboration of the private market must however be highlighted in the functioning of the cover systems and mechanisms in which the authorities intervene in more committed form.

In general, the public powers have moved in this area by fine-tuning integrated programmes, i.e. not just creating a cover system but to complement it with preventive and loss-cutting measures.

This drive has been deployed in a variety of public initiatives, notable among these the following, which remain in place and are currently relevant:

- Flood risk: the National Flood Insurance Program-NFIP, of federal scope.
- For hurricane: state funds such as those in Florida (the Florida Hurricane Catastrophe Fund-FHCF) and Hawaii (the Hawaii Hurricane Relief Fund-HHRF).
- For earthquake: the mechanism facilitated in California through the California Earthquake Authority-CEA, also state-wide.

However, despite these initiatives, continually battered at the time of each disaster, and admitted often ungraciously and with no little resistance in the insurance market (fundamentally in relation to state schemes), many believe they have yet to find the mechanisms which guarantee a degree of continuity and a combination of the objectives traditionally pursued: greater private mar-

⁵ *Ibidem*.

⁶ Panko, Ron: "Panacea or Boondoggle?". *Best's Review*, September 2006; pp. 80-85.

ket participation; a higher level of assurance; better design and application of preventive and loss-reduction measures; a lesser role for direct aid; better management of that aid; and a financial balance in insurance and aid programmes application.

In pursuit of those objectives, the history of this type of cover has been beset by revisions, proposals, studies, projects, some significant achievements, and some failures. Thus, following hurricane Katrina (August 2005), a variety of proposals appeared to enhance the availability of insurance as protection against disasters. Many such initiatives refer to the contingency of public backing, most of them emphasising three main aspects: the commercialisation of insurance by the private insurance companies; the creation of regional or state pools to provide reinsurance for the insurers operating in each State; and the establishment of a national, multi-peril disaster or mega-disaster fund. At the same time, some Atlantic coast states are examining the possibility of creating instruments similar to the Florida Hurricane Catastrophe Fund, discussed below ⁷.

3. Flooding: The National Flood Insurance Program (NFIP)

3.1. Introduction

From the first decades of last century, the Federal Government was impelled to become involved in the problem of flood risk control ⁸, although there were early antecedents to that in the incipient flood prevention work done in the United States in the eighteen seventies ⁹.

It was traditionally considered that flood risk cover could not be assumed on the US private market because of the catastrophic nature of the losses, the repetitive nature of claims, and the adverse selection such risk produced ¹⁰. On 1 August 1968, Congress passed the National Flood Insurance Act setting up the National Flood Insurance Program - NFIP ¹¹. The aim of this national Program was to make flood cover possible particularly in zones most susceptible to the risk (the so-called Special Flood Hazard Areas - SFHAs, dealt with below), using risk-grouping and cost-minimising procedures, and encouraging state and local governments to regulate their territory and prevent flooding. Thus the NFIP combines three fundamental aspects: the availability of property damage insurance, solely to owners and tenants of residential and commercial properties

⁷ Insurance Information Institute: "Residual Markets". The Topic. September 2006 (www.iii.org/media/hottopics/insurance/residual/).

⁸ The 1936 Flood Control Act, and the Federal Flood Insurance Act, 1956.

⁹ Alexander, D.: *Natural Disasters*. London, UCL Press, 1993; pp. 141 et seq.

¹⁰ At the beginning of April 2006, news appeared that the *Chubb of Insurance Companies* Group had launched a new flood policy (Personal Flood Insurance) with indemnification limits up to USD 15 million jointly for premises and content.

¹¹ A comprehensive description of the system, which has provided the basis for this section, can be found at:

— FEMA: "National Flood Insurance Program. Answers to Questions about the NFIP". F-084 (5/06) (www.fema.gov).

— FEMA: "National Flood Insurance Program. Flood Insurance Manual". May 2005 (incorpora actualizaciones a octubre de 2006). *Vid.* www.fema.gov.

— General Accounting Office-GAO: "Federal Emergency Management Agency. Challenges facing the National Flood Insurance Program" (GAO-06-174T). October 18, 2005 (www.gao.gov).

— General Accounting Office-GAO: "Federal Emergency Management Agency. Improvements Needed to Enhance Oversight and Management of the National Flood Insurance Program" (GAO-06-119). October 2005 (www.gao.gov).

— Hartwig, Robert P. y Wilkinson, Claire: "Public/Private Mechanism for Handling Catastrophic Risks in the United States". Insurance Information Institute; October 2005 (www.iiidaily.com/iiidisasterpaper.pdf).

— Pasterik, Edward T: "The National Flood Insurance Program". En Kunreuther, Howard y Roth, Richard J.: *Paying the Price: The Status and Role of Insurance against Natural Disasters in the United States*. Joseph Enry Press; Washington, 1998; pp. 125-154.

belonging to communities integrated into the Program (individual insurance is possible only in these community terms); the preparation of maps identifying the areas of greatest flood risk (SFHAs); and incentives for communities to adopt and strengthen the rules for management of floodplains¹².

Since its creation in 1968, the NFIP has undergone some modifications, such as those introduced in two legislative provisions: the 1973 Flood Disaster Protection Act (following the experience of tropical storm *Agnes* in 1972) making this insurance compulsory for entitlement to some forms of federal aid and to benefit from federal or federal-government-backed mortgage credits; and the National Flood Insurance Reform Act in 1994 (following the disaster caused by the 1993 Mississippi floods) which inaugurated new mechanisms strengthening the terms of the 1973 Act. These included the Flood Mitigation Assistance Grant Program, inclusion of the Increased Cost of Compliance Coverage in the standard flood policy, etc.

In 2004, President Bush signed the Flood Insurance Reform Act, extending the NFIP's term until 2008¹³.

3.2. Institutional Organisation

The Flood Insurance Act was originally part of the Housing and Urban Development Act, attaching the NFIP to the jurisdiction and supervision of the U.S. Department of Housing and Urban Development-HUD. Within this Department, the Program was administered by the Federal Insurance Administration-FIA, outsourcing sales promotion, issue of policies, assessment of claims and other similar activities to a service enterprise called Electronic Data System Federal Corporation (EDS)¹⁴.

The organisation was modified in 1979 with the creation of the Federal Emergency Management Agency - FEMA as the point of contact within the Federal Government for the management of activities in emergencies. The FEMA has since then been in charge of the Program's implementation, taking on the function of insurer, while the FIA directly runs the NFIP Programme and takes on the function of insurer. The FEMA body entrusted with the management of the NFIP Programme is the Mitigation Directorate, which also handles matters most directly related to prevention. At this time, and since March 2003, the FEMA is attached to the Department of Homeland Security.

3.3. NFIP Integration: Forms of Participation and Insurance Possibilities

Communities' involvement¹⁵ in the Program is voluntary, and they must apply to the Federal Insurance Administration (FIA) to participate in the NFIP. As a requisite, they undertake to adopt appropriate preventive measures, assigned to them individually within the NFIP depending on the propensity and vulnerability of each to the risk. Thus, the integration in the NFIP is based on an

¹² General Accounting Office-GAO: "Federal Emergency Management Agency. Challenges facing the National Flood Insurance Program" (GAO-06-174T). October 18, 2005; p. 1.

¹³ Hartwig, Robert P. y Wilkinson, Claire: *Op. cit.*; p. 12.

¹⁴ Webb, B.L. et al.: *Insurance Company Operations* (vol. I). Pennsylvania, American Institute for Property and Liability Underwriters, 1981; p. 152.

¹⁵ A community, for NFIP purposes, is any State, area or political subdivision (Indian tribes, tribal organisations or Alaska towns, etc. included), with power to adopt floodplain management regulations [FEMA: "National Flood Insurance Program. Answers to Questions about the NFIP". F-084 (5/06), p. 4].

understanding between local communities and the federal government, whereby this government will provide flood insurance coverage to the communities which adopt and develop floodplain management regulations to limit future flood risks to new constructions situated in Special Flood Hazard Areas or SFHAs¹⁶. This is the community facet of NFIP cover.

It is possible in communities which adopt flood management measures within FEMA to obtain flood insurance from the NFIP for home and business owners and tenants¹⁷. Insurance can also be acquired by the owners of buildings under construction, joint-owners' associations and the owners of units in residential condominiums¹⁸.

There are two phases for a community's integration into the Program, those involving firstly the Emergency Program, and then the Regular Program.

- a) **The Emergency Program.** This is the initial phase of integration into the NFIP, and is provisional and prior to the Regular Program, applied when a community requests entry to the system. Because the degree of exposure is as yet unknown, at this point limited cover is provided at subsidised rates, fixed nationally, while that community's risk level is analysed. The community involved in this phase must adopt general risk-reduction measures, focusing on future use of their specific flood plan. These measures must be taken in accordance with an initial map —the Flood Hazard Boundary Map or FHBM— which uses estimative methods to indicate the community's flood zone limits, and which is applied until FEMA facilitates it with its appropriate Flood Insurance Rate Map - FIRM. The Regular Program phase then begins¹⁹.
- b) **Regular Program.** A community enters the Regular Program, the final phase of integration into the NFIP, on completion of a detailed engineering study of the flood risk (the Flood Insurance Study - FIS), and it passes ordinances for the management of the flood plan based on the Flood Insurance Rate Map. This map, together with the moderate and minimum risk zones, delimits the SFHAs, which are identified and divided into zones, depending on the flood hazard. The indication of risk zones in the FIRM is used to calculate the rates and actuarial premiums for the flood insurance²⁰. From then on, all cover limits are available²¹.

Should a community which already has its Regular Program apply voluntary risk-reduction measures beyond the minimum standards set by the NFIP, it can benefit from special incentives such as those applied as part of the Community Rating System (CRS) created in 1990. This involves a reduction of the premium payable by those insured, according to a range of regulated possibilities (each of which has its own requisites) and which, as a maximum, may reach a 45% discount²².

If on the other hand a community's flood zone management programme ceases to adjust to NFIP criteria, its insurance may shift into "conditional" status. This situation implies the application of surcharges on rates, for successive maximum one-year terms, and the process can end up

¹⁶ FEMA: "National Flood Insurance Program. Answers to Questions about the NFIP". F-084 (5/06), p.1.

¹⁷ Hartwig, Robert P. and Wilkinson, Claire: *Op. cit.*; p. 2.

¹⁸ FEMA: "National Flood Insurance Program. Answers to Questions about the NFIP". F-084 (5/06), p. 9.

¹⁹ *Ibidem*: p. 5. Also, Hartwig, Robert P. y Wilkinson, Claire: *Op. cit.*; p. 5.

²⁰ FEMA: "National Flood Insurance Program. Flood Insurance Manual". May 1, 2006 (incorpora actualizaciones a octubre de 2006); p. GR 1.

²¹ FEMA: "National Flood Insurance Program. Answers to Questions about the NFIP". F-084 (5/06).

²² *Ibidem*: p. 8.

with the suspension of cover, although a community may re-apply for inclusion in the NFIP, adopting new ordinances which are adjusted to the Program.

Despite this collective framework of the cover, purchasing it continues to depend on the personal and voluntary option of owners. However, owners who have at any point received federal flood disaster aid must insure against this hazard if they wish to continue to benefit from such aid in the future. This is one contribution as an insurance incentive, introduced in the 1994 National Flood Insurance Reform Act, which also reinforced the obligation created by the Flood Disaster Protection Act in 1973 for beneficiaries of federal mortgage credits to acquire cover.

The authorities' insistence on risk-reduction led to the startup of the so-called Hazard Mitigation Grant Program²³ under which state and local governments can receive credits, following a major disaster, with which to take measures to mitigate the risk in order to protect lives and property. Such measures may include the purchase of properties situated in high-flood-risk zones which have been repeatedly damaged.

Finally, the 1982 Coastal Barrier Resources Act, amended in the Coastal Barrier Improvement Act in 1990, prohibits federal financial aid and federal cover for flood in areas in the so-called Coastal Barrier Resources System (CBRS)²⁴. This system was created to dissuade the development of certain areas on the barrier islands and, because of their role as first line of defence against the impact of coastal storms and erosion, to safeguard their ecological integrity. The areas included in the CBRS are located on the Atlantic coasts (including on some islands) and along the shores of the Great Lakes. In these areas, it is not possible to contract federal flood insurance for structures and buildings built or substantially reformed as from 1 October 1983. Buildings constructed prior to that date can secure such cover²⁵.

3.4. Special Flood Hazard Areas (SFHAs) and the Obligation to Insure

Special Flood Hazard Areas are defined as zones with a 1% possibility of flood in any year, also known as a 100 year floodplain²⁶. As will be seen, this definition affects the territorial scope of application of the NFIP.

In principle, as already mentioned, NFIP cover is optional and, although individualised, is granted solely in a collective situation, i.e. the cover is available only if the individual applicant belongs to a community which participates in the NFIP, in compliance with the conditions (zoning by risk level, construction codes, and other risk-prevention and mitigation measures) demanded as part of this flood insurance program. Thus there are three essential facets raised in the implementation of the NFIP: identification, study and evaluation of risk; risk-prevention; and the insuring of the risk²⁷.

The entirely voluntary nature of this cover remained in place until 1973, when The Flood Disaster Protection Act made it compulsory to cover some exposure in areas of special flood risk (SFHAs) in communities participating in the NFIP. Thus owners of homes with mortgage credits

²³ Regulated by the Robert T.: Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288) as amended.

²⁴ FEMA: "National Flood Insurance Program. Flood Insurance Manual". May 1, 2006 (incorporating updates to October 2006); p. CBRS 1.

²⁵ FEMA: "National Flood Insurance Program. Answers to Questions about the NFIP". F-084 (5/06); p. 17.

²⁶ FEMA: www.fema.gov/business/nfip/intnfip.shtm#4.

²⁷ Pasterik, Edward T.: "The National Flood Insurance Program". In Kunreuther, Howard and Roth, Richard J.: *Paying the Price: The Status and Role of Insurance against Natural Disasters in the United States*. Joseph Enry Press; Washington, 1998; pp. 125-154.

granted or secured by federal bodies or credit agencies on properties located in those specific zones must acquire flood insurance for their homes for the value pending of the mortgage, to a 250,000 dollar maximum for one-family dwelling²⁸. Content insurance remains optional, and is contracted separately, in all cases to a cover limit of USD 100,000²⁹.

A 1994 Act, The National Flood Insurance Reform Act, already mentioned, sought to reinforce the objective of that earlier legislation, so that if the owner required to do so did not acquire the cover, the credit entities must do so on their own account, passing the cost on to the owners³⁰.

Moreover, and as a complement to the forgoing, that 1973 Act (later enhanced by its 1994 counterpart) prevents federal agencies from granting disaster aid in the SFHAs of communities which had not joined the NFIP Programme by 1 July 1975, or a year after having been identified as flood-prone. Likewise, and should they have failed to come into the Programme by those dates, the federal agencies involved were prevented from providing financial aid for the acquisition or construction of buildings in those SFHAs³¹.

Similarly, and in line with the two Acts, in SFHA zones of communities in the Programme, the possibility of receiving aid to acquire or construct buildings is conditional upon the subscription of flood insurance³².

But this way of forcing communities most susceptible to risk to participate in the Program does not mean that others, where the hazard is less, cannot join the NFIP. In fact, a quarter of claims to the NFIP come from outside SFHAs³³.

Around 49% of one-family US households in the SFHAs have taken NFIP cover³⁴, and while about a third of the policies under the Program are subscribed away from those zones, the rate of penetration in this case is just 1%. Countrywide, compliance with the insurance obligation is around 75-80%³⁵.

3.5. Types of Policies and Their Commercialisation

3.5.1. *The Standard Flood Insurance Policy and its Categories*

For cover of this risk, the NFIP designed a standard policy (**Standard Flood Insurance Policy - SFIP**) which, depending on the type of risk, may take one of three forms:

- a) **Dwelling Policy Form.** For communities both in the Emergency Program or Regular Program phase, this policy is issued to the owners and tenants of dwellings, or the owners of residential buildings of 2 to 4 households. It covers building and/or content in independent one-family homes (not condominiums); in properties of two to four homes (not con-

²⁸ General Accounting Office-GAO: "Federal Emergency Management Agency. Challenges facing the National Flood Insurance Program" (GAO-06-174T). October 18, 2005; pp. 8-10.

²⁹ General Accounting Office-GAO: "Federal Emergency Management Agency. Improvements Needed to Enhance Oversight and Management of the National Flood Insurance Program" (GAO-06-119). October 2005; pp. 16-17.

³⁰ General Accounting Office-GAO: "Federal Emergency Management Agency. Challenges facing the National Flood Insurance Program" (GAO-06-174T). October 18, 2005; p. 9.

³¹ Dixon, Lloyd; Clancy, Noreen; Seabury, Seth A., and Overton, Adrian: "The National Flood Insurance Program's Market Penetration Rate: estimates and Policy Implications". RAND Corporation (RAND-TR 300). February 2006; p. 1.

³² FEMA: "National Flood Insurance Program. Answers to Questions about the NFIP". F-084 (5/06); p. 12.

³³ Hartwig, Robert P. y Wilkinson, Claire: *Op. cit.*; pp. 12-13.

³⁴ *Ibidem*: p. 15.

³⁵ Dixon, Lloyd; Clancy, Noreen; Seabury, Seth A., and Overton, Adrian: *Op. cit.*, p. 29.

dominiums); in individual homes located in residential condominium buildings; in semi-detached homes and mobile homes”³⁶.

- b) **General Property Policy Form.** It is also issued in the Emergency Program or Regular Program phase to the owners of residential buildings of more than four dwellings, and to owners or tenants of non-residential buildings or units. This policy covers premises and/or content for properties such as hotels with minimum occupancy during six months, apartment buildings, residences, shops, restaurants and other businesses, silos and other agricultural structures, factories, warehouses, churches, schools, non-residential condominiums, condominium buildings for residential use of less than 75% of the land, independent garages, etc.³⁷.

Where a building and its content are owned by a single policyholder, one policy can be issued for both elements, unless the content includes personal property (domestic property), and commercial or business property. In this case, the domestic and commercial content must be insured separately, under the two types of cover already discussed - the Dwelling Policy and General Property Policy.

Cover for the building is not a requisite for content cover, or vice versa.

- c) **Residential Condominium Building Association Policy Form (RCBAP)** This policy covers complete residential buildings (as well as the dwellings comprising them) and - if wished - condominium content. It is issued solely to communities in the Regular Program and condominium associations or communities of owners³⁸.

3.5.2. *Other Types of Policy*

Although contracting generally demands a policy for each building and its contents, to which general conditions and rates are applied, the National Flood Insurance Program (NFIP) under certain circumstances provides for specific forms of contracting which allow either cover for various risks under a single policy or, in special cases, the application of improved terms or reduced rates.

- a) **Scheduled Building Policy (SBP).** Different buildings —a minimum of two and a maximum of ten— belonging to one owner, in the same location and for a single use (homes, small business, etc.) can be insured under a single policy. However and individual sum insured is assigned to each building and its contents. The rules in the standard flood policy are applied to each construction as if these were individual policies³⁹.
- b) **Preferred Risk Policy (PRP).** It has also been possible to contract this type of policy since 1 January 1989, aimed at encouraging insurance in low-flood-risk zones by applying lower than general rates. This type of policy can be contracted for one-family homes and businesses not at the *Emergency Program* stage, and with some additional conditions, including an absence of previous claims for sums or in numbers in excess of certain maximums⁴⁰.

³⁶ FEMA: www.fema.gov/business/nfip/sfip.shtm#1. Also, FEMA: “National Flood Insurance Program. Flood Insurance Manual”. May 1, 2006 (incorporating updates to October 2006); p. GR 2.

³⁷ *Ibidem*.

³⁸ *Ibidem*.

³⁹ FEMA: “National Flood Insurance Program. Answers to Questions about the NFIP”. F-084 (5/06); p. 14.

⁴⁰ Floodsmart-FEMA: www.floodsmart.gov/floodsmart/pages/prp.jsp. Also, Hartwig, Robert P. and Wilkinson, Claire: *Op. cit.*; p. 15. And FEMA: “National Flood Insurance Program. Flood Insurance Manual”. May 1, 2006 (incorporating updates to October 2006); p. PRP 1.

3.5.3. Commercialisation and Management of Cover: The “Write Your Own” System (WYO)

Until 1977, flood insurance in the context of the NFIP was commercialised through a consortium of private companies (the National Flood Insurers Association) which sold the cover through agents and brokers. From 1977, and until 1983, the federal government used agents who dealt directly with the FIA, for whose treatment, training and advice, FEMA set up twelve regional offices throughout the US.

A programme was begun in 1983 with the name of Write Your Own (WYO) to enable private insurance entities to co-operate in divulging and subscribing the standard flood policy. The FIA continues to be responsible for the administration of this WYO programme, including setting rates, designating communities eligible for insurance, and the financial control.

Under this system, the insurance companies subscribe policies in their own name, and are responsible for handling the policy and processing claims, including damage assessment and fixing the indemnification. The private entities are entrusted with the reception, control, deposit and disbursement of funds, and with maintaining administrative relations with those insured. Following payment of indemnifications, the companies send excess premium sums to the National Flood Insurance Fund in the United States Treasury. In turn, the FEMA pays the companies the portion of indemnifications which exceeded their premium revenues. The companies receive a management fee for this activity⁴¹.

The insurance entities use their own procedures for contracting and for remunerating their Agents. However, for the maximum insurable sum, policy conditions and rates, the general rules of the National Flood Insurance Program contained in the Flood Insurance Manual, published by FEMA⁴², apply. In implementing the system, the insurers can draw at all times on the FEMA’s technical assistance, for the interpretation of the cover clauses and the creation of training programmes.

There are 95 private entities participating in the NFIP through the WYO system, and 95% of policies are subscribed by this means. The remaining 5% is commercialised through agents dealing directly with the FEMA⁴³.

It must in any event be emphasised that the NFIP is a system for cover charged to the Federal Administration⁴⁴, so that both if the policy is contracted directly or through the WYO system, it is FEMA which is ultimately responsible for the indemnifications.

In April 2007, the NFIP Programme reached a record of 5.4 million policies in force (the 1978 figure was 1.7 million), belonging to about 20,300 communities⁴⁵.

⁴¹ General Accounting Office-GAO: “Federal Emergency Management Agency. Improvements Needed to Enhance Oversight and Management of the National Flood Insurance Program” (GAO-06-119). October 2005; p. 13.

⁴² FEMA: “National Flood Insurance Program. Flood Insurance Manual”. May 1, 2006 (incorporating updates to October 2006).

⁴³ General Accounting Office-GAO: “Federal Emergency Management Agency. Improvements Needed to Enhance Oversight and Management of the National Flood Insurance Program” (GAO-06-119). October 2005; p. 13.

⁴⁴ 90% of the cost of the flood cover system is subsidised by the Treasury (Alexander, D.: *Natural Disasters*. London, UCL Press, 1993; p. 143).

⁴⁵ General Accounting Office-GAO: “Federal Emergency Management Agency. Ongoing Challenges Facing the National Flood Insurance Program”. October 2, 2007 (GAO-08-118T), p. 5.

3.6. Risk Covered: Flooding

The risk covered by the NFIP, as defined in the Standard Flood Insurance Policy, is the general and temporary state of total or partial flooding of two or more acres of land which is generally dry, or of two or more properties as a result of:

- Overflow of inland or tidal waters.
- Rapid and unusual accumulation or runoff of surface waters (storms, flash floods, abnormally high tides, etc.) of any origin.
- Mud flows.
- Collapse or destabilisation of the terrain along the shore of a lake or other accumulation of water, as a result of erosion or subsidence caused by waves or currents of water exceeding cyclic levels, resulting in flooding as already defined ⁴⁶.

3.7. Exposure and Property Covered

The NFIP covers both buildings and their content, as well as buildings under construction, although in this case with some restrictions. Such buildings ⁴⁷ may be residential (houses, flats, apartments and properly moored mobile homes) or non-residential, including commercial structures. Although these are different covers (each with its premium), buildings and content can be covered under a single policy, but not necessarily. In any case, right to indemnification becomes generally effective (with some exceptions) after a 30 day period of grace following subscription of the cover.

The **cover for buildings** extends to fixed installations, machinery and equipment forming part of them, and materials and supplies for use in the construction or repair of the building insured, when such materials are inside a completely closed structure, whether the building insured or an adjacent one. The Dwelling Form policy also covers additional structures (garages and sheds) but just up to 10% of the amount of cover acquired in insuring the building ⁴⁸.

For **content cover**, the standard policy secures the personal property of the insured and family, and any other for which the insured is responsible. However, certain properties, such as jewels, works of art, precious metals, furs and the like are covered only up to an overall limit per claim of USD 2,500 ⁴⁹. In the case of antiques, only their functional value is covered, and not their artistic value. Banknotes, coins and securities are excluded from the cover.

For non-domestic content, the General Property policy form covers stock, merchandise, supplies and equipment of any sort, except when specifically excluded.

Under the Residential Condominium Building Association Policy, the content covered is that owned by the condominium, namely that in which all the homeowners in the building hold an indi-

⁴⁶ Definition taken from the “*Dwelling Form*” policy, part of the Standard Flood Insurance Policy. FEMA-NFIP.

⁴⁷ For cover purposes, a building is understood as a constructed house or a fixed trailer with permanent moorings, or a structure with two or more rigid external walls, a secure roof and permanently fixed (General Accounting Office-GAO: “Federal Emergency Management Agency. Improvements Needed to Enhance Oversight and Management of the National Flood Insurance Program” (GAO-06-119). October 2005; p. 18).

⁴⁸ FEMA: “National Flood Insurance Program. Flood Insurance Manual”. May 1, 2006 (incorporating updates to October 2006), pp GR 1-GR 12.

⁴⁹ FEMA: “National Flood Insurance Program. Answers to Questions about the NFIP”. F-084 (5/06); p. 19.

visible interest. Thus private content must be guaranteed by each owner in a separate policy under the formula of the Dwelling Form or General Property, depending on content type ⁵⁰.

Property **excluded** from the cover includes ⁵¹:

- Underground constructions, including machinery and equipment, forming part of a building, more than 49% of whose total value is below surface level.
- Constructions completely in or on water, or entirely at sea at high tide. Floating homes are also excluded.
- Storage units, mainly containers, fuel tanks (liquid or gaseous), chemical recipients, reactors, brick kilns and similar articles, except for silos and grain storage buildings which, including their content, are insurable.
- Prefabricated or mobile homes situated in areas of special flood risk and which are not properly moored.
- Covered or open-air swimming pools and marquees.

On the other hand, as a general exclusion, animals, unharvested crops, trees, aircraft, boats, automobiles and other recreational vehicles, including fittings and equipment, are not insured.

Finally, neither the household policy nor a general policy used to insure domestic property covers any form of commercial property.

Some explanation should be given in connection with basements to the effect that while walls, ceilings and floors are not covered, or the personal property they house (provisions and other contents), structural elements are covered, along with essential equipment and other basic machinery for services usually sited and habitually operating in basements.

3.8. Damage Covered

The policy covers physical loss, i.e. the destruction of or real damage to property evidenced in physical changes, and the direct result of flooding (see paragraph 3.6) or other directly flood-derived events (subsidence or collapse of the edges of water courses and coast, sewerage saturation and filtration).

Also, and up to a given limit, the policy covers certain reasonable costs incurred in protecting the insured property from flood damage, such as displacement and storage of the insured content, use of temporary barrages and extraction pumps, and cleanup and rubble removal.

Damage **excluded** includes:

- That caused by earth tremors, subsidence and landslides, and direct rain, snow or hail and storm/hurricane damage.
- Damage arising from conditions created in the building insured or under insured's control.
- Loss of profit, or that arising from interruption of business.
- Alternative accommodation charges.

⁵⁰ FEMA: "National Flood Insurance Program. Flood Insurance Manual". May 1, 2006 (incorporating updates to October 2006), p. GR 3.

⁵¹ General Accounting Office-GAO: "Federal Emergency Management Agency. Improvements Needed to Enhance Oversight and Management of the National Flood Insurance Program" (GAO-06-119). October 2005; p. 19.

- Increased costs of repair or construction arising under any ordinance regulating reconstruction or repair.
- Losses already occurring at the time when the cover became effective.

In connection with reiterated damage suffered by a single exposure, the NFIP provides for Repetitive Loss Properties, referring to any insurable building for which, since 1978, the NFIP has paid four or more claims of more than USD 1,000 each; or two losses in 10 years for a joint sum equal to or more than the real value of the insured property; or three or more losses in any period which, overall, equal or exceed the real value of the insured property⁵². In September 2007, more than 70,000 properties were in this category, accounting for just 1% of all properties insured under the NFIP Programme, but representing between 25 and 30% of claims⁵³.

To reduce the rate of these losses, the Repetitive Loss Properties Strategy was created, whereby buildings which suffered repeated losses could not renew their policies automatically, but rather through the Special Direct Facility - SDF. The SDF requires the insured party to adopt measures to reduce risks and which, once complied with, enable policy renewal to return to its normal procedures⁵⁴.

More serious are the “severe repetitive loss properties”, defined in the 2004 Flood Insurance Reform Act as one-family properties which have received at least USD 20,000 in flood indemnifications as a consequence of four or more claims each of USD 5,000, for that number of losses or when, due to two or more events, indemnifications were received which, overall, exceed the value of the property⁵⁵. In September 2007, there were 8,100 properties in this category⁵⁶.

3.9. The Financing of the NFIP System: Premiums and Credits

Financing is channelled through the National Flood Insurance Fund, using premiums and Treasury credits. The objective was in principle to achieve self-financing from premiums, but these are not set entirely according to actuarial criteria, as Congress authorised subsidies for insurance tariffs to make policies accessible, to encourage people to take them. The upshot is that the premiums turn out to be insufficient⁵⁷. At present, about 25% of those insured benefit from subsidised tariffs⁵⁸.

The factors involved in calculating premiums are the sum insured, the location, age, type of occupancy and building design and, in the SFHAs, its elevation⁵⁹.

However, to overcome the problem of premium shortfall, FEMA is authorised to seek credits from the Treasury of up to USD 1.5 billion, to keep the NFIP solvent, something it has resorted to four times in the 10 years prior to Katrina⁶⁰. In principle, these credits must be repaid to the Treasury

⁵² FEMA: www.fema.gov/business/nfip/replps.shtm.

⁵³ General Accounting Office-GAO: “Federal Emergency Management Agency. Ongoing Challenges Facing the National Flood Insurance Program”. October 2, 2007 (GAO-08-118T), p. 8.

⁵⁴ FEMA: www.fema.gov/business/nfip/replps.shtm.

⁵⁵ General Accounting Office-GAO: “Federal Emergency Management Agency. Challenges facing the National Flood Insurance Program” (GAO-06-174T). October 18, 2005; p. 7 (note 16).

⁵⁶ General Accounting Office-GAO: “Federal Emergency Management Agency. Ongoing Challenges Facing the National Flood Insurance Program”. October 2, 2007 (GAO-08-118T), p. 9.

⁵⁷ *Ibidem*: p. 5.

⁵⁸ Insurance Journal: www.insurancejournal.com/news/national/2007/09/28/83905.htm.

⁵⁹ FEMA: “National Flood Insurance Program. Answers to Questions about the NFIP”. F-084 (5/06); p. 11.

⁶⁰ General Accounting Office-GAO: “Federal Emergency Management Agency. Improvements Needed to Enhance Oversight and Management of the National Flood Insurance Program” (GAO-06-119). October 2005; p. 9.

with interest. Following hurricane Katrina in August 2005, successive increases were approved in the level of credits FEMA can seek, from USD 1.5 billion to 20.8 billion in March 2006⁶¹.

As a result of this situation, the NFIP flood programme has accumulated a debt estimated by the American Academy of Actuaries at more than USD 17 billion⁶².

3.10. Indemnification: Categories and Amounts

The standard flood policy insures up to the real value of the insured properties —understood as the cost of replacement less physical depreciation— or the cost of repair or replacement, whichever is lower.

With Dwelling Form and Residential Condominium Building Association policies, relative only to the buildings, it is possible to insure the total replacement cost, although with the first of these, the insured or the insured's spouse must have lived in the home more than 80% of the year preceding the claim, or more than 80% of the time of ownership if less than a year. To benefit from cover of the replacement cost, the insured must have contracted the policy either for the maximum available to it according to the Program, or for 80% of the replacement of the dwelling at the time of the loss. Moreover, the replacement or repair cost must be more than USD 1,000, or more than 5% of the total insured value of the property. If these requirements are not met, insurance is for the real value as defined above. Damage to content is always indemnified at the real value⁶³.

Separate deductibles are applied for buildings and contents when it comes to indemnification. The NFIP's standard deductible is USD 1,000 during the Emergency Program and, in the Regular Program, USD 1,000 if the Flood Insurance Rate Map is not yet available, USD 500 if it is. In areas catalogued as greater risk (SFHAs) which as yet have no Rate Map, the policyholder can reduce the deductible from USD 1,000 to 500 in exchange for an increased premium⁶⁴.

Finally, it is particularly noteworthy in connection with the amount of the indemnification that, because the National Flood Insurance Program sets maximum insurable sums for each type of community, there is provision, should the insured have taken that maximum, for the standard policy to take priority over any other flood insurance cover which may have been contracted. However, if the cover contracted is less than the maximum, the standard policy takes up just the proportion of the loss represented by the amount contracted, in relation to the lesser of the two following quantities: total flood cover under both policies, or maximum cover available to that insured under the standard policy pursuant to the Program.

The following table indicates the limits of the indemnification for buildings and content, depending of the phase of integration into the NFIP (the Emergency or Regular Program).

As part of the National Flood Insurance Program, if the State or community declares an insured building to be substantially or repeatedly damaged, **Increased Cost of Compliance (ICC)** cover helps to defray the cost of raising, foundations, demolition or relocation of the building, thereby complying with state or local provisions on the management of flood zones, with payments of up to USD 30,000. This guarantee, which is incorporated into the Standard Flood Insur-

⁶¹ General Accounting Office-GAO: "National Flood Insurance Program. FEMA's Management and Oversight of Payments for Insurance Company Services Should be Improved" (GAO-07-1078). September 2007; p. 10.

⁶² Insurance Journal: www.insurancejournal.com/news/national/2007/09/28/83905.htm.

⁶³ General Accounting Office-GAO: "Federal Emergency Management Agency. Improvements Needed to Enhance Oversight and Management of the National Flood Insurance Program" (GAO-06-119). October 2005; pp. 20-21.

⁶⁴ FEMA: "National Flood Insurance Program. Flood Insurance Manual". May 1, 2006 (incorporates updates to October 2006), p. RATE 12.

LIMITS ON INDEMNIFICATION UNDER NFIP COVER (USD)

Residential	Building cover		Contents cover	
	Emergency Program	Regular Program	Emergency Program	Regular Program
One-family dwelling	35.000	250.000	10.000	100.000
2-4 family dwelling	35.000			
Others	residential	100.000		
Residential	Emergency Program	Regular Program	Emergency Program	Regular Program
	100.000	500.000	100.000	500.000

Source: FEMA/NFIP ⁶⁵.

ance Policy, is possible only in SFHA zones and communities in the Regular Program. In any case, the total the policyholder will receive overall for structural physical damage and ICC is always limited by the maximum cover ceiling ⁶⁶.

4. Earthquake Cover in California: The California Earthquake Authority (CEA)

There are some 5,000 earthquakes, of various magnitudes, every year in the US, and California is the state where the earthquake hazard is most evident. Nonetheless, in the twentieth century there were earthquakes in 39 states, the damage from which affected all the country’s 50 states. According to the U.S. Geological Survey, there is a 70% likelihood of a 6.7 magnitude (or greater) earthquake in the San Francisco Bay Area in the next 30 years ⁶⁷.

As pointed out above, in the US in general, standard homeowners or commercial policies do not include cover for earthquake risk, except when specifically contracted as an endorsement to such policies or in separate policies. In the case of most such policies, the insurance covers only damage to buildings and personal property from the seismic shaking, while losses attributable to fire following earthquake (such as from gas explosion induced by earthquake) and water (such as from piping damaged by earthquake) is covered by standard household and commerce policies ⁶⁸. As will be noted below, however, policies issued by the California Earthquake Authority (CEA) are more liberal as regards water-caused losses.

Since the mid-1980s, insurers operating in California have been legally obliged to offer earthquake cover to those subscribing household policies. Until December 1996, insurers could offer the cover directly, in their own policies, or by arrangement with an affiliated or an unrelated

⁶⁵ Chart prepared on the basis of FEMA data (FEMA: “National Flood Insurance Program. Answers to Questions about the NFIP”. F-084 (5/06); p. 19).

⁶⁶ *Ibidem*: p. 22.

⁶⁷ Insurance Information Institute: “Earthquakes: Risk and Insurance Issues”. The Topic; July 2007 ([www.iii.org/ media/hottopics/insurance/earthquake/](http://www.iii.org/media/hottopics/insurance/earthquake/)).

⁶⁸ *Ibidem*.

insurer. When the CEA became operational in December 1996, its “participating insurers” became eligible to offer a CEA policy to satisfy their legal obligation (although the law allowed such insurers to supplement the CEA’s base-level coverages, only one did so, albeit temporarily).

CEA participation by insurers is voluntary.

The history of the CEA reaches back to the Northridge earthquake, which struck the Los Angeles area on 17 January 1994. Occurring in the early morning hours of a clear winter day, its 25 seconds of shaking produced billions (USD) in insured losses and many billions (USD) more in damage to public infrastructure. Northridge was many times more costly in insured loss than the Loma Prieta quake, which occurred in 1989 and produced memorable video images of San Francisco Bay Bridge damage and burning buildings and caused extensive loss of life in a freeway collapse in Oakland, across the Bay from San Francisco.

As insurers began to pay what became billions in Northridge claims, they realized that, while they had succeeded in separating earthquake loss from household policies, they had not appropriately priced the resulting separate cover. As the weeks and months rolled by after the earthquake, paid losses soon outstripped decades of premium. As a result, insurers began to stop or seriously restrict issuance of new household policies, creating fears that insurance-dependent economic functions (such as home sales) would soon suffer - the market restriction eventually reached more than 94%. Fears of a market “meltdown” persuaded the California Insurance Commissioner to propose the CEA.

Over the 1995-96 legislative years, bills by members of both major political parties were signed into law with bipartisan support, and the CEA first accepted risk on December 1, 1996. Insurers representing a California household insurance market-share of just over 70% had agreed to participate and collectively contribute required start-up capital of over USD 700 million.

The CEA, state-managed but (largely) privately-financed, is intended to maintain a basic yet adequate level of household cover.

- As its basic product, it offers an insurance policy authorized by law in 1995 in an effort to counter the post-Northridge market restrictions with a “market-based” solution. Usually called the “mini-policy,” it offers considerably less cover than their household products (especially for contents) and has excess (deductible) of 15% rather than a pre-Northridge standard 10%. Although insurers did not rush to offer the mini-policy in the pre-CEA year, it has become the CEA and market standard.
- The CEA still offers its base-limits mini-policy, but over the past five years the CEA has improved its covers and increased its limits (see below). For example, where a standard mini-policy would allow but USD 5,000 for damaged contents, the CEA policy now allows up to USD 100,000; similarly, CEA limits for additional living expenses and building code upgrade are now much higher than in the basic product. These enhancements are true only of CEA products; non-CEA policies are generally mini-policy limits only.

The CEA ⁶⁹ is neither a state agency nor part of the California Department of Insurance. It is officially termed a “public instrumentality of the State of California” and is overseen by a Governing Board comprising California’s Governor, Treasurer, Insurance Commissioner (as voting members) and Speaker of the California Assembly and Chair of the Senate Rules Committee (as non-voting members).

⁶⁹ The CEA’s official web site is: www.earthquakeinsurance.com.

The business model of the CEA can loosely be termed a “virtual organization”: Its small inside staff (comprising only 29 employees) is robustly supplemented (through multiple consultancy contracts) with a substantial number of outside vendors (for operations such as data management, agent and adjuster training, and audit) and professionals (such as reinsurance intermediaries, specialized legal counsel, and actuarial services). As another point of departure from normal state bureaucracy, the CEA law allows the CEA to operate mostly free of the usual constraints of state agencies, giving the CEA significant and highly advantageous flexibility.

The CEA is today among the world’s largest earthquake insurers for residential properties, providing policies to homeowners, mobile-home owners, condominium-unit owners, and renters throughout California. It currently has some 759,200 policies in force, with a volume of premiums in 2006 of USD 501.2 million.

Seventeen insurers actively participate in the CEA, accounting for more than 70% of the household insurance market in California. CEA’s earthquake insurance market-share is just under 70%. The respective market-share numbers differ from each other because policyholders can accept or reject earthquake cover, and different insurers take different approaches toward the offer and sale of the cover – unlike fire insurance, earthquake insurance is not required as a condition of securing a mortgage.

In fact, in 2006 only about 12% of California household-insurance policyholders acquired the earthquake cover, compared with up to 30% in 1996⁷⁰. It should be noted that the current “penetration rate” is about the same for CEA insurers and non-CEA insurers, indicating that similar product, pricing, and market conditions are likely present across both CEA and non-CEA earthquake covers.

In 1995 when the CEA was first conceived, no organisation like it existed. In fact, whether it could be started up under any conditions was a live question, so the California Legislature stipulated that despite initial enabling legislation, certain conditions had to be satisfied before the CEA could become operational:

- Binding promises of participation and capital contribution by insurers representing at least 70% of California’s household insurance market,
- a successful risk-transfer placement equal to twice the combined capital contributions of initial participants (which, if accomplished, would represent a historic placement), and
- a favorable revenue ruling from the US Internal Revenue Service (IRS), confirming that CEA revenues would not be subject to US income tax.

Sufficient insurer interest and capital was duly obtained, of course, but a series of unusual circumstances made obtaining a final revenue ruling quite difficult, and it took almost until December 1996 to finalize. Among several other attributes of the CEA, the tax issue explains the involvement of public officials in the management of the CEA – “state control” by public officials was a central factor the IRS considered in its ruling that the CEA would pay no income tax⁷¹.

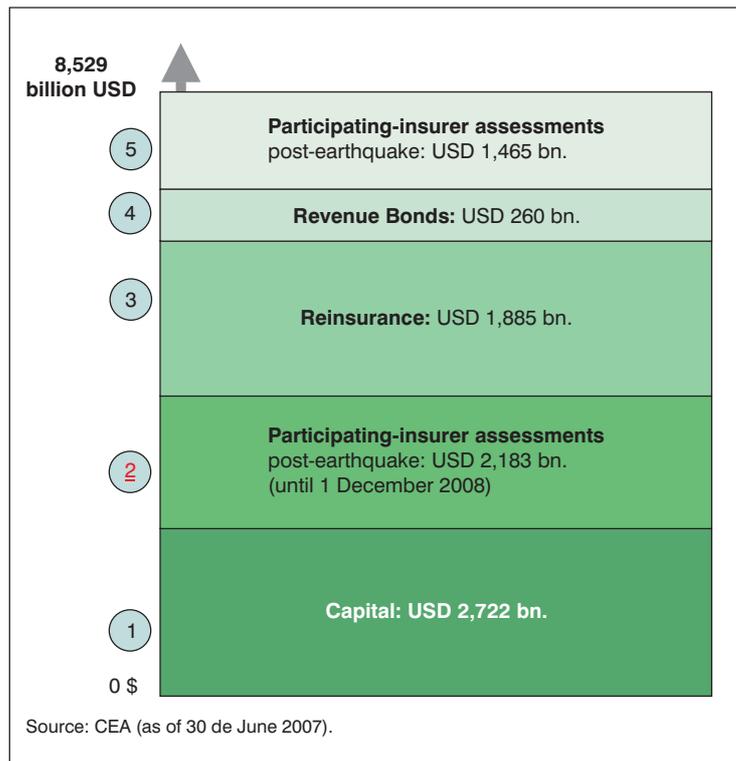
⁷⁰ Insurance Information Institute: “Earthquakes: Risk and Insurance Issues”. The Topic; July 2007 (www.iii.org/media/hottopics/insurance/earthquake/).

⁷¹ The CEA, as an integral part of the State of California, pays no federal income tax—that is, the IRS has determined administratively that because the US Internal Revenue Code does not provide for taxation of states, the states and their political subdivisions are exempt from such taxation. The CEA is not a “political subdivision” of California, however, because it has no taxing or police power—but the IRS also recognizes a category known as an “instrumentality of the state,” an entity that accomplishes a public purpose.

Without question, the tax-free status is an essential requisite for keeping some downward pressure on the price of earthquake insurance in a program that seeks rapid growth in its funds because of the high indemnity liabilities it might face.

As a general proposition, the CEA is not supported or financed through public resources or public budgets ⁷², but by the premiums paid by policyholders, contributions from participating insurers, returns on investments, the premium-tax credit (see footnote) (revenue) bonds, and reinsurance.

As of 30 June 2007, the CEA's financial capacity stood at USD 8.529 billion, considered sufficient to deal with more than three recurrences of the 1994 Northridge earthquake, or with a recurrence of the 1906 San Francisco earthquake and a recurrence of the 1994 Northridge earthquake. Such capacity may not be obvious or may seem counterintuitive, at least until one realizes that the CEA's portfolio, policy, and market share make Northridge only a USD 2.4 billion event for the CEA and San Francisco 1906 a USD 5.6 billion event - the actual insured losses (expressed in current USD) of those historical events were much larger than projected CEA losses, and of course the vast majority of the San Francisco event's insured losses were attributable to fire.



⁷² There is one exception to the “no state funds” statement, and it was important to the IRS: The California constitution provides for a unitary “premium tax” at a 2.35% rate. By law, the CEA is authorized to collect from its policyholders an amount equal to the tax, but the CEA is not required to remit the collected amount to the state. In effect (and by law), this is a “state contribution” to the CEA, which with “state control” is the other primary basis of the integral-part-of-a-state doctrine.

The CEA's financing plan is structured into various segments – the number of segments depends on the financing methods recommended by staff and selected by the Governing Board for a given year.

For a number of years, the Board managed the CEA at a highly conservative capacity, at times ranging up to “1-in-1,300 years”⁷³. In recent years, and especially as risk-transfer capacity became scarcer and much more expensive after the 2004 and 2005 hurricane seasons in the Southeast United States, the Board began to reconsider an appropriate capacity level. Presently, the capacity level stands at 1-in-600 years, and the Board has signalled its willingness to consider 1-in-500 years.

It should be noted that Layer 2, above, will expire on 1 December 2008. There is pending in the California Legislature a bill that, if passed, would assign to participating insurers a *new* assessment layer in the amount of USD 1.3 million – the legislation would place the new layer atop all other layers.

Should an earthquake cause damage beyond the CEA's indemnification capacity, the CEA law permits both pro rata payments and instalment payments, but either of those financial moves would begin what essentially would be a winding-up process led by the insurance regulatory authorities and the Legislature.

The CEA base-limits policy is considered the standard market policy; in fact, the majority of policies offered by non-CEA-participant companies are much like it. Historically and until the aftermath of the Northridge earthquake in 1994, California law required earthquake cover to match the features and limits of the homeowners policy. A pre-CEA (1995) approach to solving the vexing homeowners-market woes, post-Northridge, was a statutory authorization for what has come to be called the “mini-policy”. If the CEA had not been authorized to commence operations the following year, the mini-policy could have been merely an unsuccessful vestige of a “market-based” attempt to fix the broken market. But the CEA law established the mini-policy as the CEA's basic product, and non-CEA insurers followed the CEA lead and issued their own mini-policies.

Perhaps surprisingly to some observers, through an effective reinsurance program and the support of the Governing Board and the insurance regulator, the CEA has been able to price its products competitively, occupying the middle-price range of the California earthquake-insurance market.

The CEA base-limits policy is intended to return a resident to his or her home. The structural damage limit on a dwelling policy is the same as the underlying homeowners policy, but no coverage is provided for common features of a California residence such as swimming pools, patios and their enclosures, most pavement and sidewalks, and detached garages or outbuildings. As provided by law, the standard deductible for the home and its contents is 15% of the structural limit. Contents (or personal property) is indemnified up to a limit of USD 5,000, and accommodation expenses while a home is repaired are covered up to a maximum of USD 1,500 (no deductible applies to the latter coverage).

The CEA sells a number of policies to owners of “mobile-homes,” now often called “manufactured homes.” In the old days, these residences were sometimes called trailers since they could be pulled along the highway by a vehicle – today, they are likely to be large and well anchored to

⁷³ That is, an event or series of events in a single year would render the CEA unable to pay 100% of covered claims and related claim expenses would occur but once in 1,300 years.

the ground, even retrofitted to withstand earthquake shake damage. Essentially, the mobile-home program offers the same features as the dwelling program.

It is crucial in understanding CEA coverages to understand how the dwelling deductible (or “excess”) functions—it is not like the homeowners policies that it accompanies— see footnote ⁷⁴.

Condominium owners are able to cover their individual units up to a limit of USD 25,000, contents to a limit of USD 5,000, and accommodation expenses to a limit of USD 1,500; deductibles are fixed dollar amounts. Note that the CEA does not offer insurance on the structure of the condominium development—that is a commercial coverage the CEA does not write.

Tenants receive no structural coverage and a maximum USD 5,000 coverage for personal belongings and USD 1,500 for accommodation expenses; the deductible is USD 750.

Since 1999, the CEA has offered what it calls its “supplemental program”. The supplemental program offers significant, market-leading benefits to CEA policyholders only – in fact, the CEA believes that the availability of supplemental policy limits (and a lower deductible) are a main driver of CEA policy sales. Most non-CEA insurers offer no comparable product.

In return for an actuarially sound premium, a CEA dwelling policyholder can:

- Increase contents coverage to USD 100,000;
- Increase accommodation expenses to USD 15,000;
- Buy an extra USD 10,000 in “building code upgrade” coverage; and/or
- Lower the policy deductible (excess) from 15% to 10%.

About 25% of CEA policyholders select at least one supplemental coverage or benefit.

In return for the cover, which is instituted through a policy of insurance that is drafted by the CEA and approved by the insurance regulator, policyholders pay a premium which varies according to home value, type and date of construction, the presence of retrofitting measures, and the level of risk where the home is located—there are 19 rating territories. It is estimated that for CEA dwelling policies, the average annual rate for every USD 1,000 of structural cover is USD 3.91.

Following an earthquake, the loss is adjusted by the company that sold the CEA policy. The CEA pays the loss indemnification (according to contractual policy benefits) and pays the participating insurer a fee for its adjusting services and related expenses – insurers can use in-house adjusting staff or contracted adjusters, and from the CEA fee are responsible for all adjustment-related expenses.

All adjusters working on CEA claims must be trained according to CEA standards – in fact, California state law now requires *all* earthquake adjusters to be trained according to CEA-developed standards.

The CEA has also funded and conducted a robust, groundbreaking research program, supporting efforts ranging from seismic science to earthquake engineering, all aimed at helping the CEA (and the public) understand the earthquake risk and make sound insuring decisions. The CEA’s model, provided by EQECAT, was examined over more than two years by multidisciplinary panels of experts – it now represents what the CEA knows to be the true “state of the art” in earthquake models. And responding to expensive adjusting problems following Northridge, CEA-supported

⁷⁴ The deductible (excess) under the CEA homeowners policy is a multiple solely of the structure limit, and only structural damage is taken into account in calculating that excess. Thus, even a sizable loss to contents will be unpaid unless the insured party suffers damage to the premises greater than the excess. If the deductible (excess) is not met, the CEA pays no indemnification whatsoever for the building or for the contents (www.earthquakeauthority.com/index.aspx?id=59&pid=2).

Guidelines are now the consensus for assessing damage to wood-frame housing (>95% of California housing is wood frame).

For policy sales and servicing, participating insurers receive a 10% commission based on the associated premiums – it is the CEA’s understanding that in companies that use agents, the full commission is paid to the agents.

For risk-mitigation and reduction, the CEA assigns 5% of its investment income (or USD 5 million, whichever is less) to prevention programmes. Over the past five years, in addition to its mitigation activities, the CEA has developed into an education “powerhouse” in California, leading organisations such as the United States Geological Survey and the Southern California Earthquake Center to modernise and greatly expand their written, educational, and online product offerings to the public.

5. Hurricane Cover in Florida

5.1. The Florida Hurricane Catastrophe Fund (FHCF)

The convulsions wrought on the home insurance market in Florida by hurricane Andrew (August 1992) are quite similar to those experienced some time later by the California market as a result of the Northridge earthquake (January 1994). Given the serious danger of leaving the household market devoid of hurricane cover—as insurers abandoned the market or drastically reduced their subscriptions—urgent measures were passed in November 1992 to establish a moratorium on policy cancellations: only 5% of cancellations were permitted per annum for state policies, and 10% if the territorial demarcation of the cancellation was a county.

To raise the possibility of securing household insurance in Florida, in November 1993—a little over a year following hurricane Andrew—the Florida Hurricane Catastrophe Fund (FHCF)⁷⁵ was set up. This is a reinsurance programme under which the insurers participating may recover part of their hurricane losses according to a specific reimbursement contract, so providing the insurance company with an incentive to renew their policies. Without State financial backing, it operates as a State agency, and is not taxed. All household insurers authorised to operate in Florida must participate, and it operates under the direction of the “State Board of Administration of Florida” (SBA), entrusted with signing the reimbursement contracts and collecting the premiums from the insurers, which are what replenishes the Fund. The premium rates are set according to the risk exposure - type of dwelling (apartment, condominium, etc.), the type of construction, the risk level of the location, and the level of deductible chosen, and to the percentage of reimbursement (cover level) selected by the company: 45, 75 or 90% of the loss excess in relation to the company’s retention⁷⁶.

A retention multiple is fixed for each level of cover, as follows for the period 2006-2007: for the 90% option, 5.27; for 75%, 6.32; and for 45%, 10.54. Each company’s retention is calculated by multiplying the reimbursement premium for the index linked to the cover level selected.

The Fund’s specific features (tax-exemption, low administrative costs, etc.) makes possible rates for the insurers which are a quarter or third below those on the private market, resulting in better conditions for the expansion of direct insurance.

⁷⁵ www.sbafla.com/fhcf/.

⁷⁶ FHCF: “Reimbursement Contract” (Effective: June 1, 2007). www.paragonbenfield.com/fhcf/pdf/07contract.pdf.

The reimbursement contracts issued by the Fund are for insurers writing residential properties and provide cover against hurricane for structures in Florida (homes, apartments, condominiums, mobile homes) and their contents, along with the so-called Additional Living Expenses (ALE), room charges for when it is impossible to occupy the damaged dwelling. As to the natural risk insured, cover refers to any storm phenomenon catalogued by the National Hurricane Center as a hurricane which causes insured losses in the state, even if subsequently reduced to tropical storm category.

In 2004, the FHCF's capacity to meet indemnification liabilities stood at USD 11 billion, a sum which was increased to USD 15 billion for 2006. Insurers have access to indemnification from the Fund as of a threshold, which is each insurer's FHCF premium share of a market or industry retention limit. For 2006 the industry retention was USD 4.5 billion for the first two storms, then falling to 1.5 billion (or to 1/3) for the following storms. The industry retention is adjusted each year to grow with exposure growth in the state.

Should the Fund's resources prove to be insufficient to meet the FHCF's indemnification liabilities, the SBA can issue bonds, which are funded by an emergency assessment on all property and casualty lines of business excluding workers' compensation, medical malpractice, federal flood, and accident and health. Insurers writing the designated lines collect the assessments from their policyholders. The assessments can be up to 6% for losses occurring in any one year and up to 10% for losses occurring over multiple years. The FHCF was the first programme anywhere in the United States for which the Federal government granted tax exemption to an accumulation of private money, to pay for major natural disasters.

5.2. Citizens Property Insurance Corporation

The FHCF's major beneficiary is the state corporation Citizens Property Insurance Corporation (Citizens)⁷⁷, created in 2002 in a merger of "Florida Residential Property and Casualty Joint Underwriting Association" (FRPCJUA) and "Florida Windstorm Underwriting Association" (FWUA), aimed at providing insurance to homeowners, residential properties and commercial businesses in high-risk zones and to others unable to find cover in the private market. This is tax-exempt.

Citizens has about 1.3 million policies in force in Florida (January 2008), for exposed values totalling more than USD 500 billion, and resource availability to meet claims of the order of USD 9.4 billion⁷⁸. By law, should Citizens be unable to deal with all claims, the other companies must place a surcharge on their household policyholders to fund the public company, the same surcharge which all Citizens' own clients must also pay. If necessary, bonds can also be issued by Citizens, tax-free.

6. Hawaii Hurricane Relief Fund (HHRF)

The Hawaii Hurricane Relief Fund (HHRF) has been dormant since 2002. HHRF will restart if there is a property insurance scarcity in Hawaii.

⁷⁷ www.citizensfla.com/.

⁷⁸ Insurance Information Institute: "Residual Market". The Topic; February 2008 (www.iii.org/media/hottopics/insurance/residual/).

HHRF, a state agency, was created in 1993 following Hurricane Andrew in Florida and Hurricane Iniki on the island of Kauai. In the wake of Hurricane Iniki, homeowner's insurance companies decided to substantially reduce their writings of new and renewal policies. HHRF estimated that about 45% of the market had their homeowner's policies canceled or non renewed. Because the secondary market in mortgage loans requires hurricane coverage for Hawaii homes, banks began to force place homeowners in the surplus lines market at very high rates. The scarcity in property insurance also affected the real estate industry, which of course relies heavily on mortgage lending.

HHRF was enacted in 1993 pursuant to Hawaii Revised Statutes chapter 431P to correct for the market failure that occurred by providing hurricane insurance. HHRF issued its first policy in 1994 and at its peak covered 160,000 policyholders, or about two thirds of the Hawaii residential market. HHRF provided residential coverage. HHRF's commercial lines coverage was never more than 5% of its book of business and was discontinued midway through HHRF's program. Around 2000, private insurers began to return to the Hawaii market and by 2002 HHRF was able to shut down its operations. Since then, hurricane coverage in Hawaii has been provided exclusively by the private market. No hurricane occurred while HHRF was in existence and therefore no claims were ever paid.

HHRF writes its hurricane policy in conjunction with a homeowner's policy written by a private insurance company. The private insurance companies must make a decision whether they wish to participate in HHRF or not. If they do participate, all of their homeowner's policies must be issued with HHRF coverage for hurricane. If they do not participate, they must write the hurricane coverage on their own. HHRF thus enabled these private insurance companies to continue to write their homeowner's business, while simultaneously being substantially shielded from the risk of hurricane (with the exception of assessments discussed below). In return, the private insurance companies acted as HHRF servicing facilities, providing policy issuance, servicing and claims handling.

The HHRF had three primary sources of current revenue: (a) premiums; (b) an assessment on property and casualty premiums of 3.75%; and (c) a fee on recorded mortgages of one tenth of one percent of the principal amount of the mortgage. Following a hurricane, the HHRF may increase its revenue sources by: (a) raising the assessment on property and casualty premiums to 5%, exclusive of motor vehicle; and (b) levying a 7.5% surcharge on property and casualty premiums. The HHRF was exempt from federal and state income tax because it is a state agency.

HHRF's financing structure consisted of four elements: (a) an assessment on the private homeowner's insurers acting as HHRF's servicing facilities of 1.5% of the total coverage provided by HHRF (about USD 600 million); (b) reinsurance (about USD 700 million); (c) revenue bonds of up to USD 500 million issued by the department of budget and finance following a hurricane; and (c) cash reserves of about USD 180 million. Thus, the total current funding available to HHRF was a little less than USD 2 billion. That is enough to handle an Iniki-sized hurricane, but not to handle a Category 4 hurricane hit on Honolulu,

The way HHRF paid for its financing structure was as follows. Premiums were used to pay for reinsurance. The assessment of 3.75% (up to 5%) and the surcharge of 7.5% were pledged to repay the revenue bonds. The mortgage recording fee was used to pay the expenses of the servicing facilities.

HHRF provided a residential insurance policy that is very similar to the standard homeowner's policy offered by a private insurance company with the exception that it does not cover liability and it only covers the peril of hurricane. The base rate was initially USD 1.75 per thousand, but was later reduced to USD 1.49 per thousand. The base rate could be adjusted upwards

or downwards to take account of building construction class and the installation of wind resistive devices.

Hurricane models suggest that the risk of a severe hurricane making landfall in Hawaii is very low. However, it is not a question of “if”, but “when” a hurricane will hit Hawaii. We do not know whether the next hurricane will trigger a property insurance scarcity in Hawaii, but if it does HHRF will be available as a tool to stabilize the market until the private market feels ready to return.

7. Residual Market Mechanisms (RMMs)

RMMs are an important component of the public participation in the treatment of some risks and their assurance, including catastrophic risks among others ⁷⁹. This may take a number of forms: plans, programmes, pools, associations, etc., for both insurance and reinsurance. The company Citizens, already discussed, is a specific example of this type of initiative.

These mechanisms, created under each state’s legislation, are not an alternative to the private market, but are conceived as a last resort in covering risks which that market, given the vast potential for loss from said risks, is not in a position to take on. They are also designed to function temporarily so that they are not greatly developed and tariffs can be applied which are adequate in actuarial terms. Thus they do not seek to replace the private market, or to offer subsidised cover, although in some cases practice does not adhere to this orthodoxy when it comes to rates. Rates lower than technical criteria might advise would be to the detriment of the market, amounting to competition which would dissuade the acquisition of cover on the private market, and because it is the private companies which, in the case of a shortfall in one of these mechanisms, end up taking on the losses equitably.

⁷⁹ The first RMM for cars cover was set up in New Hampshire in 1938. See: Insurance Information Institute: “Residual Markets”. The Topic. September 2006 (www.iii.org/media/hottopics/insurance/residual/).

