Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem

MedPartnership

Together for the Mediterranean Sea

GEF UNEP

Assessment of Banking and Insurance Practices Related to Climate Variability and Change in the Mediterranean

Integration of Climatic Variability and Change into National Strategies to Implement the ICZM Protocol in the Mediterranean

Technical report

September 2015

PAP/RAC

Report:

Assessment of Banking and Insurance Practices Related to Climate Variability and Change in the Mediterranean

This document was prepared under the project "Integration of Climatic Variability and Change into National Strategies to Implement the ICZM Protocol in the Mediterranean", funded by the Global Environment Facility (GEF) and other donors, including the European Commission, and implemented by the United Nations Environment Programme/Mediterranean Action Plan (UNEP/MAP), together with partnering institutions, including the Priority Actions Programme/Regional Activity Centre (PAP/RAC) from Split, Croatia, in cooperation with the Ministry of Environmental and Nature Protection of the Republic of Croatia.

Editor:

Marko Prem, PAP/RAC, Split, Croatia

Author:

Matthieu Wemaëre, Senior Attorney, Law Firm Matthieu Wemaëre Association d'Avocats, Brussels and Paris Bar Associations

Acknowledgement:

Special thanks to Daria Povh Škugor, Senior Programme Officer, and Marko Prem, Deputy Director, PAP/RAC, Split, Croatia

Graphic design:

Studio Quarto, Split, Croatia

Slobodan Pavasović, PAP/RAC Associate, Split, Croatia

Photo:

Cover – Daniel Pavlinović

Back cover – Nino Strmotić/PIXSELL

Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem
MedPartnership

Together for the Mediterranean Sea
GEF UNEP

Assessment of Banking and Insurance Practices Related to Climate Variability and Change in the Mediterranean

Integration of Climatic Variability and Change into National Strategies to Implement the ICZM Protocol in the Mediterranean

Technical report

September 2015

PAP/RAC

Table of Contents

List of Boxes

List of Figures

List of Tables

List of Acronyms

ABI	Association of British Insurers
AON	Application-Oriented Networking
AXA CS	AXA Corporate Solutions
AYII	Agriculture Yield Index Insurance
BH	Bosnia and Herzegovina
BMCI	*Banque marocaine pour le commerce et l'industrie* (Moroccan Bank for Trade and Industry)
BNP	*Banque nationale de Paris* (National Bank of Paris)
BSR	Baltic Sea Region (Programme)
CAMP	Coastal Area Management Programme
CC	Climate Change
CCRA	Climate Change Risk Assessment
CEA	*Comité européen des assurances* (Committee of European Insurance Companies)
CEIGRAM	Research Centre for the Management of Agricultural and Environmental Risks
CEO	Chief Executive Officer
CFO	Chief Financial Officer
Climate-ADAPT	European Climate Adaptation Platform
CLUE	Climate, Land Use, and Energy
CNMA	*Caisse nationale de mutualité agricole* (Agricultural Mutual Assistance Fund)
CO^2	Carbon dioxide
CORINE	Co-ORdinated INformation on the Environment
CTAMA	*Caisse tunisienne d'assurances mutuelles agricoles* (Tunisian Agricultural Mutual Insurance Fund)
CU	Corporate Underwriting
DINAS-COAST	Dynamic and Interactive Assessment of National, Regional and Global Vulnerability of Coastal Zones to Climate Change and Sea-Level Rise
DIVA	Dynamic Interactive Vulnerability Assessment
EC	European Commission
ENPI	European Neighbourhood and Partnership Instrument
ERM	Enterprise Risk Management
ESG	Environmental, Social and corporate Governance
EU	European Union
Europa Re	Europa Reinsurance Facility Ltd.
FGCA	*Fonds de garantie contre les calamités agricoles* (Fund for Agricultural Disasters)
GIIF	Global Index Insurance Facility
FP7	Seventh Framework programme
FYR	Former Yugoslav Republic
GEF	Global Environment Facility
GNP	Gross National Product
ha	hectare
HSBC	Hong Kong & Shanghai Banking Corporation
ICZM	Integrated Coastal Zone Management
IIED	International Institute for the Environment and Development
INRA	*Institut national de la recherche agronomique* (National Agricultural Research Institute)
IPCC	Intergovernmental Panel on Climate Change
IRM	Integrated Risk Management
IT	Information Technology

MAP	Mediterranean Action Plan
MAMDA	*Mutuelle agricole marocaine d'assurance* (Moroccan mutual agricultural insurance)
MODIS	Moderate Resolution Imaging Spectroradiometer
NBD	National Bank of Dubai
NFIP	National Flood Insurance Programme
OTP	*Országos Takarék Pénztár* (Hungarian: General Saving Bank**)**
PAP/RAC	Priority Actions Programme Regional Activity Centre
PBZ	*Privredna banka Zagreb* (Croatian: Privredna Bank Zagreb)
P&C	Property & Casualty
PEGASO	People for Ecosystem Based Governance in Assessing Sustainable Development of Ocean and Coast
PSI	Principles for Sustainable Insurance
PV	Photovoltaic
RCC	Regional Co-operation Council
RCP	Representative Concentration Pathway
SECO	Swiss Secretariat for Economic Affairs
SEEC CRIF	Southeast Europe and Caucasus Catastrophe Risk Insurance Facility
SEE	Southeastern Europe
SMEs	Small and Medium Enterprises
SONAR	Systematic Observation of Notions Associated with Risk
UK	United Kingdom
UBCI	*Union bancaire du commerce et de l'industrie* (Banking Union for Trade and Industry)
UIB	*Union internationale de banques* (International Union of Banks)
ULI	Urban Land Institute
UN	United Nations
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNISDR	United Nations International Strategy for Disaster Reduction
US	United States
VIG	Vienna Insurance Group
WB	World Bank
WFP	World Food Programme
WG	Working Group
WWF	World Wildlife Fund

Introduction

In 2013, the working group I's contribution to the IPCC's Fifth Assessment Report – "*The Physical Science Basis*"[1] – concluded that the "warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia: the atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased". In terms of the increase in global mean surface temperatures, for 2081–2100 relative to 1986–2005, it is projected to be in the ranges of 0.3°C to 1.7°C (Representative Concentration Pathway (RCP)[2] 2.6) and 2.6°C to 4.8°C (RCP 8.5)[3]. The global mean sea-level rise will be in the ranges of 0.26 to 0.55 metres (RCP 2.6) and 0.45 to 0.82 metres for (RCP 8.5).

Chapter 23 of the IPCC's report "*Climate Change 2014: Impacts, Adaptation, and Vulnerability*"[4], which relates to Europe, underlines that "*climate trends and future climate projections show regionally varying changes in temperature and rainfall in Europe: increasing precipitation in Northern Europe and decreasing precipitation in Southern Europe, increase in high temperature extremes, meteorological droughts and heavy precipitation events with variations across Europe*"[5]. Climate change will affect Europe's coastal and marine ecosystems "by altering the biodiversity, functional dynamics and ecosystem services of coastal wetlands, dunes, offshore shelves, seamounts and currents through changes in eutrophication, invasive species, species range shifts, changes in fish stocks and habitat loss"[6]. Similar, but geopolitically specific, predictions are made for each of the other regions of the globe in the chapters that follow.

In respect of the African continent, a reduction in rainfall is expected over northern and south-western countries, with added water stress in those areas and elsewhere, together with agricultural challenges and "substantial" ecosystem changes (see the Figure that follows). Water stress is also a scenario envisaged for the Middle East; however, in that region the understanding of likely impacts is said to be hindered at present by a lack of data on precipitation projections and ecosystem vulnerability. In the Mediterranean Region, for the same period, the change in average surface temperatures is expected to be an increase of between 1.0°C to 1.5°C (RCP 2.6), and of 4.0°C to 5.0°C (RCP 8.5). The average amount of precipitation will be in the range of –10% to 10% (RCP 2.6), and –40% to –10% (RCP 8.5)[7], which signals an inevitable drought.

---

1 IPCC, 2013: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press (summary for policymakers, p. 4).

2 For its Fifth Assessment Report, the IPCC adopted four Representative Concentration Pathways (RCP) which relate to atmospheric concentrations of greenhouse gases. The four RCPs – 2.6, 4.5, 6 and 8.5 – each represents a different future climatic scenario, depending on the extent of greenhouse gas emissions.

3 IPCC, 2014, Climate Change 2014: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Chapter 23, Cambridge University Press, pp. 18-23.

4 IPCC, 2014, Climate Change 2014: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Chapter 23.

5 IPCC, 2014, Climate Change 2014: Impacts, Adaptation, and Vulnerability, supra note 1, p. 1270.

6 IPCC, 2014, Climate Change 2014: Impacts, Adaptation, and Vulnerability, supra note 1, p. 1272.

7 IPCC, 2013: Climate Change 2013: The Physical Science Basis, Summary for policymakers, *supra* note 4, p. 20.

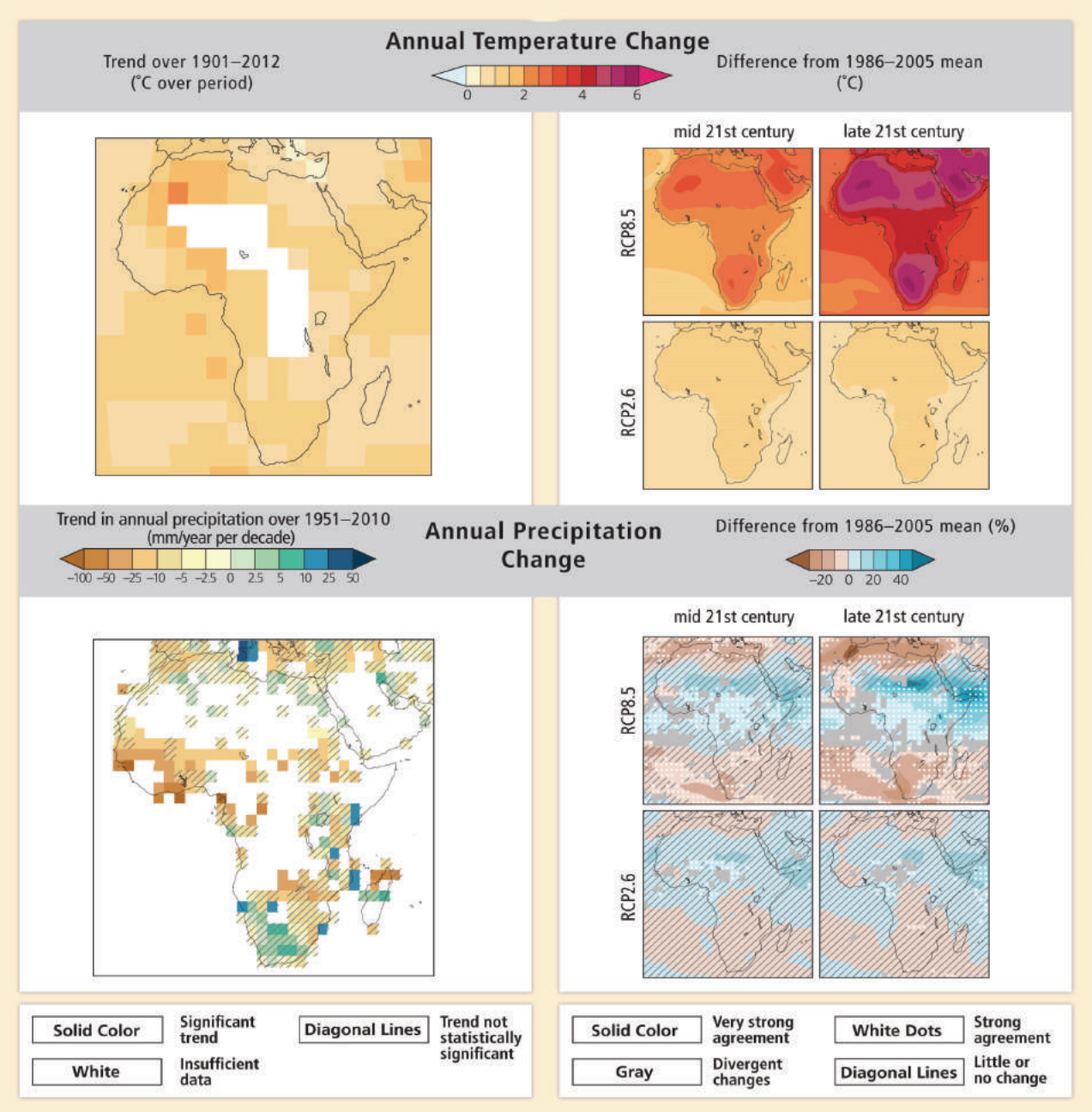

Figure: Observed and projected changes in annual average temperature and precipitation (Source: IPPC 2014 – WGII – AR 5 – Fig. 22-1)

Climate change refers to alterations in the mean and/or the variability of climatic properties persisting for an extended period of time, typically decades or longer[8]. It may be due to natural internal processes, or external ones such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use. The distinction between "climate variability" and "climate change" relates to timescale; "climate variability" is conceptualized as variations in the climate system over short time periods such as months, years or decades (examples of climate variability include extended

[8] IPCC, 2014, Climate Change 2014: Impacts, Adaptation, and Vulnerability, Summary for Policymakers, supra note 1, p. 5 – Article 1 UNFCCC defines climate change as: "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods."

droughts, floods, and conditions that result from periodic El Niño and La Niña events) whereas "climate change" is a long-term trend (periods of decades or longer)[9].

Southern and eastern Mediterranean countries are vulnerable to climate change because of their geographical position and their dependence on climate-sensitive economic sectors. Climate change is expected "to impede economic activity in Southern Europe more than in other regions, and may increase future intra-regional disparity"[10]. It also endangers the living conditions of millions of people on the Mediterranean coast and important economic sectors, such as tourism and agriculture on which the region heavily depends[11]. The IPCC estimates that with no adaptation, coastal flooding in the 2080s is likely to affect between 775,000 and 5.5 million more people per year in the EU27[12]. Allianz, one of the largest global insurers, estimates that around 35 to 40% of insured losses are already due to natural catastrophes (mainly floods and storms)[13].

Natural catastrophes/disasters and climate risks are related yet also distinct from one another. Climate risks are those caused by climate change and which impact upon the environment, people and society, and can include natural disasters exacerbated by climate change. However, not all natural disasters are climate change–related. Generally, natural catastrophes are subdivided into the following categories: floods, storms, earthquakes, droughts/forest fires/heat waves, cold snaps/frost, tsunamis, among others.

The impacts of climate change on populations and infrastructure in coastal regions can be reduced by adaptation[14]. However, the IPPC's report underlines that the world is "*ill-prepared for risks from a changing climate*"[15]. The report points out that risks come from vulnerability (lack of preparedness) and exposure (people or assets in harm's way) overlapping with hazards (triggering climate events or trends) and each of these three components can be targeted by intelligent actions to decrease risk.

In the Mediterranean coastal region, adaptation measures are now being implemented, including in coastal areas. In 1976, sixteen Mediterranean countries and the European Community adopted the Convention for the Protection of the Mediterranean Sea against Pollution (Barcelona Convention[16]). This Convention has given rise to seven Protocols addressing specific aspects of Mediterranean environmental conservation. One of them, the Protocol on Integrated Coastal Zone Management in the Mediterranean ("ICZM Protocol") was signed in January 2008 by 14[17] of the 22 Parties to the Barcelona Convention and entered into force on 24

[9] The IPCC defines climate vulnerability as "the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity".

[10] IPCC, 2014, Climate Change 2014: Impacts, Adaptation, and Vulnerability, supra note 1, p. 1270.

[11] IPCC, 2014, Climate Change 2014: Impacts, Adaptation, and Vulnerability, supra note 1, p. 1271 (After 2050 tourism activity is projected to decrease in Southern Europe).

[12] IPCC, 2014, Climate Change 2014: Impacts, Adaptation, and Vulnerability, supra note 1, p. 1279.

[13] Allianz Group and WWF, Climate Change & Financial Sector: An agenda for action, June 2005, p. 7.

[14] Example: In 2013, total economic losses from catastrophic events were USD 140 billion, down from USD 196 billion in 2012 and well below the 10-year average of USD 190 billion (Swiss Re – Sigma Study).

[15] IPCC Report: A changing climate creates pervasive risks but opportunities exist for effective responses, March 2014.

[16] Renamed since 1976: Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Amendment 2004).

[17] At present, 10 countries have ratified it, out of which 5 are participating in the Project (Albania, Croatia, Montenegro, Syria and Morocco). Two additional participating countries signed the Protocol (Algeria and Tunisia) but they still have to ratify it. Bosnia and Herzegovina, Libya and Egypt have not yet signed it.

March 2011. The EU became a signatory one year later. Of the 15 signatories, ten have so far ratified the Protocol.[18]

The ICZM Protocol is the first "*supra-State legal instrument specifically aimed at coastal zone management and embodies an innovative approach by making an important shift away from the simple framework of soft law provisions in favour of binding legal obligations*"[19]. *It shows how worried Mediterranean countries are about the "risks threatening coastal zones due to climate change which is likely to result … in a rise in sea level, and aware of the need to adopt sustainable measures to reduce the negative impact of natural phenomena*"[20]. *Regarding the risks affecting the coastal zone, Parties should "within the framework of national strategies for integrated coastal zone management, the Parties (…) take prevention, mitigation and adaptation measures to address the effects of natural disasters, in particular of climate change*"[21].

Main projects focusing on climate change variability in the Mediterranean Region

- The Global Environment Facility (GEF) ClimVar project — Integration of Climate Variability and Change into National Strategies to implement the Integrated Coastal Zone Management Protocol in the Mediterranean — aims to integrate climate variability and change into national strategies for the implementation of the Integrated Coastal Zone Management (ICZM) Protocol in the Mediterranean (Plan Bleu participation).
- The European Neighbourhood and Partnership Instrument (ENPI) Clima South project – support for climate change mitigation and adaptation in the ENPI-South region — aims to enhance regional cooperation between the EU and its Mediterranean neighbours (EU-South) and among ENP-South partners themselves (South–South) on climate change mitigation and adaptation, mainly through capacity development and information-sharing.
- The European Climate Adaptation Platform (Climate-ADAPT) aims to support Europe in adapting to climate change.
- The Seventh Framework Programme (FP7) Climate Local Information in the Mediterranean region Responding to User Needs CLIM-RUN project (2011–2014) aims to develop a protocol for applying new methodologies and improved modelling and downscaling tools for providing adequate climate information at regional to local scale, that is relevant to and usable by different sectors of society (policymakers, industry, cities, etc.).

The challenge is to adopt efficient measures to tackle climate change effects in the coastal zone itself. But Mediterranean countries' public and private sector capacity is hampered by "*insufficient data and understanding of the issues, absence of regional assessments of the socio-economic costs of climate change and lack of consensus on policy options and possible response measures*"[22]. Rightly so, the Global Environment Facility (GEF) project untitled "*Integration of Climatic Variability and Change into National Strategies to Implement the ICZM Protocol in the Mediterranean*" aims at supporting countries to undertake climate change variability assessments, enhancing data tools and methods required to develop the most cost-effective

[18] Those that have so far ratified the Protocol are as follows: Albania, Croatia, France, Israel, Montenegro, Morocco, Slovenia, Spain, Syria and the EU.

[19] Rochette Julien and Billé Raphael, "The Mediterranean ICZM Protocol: Paper treaty or wind of change?", Ocean & Coastal Management, n°105, 2015, p. 84.

[20] Protocol on Integrated Coastal Zone Management in the Mediterranean, UNEP, 2008, §5.

[21] Protocol on Integrated Coastal Zone Management in the Mediterranean, UNEP, 2008, Article 22.

[22] UNEP/MED, Integration of Climatic Variability and Change into National Strategies to Implement the ICZM Protocol in the Mediterranean, Inception Report, February 2014, p. 5.

measures through the implementation of the ICZM Protocol, in order to protect the coastal zone from threats posed by climate variability and change[23].

Adaptation measures are required both from the public and the private sectors. With predictions of more frequent and severe extreme weather events and progressive changes in ecosystems, there is an urgent need to engage both sectors in efforts to improve adaptation to climate change. The insurance and banking sectors now realize that they are on the veritable "front line" of climate change risks[24], which are more a threat than an opportunity[25]. Their implication was re-emphasised at the recent UN Climate Summit in New York[26] where the message was that actors from the financial sector, including banks and insurers, must play an important role in building resilience through integrating risk management into business practices.

Climate change poses a major risk to the global economy: it affects the wealth of societies, the availability of resources, the price of energy and the value of companies. Consequently, the banking and insurance sectors face a number of problems related to the accurate pricing of risks, shortage of capital after large loss events and an increasing burden of losses that can affect markets and insurability[27]. By way of example, the banking sector is potentially affected by physical impacts on assets and investments. The insurance industry is affected by drought and storm damage to property and agriculture[28], and faces a new challenge of adapting internal processes, corporate policies and products and services to meet the challenges its clients face[29].

It is expected that the sharing of banking and insurance experiences to address climate change variability will contribute to a smooth implementation of the ICZM Protocol. This study summarizes available best practices in major banking and insurance companies to address climate change and variability in the Mediterranean coastal zone. The purpose is to provide insights into how banking and insurance companies are managing or transferring climate change risks today, in other words, how they include this issue in their internal governance procedures from an awareness campaign to a product or service, which can provide for an incentive to adapt to climate change. This study does mainly focus on property and land insurance, because erosion, rising sea levels and drought in the Mediterranean coastal zone damages are expected to be significant in the future. It provides concrete examples of leading companies' climate risk management practices, and highlights industry trends. Based on existing practices, it puts forward some recommendations to improve the banking and insurance sectors' overall management of climate change risks.

---

[23] UNEP/MED, Integration of Climatic Variability and Change into National Strategies to Implement the ICZM Protocol in the Mediterranean, Inception Report, February 2014, p. 6.

[24] The insurance industry refers to both insurers and reinsurers. Reinsurance is a contract under which a company, the reinsurer, agrees to indemnify an insurance company, the ceding company, against all or part of the primary insurance risks underwritten by the ceding company under one or more insurance contracts (Scor).

[25] Allianz Group and WWF, Climate Change & Financial Sector: An agenda for action, supra note, p. 25.

[26] Climate Summit 2014, Catalysing Action, UN Headquarters, New York, 23 September 2014.

[27] IPCC, 2014, Climate Change 2014: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Chapter 10, Section 10.7: Cost and potentials, Cambridge University Press, pp. 765-767.

[28] IPCC, 2014, Climate Change 2014: Impacts, Adaptation, and Vulnerability, supra note 1, p. 1283. Climate change is increasing the potential for property damage at a rate of between 2 and 4 percent a year (ABI).

[29] Allianz Group and WWF, Climate Change & Financial Sector: An agenda for action, supra note, p. 7.

Methodology and constraints

This report is based upon a questionnaire that was sent to major insurance and banking companies operating in the southeast Mediterranean.[30] However, only a small number of insurance and banking companies responded to the questionnaire.[31] Much of the analysis contained in this report therefore relies upon information obtained from generic sources, rather than those specifically relating to the Mediterranean region. Further, regionally specific, research may be required to fully understand the insurance market in the countries under consideration. Given the globalised nature of the insurance industry however, and the common climate change risks around the world, the analysis herein is relevant to the area covered by the ICZM Protocol, in particular for Governments to understand how climate variability and change is addressed by key actors of the private sector involved in land use and management in coastal areas.

[30] The countries covered in this report are as follows: Albania, Algeria, Bosnia and Herzegovina, Croatia, Egypt, Libya, Montenegro, Morocco, Palestine, Syria and Tunisia.

[31] See Annex I.

Part I:

General overview of the banking and insurance sectors and their role in managing climate change risks

A) The role of the banking and insurance sectors in relation to climate change and variability

a) The banking sector

As the world's major capital providers and risk management experts, "*banks have a vital role in finding timely, practical and cost-effective solutions to mitigate climate change and adapt the economy to its already apparent effects". However, the results of this study confirm findings elsewhere that "the banking industry has not successfully integrated climate change risk into its long-term strategic planning or understood the implications of this game-changing phenomenon for its business operations*".[32]

This may explain why so few banks are ready to make available information on their policies, products or services. For instance, only Barclays and Société Générale (Algeria) responded to the questionnaire and provided information. In particular, Société Générale (Algeria) clearly stated that its policies do not take climate risk into account, and that interest rates fluctuate according to the repayment period only. The information provided by Barclays was very general, and consisted of general observations on climate change risk and opportunities, together with a general outline of risk management options, rather than concrete policies, as shown below (Box 1).

It is therefore apparent that much work remains to be done in involving the banking sector in climate change risk management, and encouraging climate risk to be taken into account in lending and investment decisions.

[32] http://www.bostoncommonasset.com/documents/ThoughtPiece-2014-07-FinancingClimateChange.pdf

Box 1: Barclays Group

Risk & Opportunities[33]	Risk management options
Sea-level rise, increased precipitation and river flow can increase flood and coastal erosion risks. This can lead to asset damage, inability to operate and downtime during clean up operations. Areas at risk from flooding may become uninsurable. Existing flood management systems will be compromised by sea-level rise, storm surges, increased seasonal precipitation, and increased risk of river and flash floods. This may lead to increased premiums, wider exclusion clauses and removal of cover. Loss of cover will have an impact on asset value and availability of finance. Increased exposure to flood risk for workforces and communities in the vicinity of industrial sites.	Siting and design of new facilities taking account of climate change. Relocation of existing facilities may be necessary in some cases. Flood and coastal erosion management strategies for existing facilities include: ▪ Diversion of flood flows away from areas at risk; ▪ Upstream flood attenuation and temporary water storage; ▪ …
There is potential for damage to accommodation, attractions or facilities through increased rates of coastal erosion, sea-level rise, storm surges, and flooding after heavy rainfall. As well as damage to assets and building contents, flooding can create access problems. Some properties may become uninsurable if they are in flood-prone areas. Coral bleaching and mortality associated with climate change is a particular concern in areas where reefs have historically provided a measure of protection against coastal flooding and inundation.	Flood risk assessments should identify land at risk and the degree of risk. Design and location of assets should take account of changing flood risk. New development should be directed away from flood risk areas. Owners and planning authorities should take opportunities to relocate existing buildings that will be vulnerable in future to flooding. Land that is required for current and future flood risk management should be safeguarded. Flood resilient design and materials, such as raised floor levels, widened drains, and temporary flood barriers, should be incorporated at the design stage or during upgrades or refurbishment. In high-risk areas, ground floor spaces can be used for public open space, while accommodation and storage of goods and materials might be relocated to higher levels.

[33] Barclays/Acclimatise "*Credit risk impacts of a changing climate*", http://www.barclays.com/content/dam/barclayspublic/docs/Citizenship/Reports-Publications/storm-shelter-climate-risks-africa.pdf

b) The insurance sector

The insurance sector globally is increasingly alive both to the risks associated with climate change, and the industry's role within it. This perception is equally shared by the public (see Box 2).

Box 2: Industry insurance: A key role to play

In a 2012 AXA/Ipsos survey about individual perceptions of climate risks, 61% of people surveyed said that insurers had a role to play and could limit risks related to climate change34, while 57% thought that insurance companies could help people adapt to the consequences of climate change. This belief is most widespread in those countries where the level of anxiety is at its highest35. In terms of actions that insurers should take, 22% thought that they should offer "new insurance products that also encourage more environmentally conscious behaviours". Respondents also wanted insurers to act collectively, together with public-sector entities, by "working with national and local authorities to reduce the impact of climate change" (20%), "promoting scientific research on climate change" (17%) and raising awareness in high-risk regions (17%)36.

In May 2014, the Geneva Association – a leading international think-tank for the insurance industry – issued a Climate Risk Statement – to which 66 of the world's leading insurers have signed up, confirming the "substantial role that insurance can play in global efforts to tackle climate-related risks".[37]

On 23 September 2014, UN Secretary-General Ban Ki-moon has invited in New York world leaders, from government, finance, business, and civil society to the Climate Summit 2014 to galvanize and catalyse climate action. He has asked these leaders to bring bold announcements and actions to the Summit that will reduce emissions, strengthen climate resilience, and mobilize political will for a meaningful legal agreement in 2015.

Among the actions proposed by the industry, the 1-in-100 Initiative must be emphasized as driven by an alliance of public and private sector organizations to integrate natural disaster and climate risk into financial regulation globally. "*Up to 65% of climate risks can be averted through conscious risk management and cost effective resilience*", said Swiss Re CEO, Michel Lies at the UN Climate Summit. At the core of the initiative is the 1-in-100 year solvency "stress test", a similar concept to that developed in recent years by the insurance sector to assess its own ability to manage risk. The test evaluates the maximum probable annual financial loss that an organization, city, or region, could expect once in a hundred years, in order to enable them to manage their risk in a more informed and effective way. Commitments taken as part of 1-in-100 initiative are described in Box 3.

[34] AXA & Ipsos, Individual perceptions of climate risks, Survey, 2012, p. 15.

[35] AXA & Ipsos, Individual perceptions of climate risks, Survey, 2012, p. 15.

[36] AXA & Ipsos, Individual perceptions of climate risks, Survey, 2012, p. 15.

[37] www.genevaassociation.org/media/878689/pr14-06-climate-risk-statement.pdf

Box 3: Integrating Risks into the Financial System – The 1-in-100 initiative[38]

A consortium of partners (from finance, science and public sector) commits to:

- Invest a year in preparation and pilot application of 1-in-100 year climate risk metrics across banking and securities regulation; incorporate them within public and private accounting standards; require reporting of these metrics on an annual basis based on the tools and experience of the insurance industry.
- Liaise further with the relevant regulatory authorities and stakeholders through to the end of 2015 to determine how this approach can be applied and implemented within processes and protocols with an aspiration for climate and disaster risk and resilience to be incorporated within the financial system by 2020.
- Establish a Resilience Modelling & Mapping Forum that will bring together leaders from the science, capital and policy domains to coordinate research programmes and data collection; create and maintain common standards; and provide shared, open, modelling and mapping platforms to enable urgently needed interoperability and services.
- Coordinate at least USD 100 million annual investment into public science research by the global insurance industry from 2016 onwards and that this can support aligned funding and shared programmes and facilities with public agencies.

In 2012 at the UN Conference on Sustainable Development, a new initiative – the Principles for "Sustainable Insurance"[39] – was launched by UNEP to "*serve as a global framework for the insurance industry to address environmental, social and governance risks and opportunities*". "Sustainable insurance" is a strategic approach where all activities in the insurance value chain, including interactions with stakeholders, are done in a responsible and forward-looking way by identifying, assessing, managing and monitoring risks and opportunities associated with environmental, social and governance issues. It aims to reduce risk, develop innovative solutions, improve business performance, and contribute to environmental, social and economic sustainability. More than 70 insurers have joined this initiative to date, which has a focus on climate risks as part of its attention to addressing social, environmental and governance issues, and working towards disaster risk reduction.

The main 2014–2015 programme launched by the PSI (Principles for Sustainable Insurance – UNEP) is the Global Resilience Project[40], which aims to shift the focus away from post-disaster reactivity to "upfront measures that reduce disaster risk". Part of the focus is on flooding which is established as a natural phenomenon exacerbated by climate change. The project consists of three phases, the first of which – a report on how to build disaster-resilient communities – was launched in June 2014. The second phase, to be delivered in May 2015, comprises the building of global and country natural disaster risk maps to identify particular areas of exposure and vulnerability. The third phase, to commence in June 2015, will develop supportive country-level stakeholder engagement strategies and plans for pre-disaster resilience.

Another key initiative is ClimateWise, a global insurance industry group launched by 16 major insurers in 2007 (see Box 4).

[38] United Nations, Action Statement, Integrating Risks into the Financial System – The 1-in-100 initiative, Climate Summit 2014, p. 2.

[39] The four principles can be found at: http://www.unepfi.org/psi/the-principles.

[40] http://www.unepfi.org/psi/global-resilience-project.

These multiple initiatives at international level are testament to the current momentum within the insurance sector at international level aimed to explore and address climate risk and variability. This provides considerable scope for working closely together with the insurance industry to tackle key regional issues and to ensure the necessary tools and products are in place to deal with the risk and the consequences of climate change within the target area. As discussed further below, however, not all insurers have an equal level of awareness of this issue, and greater efforts and dialogue are likely to be required with smaller, national insurers in the countries in question.

Box 4: Climate Wise – A global insurance industry leadership group

Created in 2007 to drive action on climate change risk, the group leverages the insurance industry's expertise to better understand, communicate and act on climate risks with members committing to action under the ClimateWise principles both individually and collectively through collaborative action. The group is facilitated by the Cambridge Programme for Sustainability Leadership41.

The ClimateWise principles are designed to enable members to work individually and collectively to reduce the economy's and society's long-term risk from climate change, within the confines of a competitive market. The six principles cover all aspects of the diverse insurance sector's response to climate risk and require the members to[42]:

1. Lead in risk analysis
2. Inform public policy-making
3. Support climate awareness amongst customers
4. Incorporate climate change into investment strategies
5. Reduce the environmental impact of their own business
6. Report and be accountable

In 2010, ClimateWise published a report entitled "Adapting to the extreme weather impacts of climate change – how can the insurance industry help?" based on case studies of ten countries and ten different insurers.[43]

[41] ClimateWise website – www.Climatewise.org.uk

[42] ClimateWise report, "Addressing the risk we and our customers face from climate change", 2014.

[43] http://www.climatewise.org.uk/storage/_website-2012/collaborations/adaptationrisk-management/ClimateWise%20Adaptation%20Report.pdf

B) Overview of the insurance and banking sectors in the Mediterranean

In the Mediterranean coastal zone, climate change will have a direct impact on many types of banking and insurance business. In several areas, the impact of flash floods or droughts on property insurance will be particularly acute: for instance, homes and industrial properties located close to rivers are under threat from rising sea levels. Extreme weather events can also have a variety of consequences for farmers: they can increase the risk of damage to certain crops, increase the risk of forest fires and lower the productivity of agricultural land. Property insurance in both cases for owners and farmers is particularly vulnerable. The banking and insurance sectors will inevitably have an important role to play in the both preventing and facilitating the recovery of economic losses caused by weather-related catastrophes.

A number of multinational insurance companies, outlined below, operate in the region. However, it remains unclear what proportion of the market they control, and how much of the market is in the hands of smaller providers. However, one should be aware that only with a full understanding of the market in each country can a complete suite of forward actions be devised. The following are the main multinational insurance and reinsurance companies operating in the region:

- Allianz
- AXA
- Generali
- UNIQA
- ACE Group
- Swiss Re
- Munich Re (in Croatia)
- Zurich (in Morocco)

The next section of the report examines the current engagement and specific actions being taken by these leading insurers, both within the region and generally, to address climate risk and variability.

a) General engagement

All of the major insurance and reinsurance companies operating in the Mediterranean region are engaged in one or more of the sector-wide initiatives highlighted in the previous section. The following are PSI members:

- Allianz
- Generali
- AXA
- Swiss Re
- Munich Re

ACE, Allianz, Zurich and Swiss Re are all members of ClimateWise. UNIQA, AXA, Allianz, ACE Group, Swiss Re and Munich Re have all signed up to the Geneva Association's Climate Risk Statement. All of the multinational insurance companies present in the Mediterranean region are therefore engaged in one or more of the

initiatives that are harnessing international attention on the industry's role in climate change mitigation, adaptation and the management of risk. This creates a firm baseline from which further efforts and dialogue can take place in the context of the target countries.

b) Specific actions

i) A regional approach

Natural disasters do not respect national borders, making regional cooperation and risk management crucial for climate risk adaptation. Although the multinational insurers mentioned above have a presence, and in some cases, a major office in the target countries, there is little evidence of specific attention being paid to the challenges of the Mediterranean region. Based on the available information, it is not clear if the banking and insurance sectors have merged in order to share or transfer risk in the Mediterranean region. However, some major insurance companies are developing offices in the Mediterranean region to facilitate the development of risk management and new products. Zurich has a main office base in Morocco, and Munich Re has a strong presence in Croatia. AXA, meanwhile, has offices in Algeria and Morocco. Nevertheless, there is little evidence of the companies taking a specific regional approach to the challenges in the Mediterranean.

An innovative model, the Southeastern and Central Europe Catastrophe Risk Insurance Facility, was established, however, to enable a catastrophe and weather-risk reinsurance facility (Europa Re, see Box 5 below)[44] to develop new products in this region. This insurance programme was facilitated by the World Bank (WB), with the United Nations International Strategy for Disaster Reduction (UNISDR) and the Regional Cooperation Council (RCC). With Albania as an existing member, and Montenegro and Bosnia and Herzegovina keen to join, the initiative offers an invaluable regional focal point to take this work forward.

Box 5: Good practices by Europa Re

Europa Reinsurance Facility Ltd. (Europa Re) is a Swiss-based specialty property catastrophe reinsurance company owned by countries of Southeastern Europe (SEE) offering reinsurance support to insurance companies in the countries of Southeastern Europe to enable them to provide homeowners, farmers, enterprises and government organizations with affordable insurance coverage against weather risk and geo-related perils. Working together with its partner company Europa Re Management Ltd. – a Swiss-based specialty insurance services provider, it is dedicated to introduce a comprehensive market development package (reinsurance capacity, insurance market infrastructure services and technology solutions) to insurance companies in support of innovative catastrophe and weather risk products. Its vision is to increase the level of catastrophe insurance penetration among households and small and medium enterprises (SMEs) in Southeast Europe. Preparation of the Facility began in 2008 with the financial and technical support from the World Bank under the SEEC CRIF (Southeast Europe and Caucasus Catastrophe Risk Insurance Facility) project, the Global Environment Facility (GEF), the Swiss Secretariat for Economic Affairs (SECO) and the United Nations International Strategy for Disaster Reduction (UNISDR) Europe. The Republic of Albania, Europa Re's first shareholder, joined in the spring of 2010; the Republic of Serbia and the former Yugoslav Republic (FYR) of Macedonia followed with their respective shareholder memberships in 2012; Bosnia and Herzegovina and Montenegro have also expressed their interest to join the programme.

[44] http://www.europa-re.com/?page=EN10

In addition to taking a regional approach, the involvement of the banking and insurance sectors in climate change adaptation and in creating a more resilient society has several dimensions. First of all, climate risk must be considered a strategic governance issue within the company to ensure that action is driven in a holistic way from the very top; secondly, an effective risk management approach is needed, meaning a detailed assessment of the current and potential impacts of climate change. Secondly, awareness of the significance of climate change will be needed for strategy purposes and for communication with customers. Lastly, risk transfer must take place to enable products and services to be tailored to reducing costs and the impacts of climate change.

ii) Governance

The importance of an effective approach to climate risk at governance level cannot be overstated. In essence, "*those insurers with strong, top-level leadership will be most able to address climate risk in a comprehensive and substantive manner*".[45]

In the recent Ceres report on industry performance in relation to climate risk, the leading insurers were assessed against the following four criteria:

- Whether climate risk was assessed at executive level;
- Whether it was expressly considered in the company's enterprise risk management (ERM) framework;
- Whether the board of directors has a role in managing the firm's climate risk;
- Whether the company has issued a public climate change policy statement.

Of those operating in the Mediterranean region, only ACE Group Ltd., Allianz and Munich Re received a "leading" rating. In relation to the public climate change policy statement objective, Swiss Re and Zurich were also considered to be a "leading" example (see Box 6 below).

Box 6: Policy statements on climate change

Allianz

"As a global corporate citizen, Allianz takes sustainability seriously. Environmental, social and corporate governance (ESG) aspects are continuously being integrated into our operations, insurance and investment decisions. Climate change is an important mega trend [read more] that our ESG activities specifically address (…).

As an integrated financial services provider, Allianz is well aware that climate change could affect its entire business spectrum. We therefore adapt internal processes, policies, products and services to meet the challenges our clients face, and to identify new business opportunities at an early stage to safeguard our own competitiveness. Allianz' Climate Change Strategy outlines how Allianz contributes to a low carbon economy and consists of three areas, embraced by our thought and action leadership".

[45] Ceres Insurance Programme, 'Insurer Climate Risk Disclosure Survey: 2014 Findings & Recommendations' October 2014, p. 28.

iii) Risk management

Risk identification means, for an insurance company, understanding how climate change impacts its activities and customers. The importance of such an approach is highlighted in the recent Ceres report:

"A risk management programme that considers climate-influenced catastrophe risk correlations across both underwriting and investment business lines can ensure that risks and opportunities are balanced and coordinated. Catastrophe modelling and other measures can more accurately price (subject to regulatory constraints) mounting extreme weather risks due to climate change. Furthermore, with the on-going maturation of renewable energy technologies, as well as the development of new investment and securitization vehicles in clean energy, insurers are presented with unprecedented opportunities to profit from investments in climate change mitigation".

According to the analysis of industry performance as regards climate risk, most multinational insurers are failing adequately to incorporate climate risk into their risk management approach. *"Despite this sector's distinct vulnerability to climate-related physical impacts as well as climate-related litigation, the vast majority of P&C insurers are not addressing climate risks in a comprehensive manner".*[46]

Of those operating in the Mediterranean, only Allianz, Swiss Re and Munich Re received a "leading" rating for their enterprise-wide risk management approach (see Box 7).

[46] Ceres Insurance Programme, "Insurer Climate Risk Disclosure Survey: 2014 Findings & Recommendations" October 2014, p. 26.

Box 7: Good practice example: Factoring climate risk into investment decisions

Allianz

Mobilizing just 1% of available institutional assets per year would be sufficient to finance a sustainable energy transition.

Alternative climate-related assets, such as renewable energies and new infrastructure, are an attractive growth market and can contribute to portfolio diversification as well as (potentially) offer sound long-term returns. Allianz is one of the world's largest investors in wind and solar power and offered third party clients in 2013 for the first time the opportunity to invest into a renewable energies fund.

Swiss Re

"*As a major global reinsurer, Swiss Re is committed to taking a leading role in the climate debate. We identified climate change as an emerging risk some 20 years ago, and the concern has since evolved into an important component of the company's long-term risk management strategy. Our actions are based on the premise that it is in the interest of our shareholders, clients and employees, the wider stakeholder community and society in general to tackle this issue.*

*We are continuing to develop and strengthen our commitment to this issue. Swiss Re is pursuing the raising awareness about climate change risks through risk dialogue with clients, employees and the public, and advocacy of a worldwide policy framework for climate change. Climate change has been designated a Swiss Re Top Topic, which means that it is recognised as an issue of Group-wide strategic importance. Responsibility for this Top Topic is assigned to our Chief Risk Officer, a member of the Executive Committee; the topic is managed and steered by the Head of Sustainability & Emerging Risk Managemen*t."[47]

Munich Re: Risk management and internal reporting

"*Together with Corporate Underwriting (CU), experts ensure that CC [climate change] considerations are incorporated in our risk assessment/management, business/product development and asset management. Research findings are passed on to CU and Integrated Risk Management (IRM) and used for product design/pricing, accumulation control and adjustments to natural catastrophe models, and are also factored into our risk capital model calculations and risk strategy.*

Risk information is collated by IRM and incorporated in control, management and operational processes at the relevant units. We provide individual support in the quantification and management of CC risks. A core component in the identification of risks is an IRM approach involving underwriters/client managers to ensure direct access to markets and dialogue with clients, i.e. an early-warning system that ensures that physical and regulatory risks are identified and assessed at an early stage, and Centres of Competence with experts who specialize in risk identification and analysis in specific lines such as liability and geo risks research."

iv) Climate change modelling and analytics

Climate change modelling and analytics is an integral part of an effective risk management approach. As noted in the Ceres' report: "*There are substantial benefits for insurers that effectively quantify risk exposures through the use of cat modelling*". Indeed, insurers that fully integrate catastrophe modelling into their risk management programmes, through both their underwriting and investment functions, are best positioned to both protect their businesses and capitalize on opportunities in a changing climate.

[47] www.swissre.com/rethinking/sustainable_energy/our_position_and_objectives.html?mobile=iphone

Key features of a climate-informed catastrophe modelling and analytics system, as indicated by the leading insurers below, are:

- Multi-Source Data Integration: Insurers with leading practices acknowledge the limitations of their catastrophe modelling systems in projecting climate-related catastrophe impacts. These insurers showed that they are mitigating the risk of relying too heavily on one model's output by blending the outputs of multiple cat models and integrating data from academic or other sources into their models.
- Stress Testing: Insurers with leading practices subject specific lines of business to stress tests by utilizing projections of possible future perils that are more severe than historical experience. By doing so, they help ensure capital adequacy in the case of major events.
- Medium to Long-Term Modelling: Insurers with leading practices employ projections in their cat models that allow them to make forecasts beyond five years. These longer-term projections allow insurers to evaluate the future insurability of various locales or regions in a climate-changed world and adapt their business strategies accordingly."[48]

Part of the importance of accurate modelling and analytics is that it enables the setting of insurance premiums that properly reflect the catastrophe risk for a given property, as well as ensuring that reinsurance is purchased as required. This appears to be one of the strongest areas of performance for the global insurance industry as a whole, but less so for those companies with a Mediterranean operation – only ACE, Allianz, Munich Re and Swiss Re were found to be leading examples in this respect (see Box 8).

Box 8: Some other good practice examples

1) Example of modelling climate risks by AXA[49]

One of the core functions—and challenge—of a natural catastrophe model is to integrate a reliable catalogue of likely events in its hazard module, able to project a limited historical time period to a broader event set encompassing the whole spectrum of likely extreme events. The three components of the catastrophe models are the following:

- The Hazard Module defines the spectrum of likely events (also called event catalogue) that might have occurred historically or could happen in the future. Each event is characterized by its period of recurrence or frequency and its key physical risk drivers (e.g. wind speed, translation, direction, pressure, etc. for a windstorm).
- The Vulnerability Module converts the physical intensity (e.g. wind speed) into damage on an infrastructure (industrial plan, residual house, etc.) at a specific location. This is where the geo-localised exposure portfolio is integrated.
- The Financial Module applies insurance conditions to the raw damage perspective in order to assess the Insurer's net loss. Falling into these insurance conditions are coinsurance shares, deductibles, limits, facultative or per-risk programmes.

[48] Ceres Insurance Programme, "Insurer Climate Risk Disclosure Survey: 2014 Findings & Recommendations" October 2014, p. 35.

[49] AXA, Paper on climate risks, risk education and research, n°4, Oct 2012, pp. 20-21.

2) Examples of risk identification tools

Swiss Re – SONAR – Thinking in scenarios[50]

"We have steadily built up a Group-wide emerging risk approach called SONAR ("systematic observation of notions associated with risk") which comprises four stages: identification, assessment, implementation and monitoring/control. Clear responsibilities are given to two governing bodies.

The assessment methodologies we apply can vary in depth and scope. Thinking in scenarios plays an increasingly important role in them. These scenarios can be understood as rigorously conducted thought experiments on possible future situations."

Sigma explorer: the data you need at your fingertips[51]

The sigma explorer is an interactive, web-based application that gives you access to information about catastrophes and world insurance premiums from as far back as 1970 from almost any Internet device.

Sigma explorer can be used to visualize and share key historical data about the number of lives lost or the level of insured and uninsured losses overall and for specific events.

3) Example of data collection by Munich Re – NatCat SERVICE[52]

"Comprising some 30,000 data records, NatCatSERVICE is the most comprehensive natural catastrophe loss database in the world (free of charge). Approximately 1,000 events are recorded and analysed every year. The information collated can be used to document and perform risk and trend analyses on the extent and intensity of individual natural hazard events in various parts of the world. A selection of analyses can be accessed here. You can find annual statistics from 2004 onwards, informative maps, Focus Analyses and comprehensive basic knowledge in Touch Natural Hazards."

4) Examples of data collections used to make detailed accurate topographical maps of coastal landscapes

- The DIVA[53] model is an integrated, global model of coastal systems that assesses biophysical and socio-economic consequences of sea-level rise and socio-economic development taking into account coastal erosion (both direct and indirect), coastal flooding (including rivers), wetland change and salinity intrusion into deltas and estuaries as well as adaptation in terms of raising dikes and nourishing beaches. These maps enable the impacts of sea-level rise to be determined and graphically illustrated using web-based tools.
- PERILS: an independent Zurich-based company has been created to aggregate and provide industry-wide European catastrophe insurance data on a subscription basis, offering a clearer picture of the potential natural catastrophe risks in Europe. The aggregated data sets will be derived from data voluntarily provided by European-based insurers. PERILS is co-founded by AXA; Swiss Re is a founding shareholder.
- Natural Catastrophe Modeling and Underwriting (AXA): in 2013, AXA decided to progressively equip itself with natural catastrophe modeling capabilities, completing the model scope currently offered by third parties. The roadmap is under implementation, supported by dedicated human and IT resources. In addition, a geo-based platform is currently deployed within the Group aiming at providing underwriting with risk information at the local level.
- CatNet® (Swiss Re): Natural hazard information combined with Google Maps™ and satellite imagery is available free of charge for Swiss Re's clients. The CatNet functions and data facilitate a professional overview and assessment of natural hazard exposure for any location worldwide. This makes CatNet® a valuable tool in preparing local, regional and cross-regional risk profiles.

[50] http://www.swissre.com/rethinking/emerging_risks

[51] http://www.swissre.com/reinsurance/insurers/sigma_explorer_the_data_you_need_at_your_fingertips.html

[52] Munich Re website.

[53] The first version of the DIVA model was developed as part of the DIVA Tool in the EC-funded project DINAS-COAST (Dynamic and Interactive Assessment of National, Regional and Global Vulnerability of Coastal Zones to Climate Change and Sea-Level Rise). www.diva-model.net

v) Stakeholder engagement and risk awareness

Stakeholder engagement and risk awareness relates to the dialogue a company has with customers, the wider public and shareholders so as to encourage action to reduce climate risks. The industry as a whole also has a key role to play in debates on policy issues, for example in relation to land-use planning, particularly along the coast, and the design and implementation of building codes.

The importance of stakeholder engagement is twofold: first, it facilitates the development of so-called "green" or "climate-aware" insurance products that take account of climate risk and promote customers' involvement in sustainability. Secondly, it is an important tool for building societal resilience in the face of the global climate change challenge by public raising awareness, encouraging research and thus reducing insurers' exposure to climate risk in the longer term.

This is an area on which the industry as a whole was found to be lagging. Once again, the only top-performing companies with a Mediterranean operation were ACE, Allianz, Swiss Re and Munich Re (Box 9).

Box 9: Good practice examples on stakeholder engagement

Allianz

Statement "An active role in promoting sustainability"[54]*: "We see a range of benefits from taking an active role in sustainability-related associations, initiatives and alliances at national and international levels. We engage in debates on specific topics, such as climate change, and take part in broader platforms that promote dialogue and discussion on sustainability. Key objectives from these types of engagement include:*

- *Exchange best practices and organizational learning.*
- *Support in creating awareness and promoting sustainability.*
- *Work on sector-specific and cross-sectorial standards to further promote sustainability in our own and other industries.*
- *Develop strategic partnerships that provide effective solutions to social challenges*".

Product development[55]

"*Allianz offers its retail and commercial customers a growing range of green products and services supporting a low-carbon economy, protecting the environment and helping clients prepare for the negative effects of climate change and/or mitigate associated economic risks. By 2013, Allianz Group offered its clients more than 130 such products and services worldwide (…).*"

Swiss Re – the Flood Risk App[56]

"*To educate the public and industry alike about the increased risk of natural catastrophes posed by climate change, Swiss Re released its Flood Risk App in August, 2012 … available for free on the iTunes App Store. The Flood Risk App gives a general understanding of flood risks and explains how to manage and insure these risks. The App explores different types of flooding and the challenges involved in making floods insurable. It highlights the importance of adapting to climate change and shows how reliable flood information can strengthen flood preparedness.*"

AXA Risk Prevention Services – to help people better anticipate and adapt to the changing climate

AXA is developing an early warning system by using meteorological previsions to help detect significant atmospheric events a few days before their occurrence to reduce their impact on society and improve AXA's post-event response[57]. For example, Meteo Alert had been recently developed and is able to detect a significant storm a few days before occurrence and produce alerts internally.

AXA Matrix (business unit dedicated to prevention) – Business Risk Prevention Solutions

- An AXA Corporate Solutions owned subsidiary with 40 years of experience in supporting clients in their risk management policies with 166 multi-peril consultants based in 18 countries. It provides expertise in risk assessment (e.g. qualify clients' risks and provide risk scoring, identify clients' needs, develop commercial approaches), underwriting support (e.g. contribute to better underwriting), business risk management (e.g. answer to business risk managers' needs, prevent losses, provide risk management solutions), claims management support (e.g. provide technical assistance, identify causes & extents, manage third parties, contribute to recoveries) and expertise building & training (e.g. learn by experience, document & disseminate expertise).
- VISIO@RISK™ is a suite of services aiming at identifying, quantifying and displaying Natural Disasters risks incl. flood across the world, and analyzing mitigation solutions to reduce, control or transfer them. VISIO@RISK™ helps risk managers enhance their communication on risk with internal (CFO, Board of Directors, divisional manager, etc.) and external (insurance brokers and (re)insurers) stakeholders, by making the risks and their consequences more visible and understandable.

[54] www.allianz.com/en/sustainability/sustainability_report_2014/sustainability_strategy/stakeholder_engagement_and_materiality.html

[55] Ceres Insurance Programme, "Insurer Climate Risk Disclosure Survey: 2014 Findings & Recommendations", October 2014, p. 38.

[56] Ceres Insurance Programme, "Insurer Climate Risk Disclosure Survey: 2014 Findings & Recommendations", October 2014, p. 35.

[57] AXA, Position Paper on Climate Risk, 9 July 9 2014, p. 3.

Part II:

Business solutions, products and services of the banking and insurance sectors to address climate change and variability in coastal zones

According to the analysis of current practice, insurers are engaged in analysing and promoting awareness of climate risks, but are less involved in developing incentives for climate change adaptation. Although there said to be considerable interest in the insurance industry in developing specific products related to addressing climate risk, the interest and potential has yet to be translated widely into action. Banks, moreover, are lagging even further behind, with most yet to even adopt a climate change strategy.

Nevertheless, there are some encouraging examples of insurance products being on offer, some of which are specifically in relation to the Mediterranean region. Some of the key types of products, and their providers, are highlighted below.

a) "Green" insurance products

Generically referred to as "green" insurance products, insurers have increasingly been developing new products and/or policies that facilitate their customers' investments in sustainability (see Box 10 below). The most common climate-aware insurance products are "green replacement" policies, which offer policyholders the ability to build or rebuild/replace to higher standards of sustainability (such as Energy Star® equipment or hybrid/electric vehicles) in the event of a covered loss, or offer premium discounts for the purchase of such items. Underwriting specific to rooftop solar PV and/or small wind power installations was also highlighted by survey respondents[58].

Box 10: Good practices – "Green" insurance products

Allianz – Green Solutions[59]

Green Solutions is the name for Allianz's suite of climate change-aware products, processes and services, stemming from its climate change strategy and leadership approach to this issue. At present, Green Solutions are provided by Allianz in forty markets, which include Croatia.

Green Solutions are developed with reference to a ratings tool that scores them according to three core elements:

1. facilitation of a technology, development or market that focuses on the climate, environment and the reduction of clients' exposure to financial and regulatory risks;
2. focus on conservation of the environment and the mitigation of climate change; and
3. protection from environmental risks and help in adapting to climate change impacts, through fostering awareness, providing incentive to reduce exposure and managing the clients' risks.

In 2015, 156 Green Solutions are on offer, covering five thematic clusters:

- mobility;
- weather;
- renewable energy;
- financial and regulatory risks;
- efficiency and resource protection.

In terms of products available specifically in Croatia, these are:

- Renewable Energy Home Insurance: Coverage for damage to renewable energy equipment due to break-in, theft, fire, or natural disasters as part of home insurance (for private customers). Renewable energy insurance is also available for commercial customers.

[58] Insurer Climate Risk Disclosure Survey: 2014 Findings & Recommendations, Ceres Insurance Programme, p. 38.

[59] www.allianz.com/v_1425382654000/media/responsibility/documents/FS_GreenSolutions_Mar2015_FINAL.pdf

- Weather Indices: Allianz offers a weather risk insurance for a predetermined event for instance against extreme temperature, rainfall, wind, frost, hail or snowfall. In some cases, this includes incorporating a price or revenue element into the payout calculation.
- Lack of Sun, Wind or Water Insurance: Allianz offers protection against the loss of revenue to businesses affected by sun, wind or water. If the energy yield is lower than the agreed-upon deviation, e.g. due to reduced solar radiation, the associated income foregone is compensated.

Business Solutions (AXA Group)[60] – "Green" insurance products

- Commercial insurance: The Global Business Line Property & Casualty commercial has set a 2011–2015 target to generate 100 M € of New Business from at least 3 "green" product offers, which include green buildings (e.g. green building refurbishing) and renewable energies (e.g. off-shore and on-shore wind power installations, solar power, etc.), and electric motor vehicles.
- Retail insurance: numerous initiatives are in place across the Group to promote retail green insurance products (e.g. renewable energies, electric motor and green household refurbishing), reinsurance (e.g. off-shore wind power installations) and claims management strategies (e.g. repair car glass rather than replace), initiatives that are encouraged through the Group's Innovation Awards.
- Parametric agricultural insurance: In 2013, AXA Corporate Solutions decided to launch a parametric insurance business in order to provide a response to "atypical climate events" such as a very hot winter or a very rainy summer, which can put a stress on business and vulnerable populations, especially linked to food security. The new unit aims to provide an appropriate response with quick compensation and very low claims administration costs. It is based on an index of parameters highly correlated with loss experience, such as rainfall, temperature, or even directly with biomass production. Payment is triggered if a threshold is reached, for example if fewer than 100 millimetres of rainfall over a given period and for a given crop. It therefore combines the expertise in data processing, use of satellite imaging and new economic model. In addition, AXA aims to partner with large international organizations, governments and banks, in order to limit the climate impacts on these countries' GNP and therefore improve their food safety.

b) Weather index-based insurance (indirect-index insurance)

Index insurances differ from other type of insurance in that the indemnities are not computed from the individual farmer's loss but from a parameter or index external to the farm.

There are two categories: area-index insurance (the index is directly an area average yield or income) and indirect-index insurance (other kind of indices, such as vegetation indices computed from satellite images). The reason for this categorisation is that the latter are more complex and much more difficult to understand or trust by the farmers.

Area-index insurance has been used for some time in certain countries while indirect indices are brand new and, in most countries, are still being developed. As regards the indirect indices, they are being promoted by the World Bank as a tool for developing countries, both for individual farmers and for Governments, so that financial aid can be provided to rural populations when there is a catastrophe[61]. In fact, in the countries surveyed, the weather risk coverage among homeowners and farmers is currently almost non-existent but insurers such as AXA (see Box 11 that follows) are interested to develop further this tool.

[60] AXA, Position Paper on Climate Risk, 9 July 2014, p. 6.

[61] Bielza Maria, Conte Costanza, Dittmann Christoph, Gallego Javier, Stroblmair Josef, Agricultural insurance schemes, Final Report, Dec. 2006, modified February 2008, Chapter 6, p. 137.

Box 11: AXA Group – Index-base climate insurance[62]

AXA is committed to investing more than EUR 5 million in human and financial resources to develop new index-based climate insurance capabilities by 2020 through AXA Corporate Solutions.

AXA is developing the climate-resilient option[63]: This is a premium fully reflecting the risk borne by the insured. It may be an incentive for policyholders to include risk consideration in their decisions. Being informed on the level of risk induced by a specific action, which translates into premium level, the policyholder may choose to adopt or reconsider the action. The risk-based pricing of insurance is, in itself, a risk reduction method since the financial incentive of a premium reduction may lead the policyholder to reduce his vulnerability to risk. It may, for instance, prevent people from building in risky areas (e.g. floodable zones), make them invest in defence systems (e.g. walls protecting against hurricanes) or choose to upgrade existing structures (e.g. replacing poorly resistant roofs). By sending risk-based pricing signals the insurance industry has the ability to encourage loss reduction like no other economic tool.

Index-insurance: a booming type of insurance[64]

On 12th February 2015, AXA Corporate Solutions (AXA CS) issued a press release announcing the signing of a Memorandum of Understanding with the World Bank Group's Global Index Insurance Facility (GIIF). An extract from the press release is below:

"*The aim of this partnership is to develop index insurance and technical expertise in developing countries based on the respective expertise and experiences of GIIF and AXA CS.*

Contrary to a classical insurance contract, index-insurance is a contract in which the insurer accepts, in advance, to pay out an agreed-upon sum to the insured in case of an extreme event, itself also agreed upon in advance. As such, there is no need for an evaluation of the insured's loss. The only piece of information needed is a precise event which itself triggers the payment. The advantages of this type of insurance for farmers in developing countries who cannot afford to pay for the high claims handling costs associated with smaller farming surfaces is clear: the payment is triggered based on weather data, meaning no need for a loss adjuster, which greatly limits claims handling costs and accelerates the entire process.

According to Philippe Rocard, CEO of AXA Corporate Solutions "… By protecting the most vulnerable farmers against weather anomalies, we contribute to resolving the issue of food security, which remains a global challenge. We thus open new perspectives for the millions of smallholder farmers affected by climate change, but also for the many industries that are considered weather-sensitive … Additionally, in the food and beverage industry, it is estimated that 2/3 of products are weather-sensitive. Beer consumption, for example, fell by 15% in spring 2012 because of low temperatures and rain in France. All these weather-related risks can be insured by AXA CS."

The setting of the premium for coastal property insurance is a particularly important issue in the Mediterranean region. Given the provisions in Article 8(2) of the ICZM Protocol with regards to setback zones in which development is to be prohibited, insurance premiums need to be set at a level which fully reflects the level of risk associated with development in the coastal zone, rather than being subsidised to a level that perversely encourages construction in high-risk zones. A related issue is the uptake of insurance in high-risk areas – compulsory insurance that is priced to reflect the level of risk can raise the general level of awareness about the dangers of building in flood-risk zones. However, compulsory insurance may well need to be publicly subsidised in order to be viable, which itself raises the spectre of unwanted secondary effects, as experience from the US shows. More generally, it is important that Article 8 of the ICZM Protocol continues to be drawn to the attention of financial stakeholders to dissuade development within the setback zone.

[62] AXA, Position Paper on Climate Risk, 9 July 2014, p. 3.

[63] AXA, Paper on climate risks, Risk education and research, n°4, Oct. 2012, p. 30.

[64] AXA, Announcement of a partnership between AXA and the World Bank Group, Press Release, February 2015, pp. 1-2.

c) Area-index insurance (agricultural insurance)

This is one of the most important climate adaptation measures available and is vitally important in ensuring farmers have financial resilience to potentially devastating climatic impacts[65]. The application of this measure in the three Maghreb countries, i.e. Algeria, Morocco and Tunisia, is presented in Box 12.

Box 12: Agricultural insurance in the Maghreb

In Morocco[66]

Agriculture accounts for only a small share of the insurance sector's business – in fact, less than 3% of total turnover in 2011. In 2010, the Moroccan firm Moroccan mutual agricultural insurance (*Mutuelle agricole marocaine d'assurance – MAMDA*, the agricultural sector's main insurer, counted 100,000 participants, or less than 7% of a total of 1.5 million Moroccan farmers.

MAMDA's core business concerns insuring persons and materials. The mutual company proposes a line of products covering agricultural machinery (tractors), fire risks, livestock loss, and hothouse crop damage and third-party liability. MAMDA also markets two government-subsidized products: hailstone insurance since 2009 and multiple risk climate insurance since 2011.

Multiple risk weather insurance was launched in 2011. It provides coverage for grains and legumes across the entire country in case of hailstorms, heavy frost, flooding, violent winds and sandstorms. MAMDA acts as insurer, but the government subsidizes the premiums, with a decreasing premium rate as surface area increases. The thresholds are as follows: surfaces under 3 ha; 3 to 5 ha; 5 to 30 ha; over 30 ha. For the first category, the premium is subsidized at 90% and amounts to 26 dirham/ha (2 euros/ha), for a maximum compensation of 1,450 dirhams/ha (130 euros/ha) to cover seasonal cropping costs engaged by farmers. The indemnity is calculated on the basis of a loss of yield rate. Assessments of losses are done by MAMDA in regions officially declared disaster zones by the government.

The launch of an indexed insurance scheme covering drought risks for grains and fodder is a project currently being considered. This scheme would be a part of the multiple risk weather insurance scheme. The point is to bring down costs, and obtain a more impartial scheme for triggering compensation, and to reduce the risk of information imbalance and moral hazard. The insurance product is being jointly developed by the Ministry of Agriculture, MAMDA, Moroccan meteorological services and the National Agricultural Research Institute (*l'Institut national de la recherche agronomique – INRA*).

In Algeria[67]

Farming only represents a very small share of the Algerian insurance market – less than 2% – with a turnover of 9 million euros in 2010, of which 74% were logged by the Agricultural Mutual Assistance Fund (Cais*se nationale de mutualité agricole* - CNMA.

The CNMA's insurance products cover the following major crops: large-scale crops (hail, fire); truck farming (hail), industrial potato and tomato multiple risk coverage (hail, freezes, windstorms, flooding, sirocco winds); hothouse farming – truck farming, flowers (multiple risk insurance for hail, heavy frost, windstorms, flood, snow, fire); arboriculture – date palms, fruit trees, citrus trees, olive trees – and vines (multiple risk insurance hail, freezes, windstorm, flooding, sirocco winds). In addition, insurance covering livestock loss, buildings and equipment and third-party liability are also offered.

Multiple risk weather insurance was developed back in 2009 for strategic crops that were a part of Algeria's better-structured sectors, in terms of irrigation systems (potatoes, tomatoes, dates). Premiums for irrigated systems represented 10 to 15% of production costs, with claims compensation equivalent to 25 to 30 times the premium.

[65] ABI Climate Wise Report 2012/2013, June 2013, p. 2.

[66] Billy Troy, Assurance et développement agricole : nouvelles dynamiques en Algérie, au Maroc et en Tunisie, Fondation pour l'agriculture et la ruralité dans le monde, Document de travail n° 5, Dec. 2013, p. 12.

[67] Billy Troy, Assurance et développement agricole : nouvelles dynamiques en Algérie, au Maroc et en Tunisie, *supra* note 63, p. 14.

Thus, in 2009, 65% of land used for autumn potatoes was insured. Nevertheless, drought risks are not covered, even though it is the highest risk for pluvial cereals.

In addition to the insurance system, there is also a Fund for Agricultural Disasters (*Fonds de garantie contre les calamités agricoles* – FGCA), set up by the government in 1990. The fund aims to compensate farmers for non-insurable risks, including drought. Yet the set-up did not meet farmers' expectations, especially after a series of adverse climatic events. Granted compensation was insufficient. The FGCA has not been in operation for a decade or so.

Since 2008, the CNMA has been designing several new farm insurance products in liaison with the government's Policy for Agricultural and Rural Renewal (*Politique du renouveau agricole et rural).* In addition to the multiple risk climate insurance offered since 2009, two products dealing with cereal grains are being designed. A multiple risk climate insurance pilot project on irrigated cereal grains was launched in 2013. Risks covered are hail, freezes, windstorms, flooding and sirocco winds. Also, insurance against drought for pluvial cereal grain crops is currently in preparation.

In Tunisia[68]

Agriculture represents a tiny share of Tunisia's insurance market (3% in 2009). For instance, in 2009, agricultural insurance turnover reached some 30 million dinars (approx. 15 million euros) for a total market of 1 billion 150 million dinars (approx. 575 million euros).

The insurer, Tunisian Agricultural Mutual Insurance Fund (*la Caisse tunisienne d'assurances mutuelles agricoles – CTAMA)* accounts for about 80% of the insurance business in the agricultural sector. Agricultural risks covered by CTAMA are the following: hailstorm damage (grain, arboriculture, vines, and market gardening), fire damage to crops, multiple risk for greenhouse crops (hail, heavy frost, storms, fire, and lightning), livestock loss, equipment, buildings, and third-party liability. Concerning hailstone damage to cereals, the premium is subsidized by 50% and represents about 3% of the total amount insured. Drought is one of the risks not covered, whereas in Tunisia this hazard represents the highest source of claims, with a drought occurring every 4 to 5 years on the average. When dealing with claims, the CTAMA sets up a decentralized network of company and private insurance adjusters who estimate damages.

Above and beyond insurance schemes, two other mechanisms also help to manage farming risks: the National Guarantee Fund (*le Fonds national de garantie*), which acts a guarantee for bank credits, in particular for drought-risk in agriculture, and the Natural Disaster Fund (*le Fonds de calamités naturelles*), that acts to provide reparation for damages incurred by farmers for uninsurable or exceptional climate hazards. But in reality, these two funds have only rarely intervened due to malfunctions in the way they are implemented.

Several new prospects for action have been evoked in order to develop the insurance sector. Implementing an index-based weather insurance scheme for drought risks could be based on several pre-existing elements: structured agronomical and meteorological data gathering systems, the CTAMA agency network planning the entire country or national and international reassurance firms that may take an interest.

Vienna Insurance Group – Bosnia and Herzegovina

Agricultural insurance is offered to provide protection for crops and fruits. The insurance covers the following general dangers: fire, thunderbolt and hail. It is also possible to agree upon insurance against additional dangers, for example: storm, flood, spring and autumn frost, and the risk of salty frost with fruit and grapes.

Europa Re

This company offers agriculture yield index insurance (AYII) coverage, designed to protect farmers from the loss of crop yields due to adverse weather events and biological risks, in countries across southeast Europe.

AYII has proven to be an excellent form of coverage for systemic or covariate risks such as drought, frost, windstorm, continuous excess rain damage, high temperatures and catastrophe flood which have huge impact over a broader area (e.g. at the municipality level). Tailored for specific crops, this insurance product provides protection to farmers against extreme weather events that affect crop yields.[69]

[68] Billy Troy, Assurance et développement agricole : nouvelles dynamiques en Algérie, au Maroc et en Tunisie, p. 13.

[69] http://www.europa-re.com/?page=EN30

d) Natural disasters/climate event insurance

Some insurance companies cover the following natural disasters and/or climate events (see the Table and Box 13 that follow), including through micro-insurance products:

- Natural disasters: flood, earthquake, storms, etc.;
- Climate events: flood, hail.

***Nota Bene* on micro insurance**:

In developing countries (Algeria, Egypt, Libya and Tunisia,, for example) the most fundamental problem is the limited status of property insurance and for low-income populations more specifically. Micro-insurance is a financial arrangement to protect low-income people against specific perils in exchange for regular premium payments (Churchill, 2006, 2007). Several pilot projects have yielded promising outcomes, yet experience is too short to judge if micro-insurance schemes are viable in the long run for local places. Many of the on-going micro-insurance initiatives are index-based – a relatively new approach whereby the insurance contract is not against the loss itself, but against an event that causes loss, such as insufficient rainfall during critical stages of plant growth. Weather index insurance is largely at a pilot stage, with several projects operating around the globe, including in Kenya, Malawi, Mongolia, Rwanda, and Tanzania [70] (IPCC Report).

Table: Indicative examples of natural disaster and climate event insurance

Property ins. coverage / Insurance company	Natural disasters	Climate events
Allianz ▪ **Principal office**	(Egypt) The building package and home contents package: items are covered in case of natural disasters (flood, earthquake, storms).	
▪ **Partner office**	(Albania) Property insurance compensates you in case of damage, loss or accidental destruction due to fire, explosion of gas appliances, earthquake, and flood or pipe flow. Prime: The premium for this insurance varies from 0.05% to 1.5% of insured sum depending on the object and types of risks that will be insured.	
AXA	Algerian terms and conditions (non official translation from French to English) **Article 8 – Natural disasters** 8.1 The damage and the goods insured are covered up to the capital limit indicated under the relevant conditions and subject to exclusions. In relation to storm events, hail and snow on rooftops: material damage caused directly to insured goods by: ▪ wind or the impact of a body knocked over the wind; ▪ hail on rooftops; ▪ the weight of snow (or ice) on rooftops; ▪ when these weather phenomenons are of such intensity that they destroy, smash or damage a certain number of well-built buildings in an area of disaster risk or in neighbouring areas.	**Article 2: General exclusions** The following are not covered under this insurance contract: any damage resulting from: ▪ An earthquake, a volcanic eruption, an avalanche, a flood, a tidal event or other natural phenomenon of a catastrophic nature, unless otherwise agreed or provided for in the terms and conditions. ▪ Climatic events that do not resemble natural catastrophes, such as: storms, hailstorms, damage caused by the weight of accumulated snow or ice on rooftops, are covered under this contract.

[70] IPCC, Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation, *supra* note, pp. 321-324

Natural disasters – An example from Algeria: *Décret Exécutif n° 04-268 du 13 Rajab 1425 correspondant au 29 août 2004* (Executive decree n° 04-268 of 13 of the month of Rajab 1425 corresponding to 29 August 2004)

Art. 1. – The purpose of this decree is to identify the events that could constitute a natural disaster and therefore be covered by the insurance policy, and to establish relevant reporting procedures.

Art. 2. – The following effects of natural disasters are covered by the insurance policy:

- earthquakes;
- floods and mudslides;
- storms and gales;
- landslides.

***Décret exécutif n° 04-269 du 13 Rajab 1425 correspondant au 29 août 2004* (Executive decree n° 04-269 of 13 of the month of Rajab 1425 corresponding to 29 August 2004)**

Art. 2. — The applicable tariffs in relation to cover for the effects of natural disasters are comprised of the premiums determined according to the risk exposure under the standard rules and technical reference standards in force at the time: the area of exposure; and the vulnerability of the construction.

Box 13: Best practices

Europa Re

Europa Re will provide reinsurance in support of catastrophe insurance products developed by its experts to address the specific natural disaster and weather risks faced by the countries of Southeast Europe.

Europa Re will support the following insurance products:

- Catastrophe insurance coverage for damages caused to property and contents by earthquake (and fire following an earthquake) and flood.
- Indemnity: Europa Re has developed a traditional indemnity type catastrophe insurance products and parametric index-based weather risk hedging contracts.

Allianz Group – Catastrophe programmes and products (bonds)

This company sets up two big catastrophe ("Cat") programmes to optimize its use of reinsurance and to increase the group protection against "worst case" natural perils[71]:

- "Super Cat" covers medium-sized events in Europe and Australia up to return periods of 250 years by pooling the potential losses of the Allianz entities.
- The "Mega Cat" programme reinsures the top natural peril scenarios of Allianz Group up to return periods of more than 1,000 years.

Both tools make extensive use of the good geographical diversification of the different Allianz entities. Depending on the scenario, these two covers provide "NatCat" protection of more than 1.5 billion euros, so that even more intense events due to climate change should be covered.

Allianz also issues a catastrophe bond, offers micro-insurance products against climate impacts and launches crop insurance: Allianz issued its first flood catastrophe bond as part of a USD1 billion programme to disperse the risk of severe regional floods across a global fund. Allianz also offers micro-insurance products in 6 countries including India, Indonesia, Egypt, Cameroon, Senegal and Colombia to help build capacity against climate change. A crop insurance product developed together with HSBC and offered in Brazil offered farmers protection against extreme weather events.[72]

[71] Allianz Group and WWF, Climate Change & the Financial Sector: An agenda for Action, June 2005, p. 29.

[72] www.unepfi.org/fileadmin/documents/FinancialInstitutionsTakingActionOnClimateChange.pdf

e) Lessons learned from other regions of the world

In considering the options for improving the approach of the insurance industry to climate change risks in the Mediterranean, it is important to note the lessons learned in other regions of the world where such work is more advanced (see Box 14).

One option to increase the uptake of insurance products designed to take account of climate risks, particularly among low-income households such as farmers, is to subsidise the products through public funding. Experience from the US, however, shows that such public subsidies can have unwanted secondary effects. There, the public subsidising of coastal property insurance has led to an increase in property development on the floodplain, increasing the risks and numbers of people exposed. Due to the unpredictability of coastal flooding events, The National Flood Insurance Programme (NFIP) has become the only provider of coastal property insurance as private companies have shied away from a risk that is difficult to assess and manage. By selling insurance to homeowners at one-half, or even one-third, of the true risk cost, the NFIP has created perverse incentives for homeowners, resulting both in increased construction in high-risk areas, and a lack of the resilience-building needed to respond effectively to climate change risks. The NFIP is also heavily in debt and has resulted in an increased burden on taxpayers. The conclusions drawn, therefore, are that problems arise when the cost of coastal property insurance does not adequately reflect the risks faced by coastal property owners, when building on the floodplain is not actively discouraged, and when communities are not encouraged to build their own resilience and responses to climate risk.[73]

As many of the countries covered by this study comprise significant coastal areas, it is likely that similar challenges will arise in determining how to address the climate risks given likely industry reluctance to take on such risks, the limited public finances available to provide extensive subsidisation, and the secondary effects that could result from doing so. The same recommendations as have been made in respect of US coastal insurance are likely to be relevant. These are that:

a) premiums reflect risk;
b) floodplain development is deterred (particularly as countries develop economically);
c) subsidies are used to encourage relocation away from coastal areas and to adapt properties that remain;
d) community-led resilience is encouraged;
e) some of the risk is transferred to capital markets through the purchase of reinsurance and bonds issuance; however, only where doing so will not lead to increased coastal development in high-risk areas and to large publicly funded bailouts.

[73] Union of Concerned Scientists, "Overwhelming Risk: Rethinking Flood Insurance in a World of Rising Seas" (February 2014), www.ucsusa.org/floodinsurance

Box 14: Risk reduction in a changing insurance climate: examples from the US and UK

Coastal cities face a range of increasingly severe challenges as sea-level rises, and adaptation to future flood risk will require more than structural defences. Many cities will not be able to rely solely on engineering structures for protection and will need to develop a suite of policy responses to increase their resilience to impacts of rising sea level. Insurance can be used as a risk-sharing mechanism to encourage adaptation to sea-level rise, using pricing or restrictions on availability of cover to discourage new development in flood risk areas or to encourage the uptake of flood resilience measures. We draw on flood insurance policy lessons learned from the United States and the United Kingdom to propose risk-sharing among private insurers/reinsurers, government, and policyholders to alleviate major issues of the current programmes, while still maintaining a holistic approach to managing flood risk.

The UK and the US are almost polar opposites in the way flood insurance is implemented. Flood insurance in the US is fully public and in the UK fully private; however, in both countries the participants feel that the established system is unsustainable. In the US, flood coverage is excluded from property policies provided by private insurers, and is only available through the National Flood Insurance Programme (NFIP), with the federal government acting as insurer of last resort. Flood risk reduction has been part of the NFIP remit since the introduction of the programme in 1968. Following massive payments for flood claims related primarily to Hurricanes Katrina and Sandy, the NFIP is approximately USD 26 billion in debt, prompting calls to bring private insurance back into the flood insurance business. Two major Congressional modifications to the NFIP in 2012 and 2014 have pushed the contradictory goals of fully risk-based, yet affordable premiums. The private market has not been significantly involved in a risk-bearing role, but that is changing as private insurers enter as competitors, which is likely to increase NFIP flood risk portfolio volatility and undermine the NFIP goal of integrated flood risk management and risk reduction.

In the UK, flood coverage is available only from private insurers, and is bundled with other perils in property policies. This approach is unusual in not passing all or part of the flood risk to government, with the financial costs of floods borne entirely by the private sector. Although the UK flood insurance market will change significantly in 2015 with the introduction of Flood Re, a subsidized flood insurance pool for high-risk households, flood cover will continue to be provided solely by the private sector. Flood Re does not reduce flood loss, but spreads the risk, protecting some policyholders from the costs of flooding at the expense of others. In contrast to the NFIP, Flood Re does not provide any incentives for policyholders or communities to improve the flood resilience of their properties.

Conclusions and recommendations

Both the banking and insurance industry are directly concerned by the climate change challenge. There is an urgent need to make additional efforts to adjust policies, products and services to avoid and reduce losses in properties, equipments and infrastructures that can be already anticipated today. In particular the insurance industry, by being responsible and forward-looking, can lead the way to better public and private investments as well as more robust research and policy engagement to identify, quantify and mitigate the key climate risks.

Obviously, the insurance sector is much advanced as compared to the banking sector, which could play a key role in adapting better to climate change, in particular through a more stringent lending policy integrating results of climate impacts assessment, particularly in coastal zones where sea-level rise and coastal erosion may affect properties and the natural ecosystems.

To contribute to increasing society's resilience to climate change, and to improve practices of banking and insurance companies to address climate vulnerability, four key areas should be considered to enhance further climate action in the banking and insurance sectors.

1) Enhance knowledge and raise awareness on climate risks

A better understanding and a public awareness are critical to build a resilient economy. It is fundamental to support global fundamental research to understand climate risks and its effects on the environment and human life and to share this knowledge with governments and the general public – above all customers.

For Governments, Public Entities:

- Collect and gather information on future climate risks on the Mediterranean coastal zone, using MAP systems, including from CAMP demonstration projects[74], and other existing databases, such as PEGASO[75]:
  - Special data collection (directed by the PAP/RAC, GEF, etc.);
  - Develop tools such as risk zoning (e.g. flood or erosion zoning);
- Make meteorological and climate data available to the general public through open source data initiatives;
- Promote the development and use of standardized international metrics related to climate risk and exposure.

[74] One of the objectives of the **Coastal Area Management Programme (CAMP)** is to disseminate information on coastal area values and vulnerabilities as a result of the implementation of practical coastal management projects in selected Mediterranean coastal areas. Generally, information on the value of natural resources in the coastal area and necessity to manage them in a sustainable way is not communicated to the public in an organised way. Yet, available information on the threats from unsustainable development patterns is not present in the public to the extent that could lead to changing perceptions and behaviours.

[75] **PEGASO** (People for Ecosystem Based Governance in Assessing Sustainable Development of Ocean and Coast) is a research project funded by the EU (FP7), which aims at developing a shared Integrated Coastal Zone Management (ICZM) Governance Platform including tools such as maps. The PEGASO land cover product is created from MODIS multispectral data following a simplified CORINE classification scheme. Maps represent the land-based impacts on the Western Mediterranean Sea ecosystems. They show that main impacts on sea ecosystems take place near the coast, coinciding mostly with urban growth on land and river catchments. It can be also appreciated that in areas where water is renewed through strong currents (area near to the Gibraltar strait for example), impacts are lower. Information from PEGASO can also be extremely useful for developing ICZM national strategies, marine strategies and marine spatial plans.

For Bank & Insurance Companies:

- Internal staff and human resources (of each bank or insurance company) should strengthen their capabilities to better understand the impacts of current and future climate risks on their activities/products/services;
- Integrate climate risk disclosure in financial oversight processes;
- Develop and use climate impact assessments as tools to strengthen lending policies integrating climate risks.

2) Reinforce climate risk prevention services

In order to improve better prevention practices *vis-à-vis* climate risks, bank and insurance companies should dedicate operational human resources to develop appropriate products and offer related services to their clients as well as to the general public.

For Bank & Insurance Companies:

- Improve customer's awareness by communicating the risks associated with climate change through pricing and underwriting;
- Indicate consideration of climate-related asset value erosion in the evaluation of real estate and municipal bond investments;
- Educate clients about the benefits and processes being used to incorporate extra-financial issues, such as climate change, in the management of their assets;
- Promote further insurance leading practices based on customer-facing website portals, informational materials, and in some cases, risk assessment tools to educate policyholders about climate risk[76];
- Build societal resilience by insuring people with micro-insurance products.

For Governments, Public Entities:

- Promote insured behaviour: in some countries, it is not common to have property or agriculture insurance. This function should be undertaken by public and private entities;
- Support implementation of practical coastal management projects in Mediterranean coastal areas as a way to raise further awareness of both the public and the insurance and banking sectors.

3) Development products/services (insurance or investment products) as incentives mitigation and adaptation

- Both homeowners and farmers are threatened by the climate variability and change in the Mediterranean Region.
- Adaptation measures must be developed in taking into account specific time and location conditions (e.g. adaptive measures in one location may be useless or even inappropriate in another time and place, e.g., buildings may have to be periodically relocated if sea-level rise continues, and switching to more heat-resistant seed types can be effective only up to some temperature limit[77]).

[76] Insurer Climate Risk Disclosure Survey 2014, Findings & Recommendations, Ceres Insurance Programme.

[77] Biagini Bonizella and Miller Alan, "Engaging the Private Sector in Adaptation to Climate Change in Developing Countries: Importance, Status, and Challenges", Climate and Development, Vol. 5, Issue 3, 2013, p. 248.

- Property and casualty insurers – those at the "front line" of climate risks are not addressing climate risks comprehensively. Because property and casualty insurers tend to limit coverage or withdraw from disaster-prone areas, like coastal regions, they shift responsibility and risks to local communities and public institutions.
- Such as for natural disasters, property and agriculture insurance should fully integrate exposure zones.
- Establish a Mediterranean Catastrophe Risk Insurance (based possibly on the model of the Caribbean Catastrophe Risk Insurance).
- Establish regional risk management institutions and platforms to foster collaborative action to coordinate the management of weather-related risks and build risk prevention and management capabilities.

4) Public sector role to create the enabling environment

- Create an enabling environment for enhancing adaptation through appropriate banking and insurance policies, products and services. This requires more integration of insurance needs and/or impacts into framework strategies such as sustainable development, national environmental protection and ICZM strategies to be established in accordance 18 of the ICZM Protocol, with a particular focus on the management of set-back zones (Article 8.2) and natural hazards (Article 22).
- Promote the development of public private partnerships for large-scale risk coverage in some coastal regions where insurance products do not cover climate change related risks.
- Avoid maladaptive risk management decisions: even in countries with free-market flood insurance systems, insurers may be reluctant to charge the full technical rate because consumers have come to assume that insurance costs should be relatively consistent in a given location. Without charging technical rates, however, it is difficult to use pricing to motivate adaptation strategies such as flood proofing or elevating the ground floor of a new development, restricting where properties can be built, or justifying the construction of communal flood defences[78].
- Where necessary to ensure collective or societal benefits for local populations from some public investments, to impose insurance cost sharing or levies to cover insurance costs.

[78] IPCC, Chapter I, p. 55 (doc 2008).

Annex 1 – Questionnaire

The general background of this questionnaire is the "*Integration of climatic variability and change into national strategies to implement the ICZM Protocol in the Mediterranean*" (ClimVar & ICZM) project funded by the GEF (Global Environmental Facility).

The Priority Actions Programme Regional Activity Centre (PAP/RAC), a key component of the Mediterranean Action Plan (MAP), itself part of the United Nations Environment Programme (UNEP), has been asked to identify the best practices of major regional (Mediterranean) banks and insurance companies on climate change adaptation.

The specific objective of PAP/RAC is to contribute to the sustainable development of coastal zones and the sustainable use of their natural resources.

PAP/RAC has been tasked with assessing aspects of banking and insurance company practices, such as:

1. Does your company have an idea about the expected economic losses caused by weather-related disasters? Regarding the Mediterranean coastal zone?
2. Is your company progressing in term of climate risk identification through, for example, the development of forward-looking risk models?
3. Does your company contribute to risk awareness through risk-based terms and conditions and advice to its customers in the Mediterranean coastal zones?
    - Yes / No
    - Could you, please, give us a typical clause of contract for any example?
4. Does your company offer products or services as incentives for climate change adaptation in coastal zones?
    - Yes / No

    For example:

    a) Insurance against weather-related disasters
    - Yes / No

    b) Green insurance products (to facilitate the construction of more environmentally friendly buildings)
    - Yes / No

    c) Weather-related risk in property insurance (individual and commercial lines)
    - Yes / No

    d) Other products or services

    Could you, please, give us a typical contractual clause for example?
5. Does your company provide specific conditions for coastal property (concerning the Mediterranean coastal zone) where there are rising sea levels and an increasing strength of storm surge?

    a) Will underwriters' costs rise?
    - Yes / No

    b) Could you, please, provide a typical contractual clause?
6. Does your company provide opportunities/solutions for sectors with high climate change risks in coastal zones?
    - Yes / No
    - Could you, please, give us an example?

7. Does your company integrate spatial diversification in its products/services, by identifying the level of risk for different locations?
    - Yes / No

   a) Do banking companies accept loans for real estates in close proximity to the sea?
    - Yes / No
    - If yes, do they increase the interest rates?

   b) Could you, please, give us a typical contractual clause?

8. Does your company take into account typical coastal issues (tourism development, water supply, forest fires) in your services?
    - Yes / No
    - Could you, please, give us an example?

9. Does your company work with policymakers to guide society with tools such as land-use, coastal zone planning and building codes?
    - Yes / No

Annex 2 – Major Bank & Insurance companies

Country	Insurance companies	Reinsurance companies	Bank companies
Albania	▪ Sigal (Uniqa Group – Allianz partner office) ▪ Sigma (VIG - Vienna Insurance Group) ▪ AXA partner company	▪ Swiss Re ▪ Europa Re	▪ Société Générale Albania ▪ Credit Agricole Albania
Algeria	▪ AXA Algeria ▪ Compagnie d'assurances des hydrocarbures (Allianz partner office) ▪ Mamda	▪ Mamda Re (Partner Re + Mutuelle centrale de Réassurance)	▪ Natixis Banque ▪ Société Générale ▪ BNP Paribas ▪ HSBC ▪ Crédit Agricole Corporate et Investment Bank ▪ Citibank
Bosnia and Herzegovina	▪ Uniqa Sarajevo osiguranje d.d. (Allianz partner office) ▪ Vienna Insurance Group ▪ Triglav ▪ A.M. Best ▪ AXA partner company	▪ Swiss Re ▪ Europa Re	▪ Balkan Investment Bank ▪ Unicredit Bank ▪ Sberbank BH d.d. ▪ Procredit bank
Croatia	▪ Generali ▪ Allianz ▪ UNIQA osiguranje d.d., Zagreb ▪ Triglav ▪ AXA partner company ▪ ERGO (Munich Re company)	▪ Swiss Re ▪ AON Insurance	▪ OTP Banka (OTP group) ▪ Erste Bank (Erste Group) ▪ Zagrebacka banka (Unicredit Bank) ▪ Privredna banka Zagreb - PBZ (Intesa Sanpaolo Group) ▪ Société Générale ▪ Sberbank BH d.d.
Egypt	▪ Allianz Insurance ▪ ACE Insurance ▪ A.M. Best ▪ AXA partner company	▪ AON Insurance	▪ Credit Agricole Egypt ▪ Bank Audy Egypt ▪ HSBC Bank Egypt ▪ Citibank ▪ BNP Paribas (acquired by Emirates NBD) ▪ Barclays
Libya	▪ United Insurance Company (Allianz partner office)	▪ Arab Re	▪ HSBC (HSBC Bank Middle East Limited) ▪ Crédit Agricole
Montenegro	▪ UNIQA neživotno osiguranje A.D. (Allianz partner office) ▪ Triglav ▪ Generali ▪ AXA partner company	▪ Swiss Re ▪ Europa Re	▪ OTP Group
Morocco	▪ Wafa Insurance (Allianz partner office) ▪ AXA Assurance Maroc Insurance ▪ A.M. Best ▪ Zurich Insurance	▪ AON	▪ Société Générale Maroc BMCI (BNP Paribas Group) ▪ Citibank ▪ Crédit du Maroc (Crédit Agricole Group)
Palestine	▪ Palestinian Insurance Company	▪ Swiss Re	▪ HSBC (HSBC Bank Middle East Limited)
Syria	▪ Arabia Insurance ▪ ADIR (Partnership with NATIXIS Assurances – France) ▪ A.M. Best	▪ Swiss Re	▪ Bank Audi Syria
Tunisia	▪ Generali ▪ ACE Insurance ▪ Assurance Maghrebia (Allianz partner office) ▪ CTAMA ▪ A.M. Best ▪ AXA partner company	▪ AON	▪ UBCI (Groupe BNP Paribas) ▪ UIB (Groupe Société Générale) ▪ Citibank

Bibliography

- A ULI Global Policy and Practice Forum Report, Risk & Resilience in Coastal Regions, ULI Climate, Land Use, and Energy (CLUE) Initiative, 2013, 44 p.
- ABI Climate Wise Report, June 2013, 3 p.
- Allianz Group and WWF, Climate Change & Financial Sector: An agenda for action, June 2005, 59 p.
- AON Benfield, Annual Global Climate and Catastrophe Report, Impact Forecasting, 2013, 68 p.
- AXA & Ipsos, Individual perceptions of climate risks, Survey, 2012, 18 p.
- AXA, Announcement of a partnership between AXA and the World Bank Group, Press Release, February 2015.
- AXA, Paper on climate risks, Risk education and research, n°4, Oct. 2012, 36 p.
- AXA, Position Paper on Climate Risk, July 9, 2014, 7 p.
- Baglee, A., Haworth, A. and Anastasi, S, Climate Change Risk Assessment for the Business, Industry and Services Sector, UK Climate Change Risk Assessment (CCRA), January 2012, 202 p.
- Barclays Environmental Risk Management & Acclimatise for CO2 London Accord, Credit risk impacts of a changing climate, 60 p.
- Biagini Bonizella and Miller Alan, "Engaging the Private Sector in Adaptation to Climate Change in Developing Countries: Importance, Status, and Challenges", Climate and Development, Vol. 5, Issue 3, 2013, pp. 242-252.
- Bielza Maria, Conte Costanza, Dittmann Christoph, Gallego Javier, Stroblmair Josef, Agricultural Insurance schemes, Final Report, Dec. 2006, modified February 2008, European Commission, 321 p.
- Brack Estelle, Elsen Robert and Pons Jean-François, "Financial services in the Euro-Mediterranean partnership: banking", *Munich Personal Re Archive*, April 2009, 18 p.
- CEA Insurers of Europe, Tackling climate change, the vital contribution of insurers, April 2009, 64 p.
- Climate Summit Scales Up Adaptation and Resilience Support for Most Vulnerable Countries, Press Release, Climate Summit 2014, 4 p.
- Climate Wise Report, Addressing the risk we occur and our customers face from climate change, Zurich, 2014, 20 p.
- Convention for the protection of the Marine environment and the coastal region of the Mediterranean, UNEP, 2004.
- Convention for the Protection of the Mediterranean Sea against Pollution, UNEP, 1976.
- Douglas Rowan, Integrating Natural Disaster Risks & Resilience into the Financial System, Concept Note, Willis Research Network, June 2014, 10 p.
- Economics of climate adaptation, Shaping climate-resilient development, A framework for decision-making, 2009, 159 p.
- Finley Tiffany and Schuchard Ryan, Adapting to Climate change: A Guide for the Financial Service Industry, BSR, Sept. 2012, 2011, 7 p.

- Garrido Alberto, Bielza Maria, Rey Dolores, Minguez Ines, Ruiz-Ramos M., Insurance as an Adaptation to Climate variability in Agriculture, CEIGRAM, Research Centre for the Management of Agricultural and Environmental Risks, Working paper n° 2, Dec. 2010, 30 p.
- Herweijer Celine, Ranger Nicola and E. T. Ward Robert, Adaptation to Climate Change: Threats and Opportunities for the Insurance Industry, *The Geneva Papers*, 34, 2009, pp. 360–380.
- Insurer Climate Risk Disclosure Survey: 2012 Findings & Recommendations, Ceres Insurance Programme, March 2013, 72 p.
- Insurer Climate Risk Disclosure Survey: 2014 Findings & Recommendations, Ceres Insurance Programme, Oct. 2014, 80 p.
- IPCC, 2013: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, 1535 pp.
- IPCC, 2014, Climate Change 2014: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Chapter 23, Cambridge University Press, pp. 1267- 1326.
- IPCC, Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation, Cambridge University Press, 2012, 594 p.
- Mcgranahan Gordon, Balk Deborah and Anderson Bridget, "The rising tide: assessing the risks of climate change and human settlements in low elevation coastal zones", *Environment & Urbanization*, International Institute for the Environment and Development (IIED) in London, Vol. 19, 2007, pp. 17-37.
- Mills E., Responding to climate change – The Insurance Industry Perspective, Climate Action Programme, 4 p.
- Osberghaus Daniel and Baccianti Claudio, "Adaptation to Climate Change in the Southern Mediterranean – A Theoretical Framework, a Foresight Analysis and Three Case Studies", *MEDPRO Technical Report*, No. 26/February 2013, 100 p.
- Protocol on Integrated Coastal Zone Management in the Mediterranean, UNEP, 2008.
- Rochette Julien and Billé Raphael, "The Mediterranean ICZM Protocol: Paper treaty or wind of change?", *Ocean & Coastal Management*, n°105, 2015, pp. 84-91.
- Rochette Julien, Wemaëre Matthieu, Billé Raphael, du Puy-Montbrun Guillaume, A contribution to the Interpretation of Legal Aspects of the Protocol on Integrated Coastal Zone Management in the Mediterranean, UNEP, MAP, PAP/RAC, 2012, Split.
- Rupprecht Consult, Evaluation of Integrated Coastal Zone Management (ICZM) in Europe, Final Report, International Ocean Institute, European Commission, 2006.
- Rym Ayadi, Emrah Arbak and Willem Pieter De Groen, "Convergence and Integration of Banking Sector Regulations in the Euro-Mediterranean area Trends and Challenges", *MEDPRO Technical Report*, No. 34, March 2013, 35 p.
- Rym Ayadi, Emrah Arbak, Sami Ben Naceur, Barbara Casu, "Convergence of bank regulations on international norms in the southern mediterranean impact on bank performance and growth", Centre for European Policy Studies (CEPS), Brussels, 2011, 159 p.
- Swiss Re, A global overview of case studies with a focus on infrastructure, Economics of Climate Adaptation – Shaping climate-resilient development, 2014, 13 p.
- Swiss Re, Corporate Responsibility Report Committed to Sustainable value creation, 2012, 78 p.

- Swiss Re, Natural catastrophes and man-made disasters in 2013: large losses from floods and hail; Haiyan hits the Philippines, Sigma, n°1, 2014, 49 p.
- The Geneva Association, Climate Risk Statement of the Geneva Association, May 2014.
- Troy Billy, Assurance et développement agricole: nouvelles dynamiques en Algérie, au Maroc et en Tunisie, Fondation pour l'agriculture et la ruralité dans le monde, Document de travail n°5, Dec. 2013, 70 p.
- UNEP, Financial Institutions taking action on Climate Change, Sept. 2014, 36 p.
- UNEP, Global insurance industry statement on adapting to climate change in developing countries, 2013, 4 p.
- UNEP/MED, Integration of Climatic Variability and Change into National Strategies To Implement the ICZM Protocol in the Mediterranean, Inception Report, February 2014, 74 p.
- Union pour la Méditerranée, Integrated coastal zone management in the Mediterranean, from local to regional, how to stop the loss of biodiversity, The ICZM coping with Climate change, Workshop 2, Dec. 18-19 2008, France, 6 p.
- United Nations, Action Statement, Integrating Risks into the Financial System – The 1-in-100 initiative, Climate Summit 2014, 3 p.
- WFP & International Fund for Agricultural Development, Weather Index-based Insurance in Agricultural Development, A technical guide, 2011, 68 p.
- World Economic Forum, A vision for managing natural disaster risk, Proposals for public/private stakeholder solutions, April 2011, 127 p.
- Zhang Haiyan, Putra Handi Chandra, Andrews Clinton J., Bloustein E.J., "Modeling Real Estate Market Responses to Climate Change in the Coastal Zone", *School of Planning and Public Policy*, 2013, 18 p.

Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem

MedPartnership

Together for the Mediterranean Sea

GEF UNEP

PAP/RAC

Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem

MedPartnership

Together for the Mediterranean Sea

GEF UNEP

PAP/RAC is established in 1977 in Split, Croatia, as a part of the Mediterranean Action Plan (MAP) of the United Nations Environment Programme (UNEP). PAP/RAC's mandate is to provide support to Mediterranean countries in the implementation of the Barcelona Convention and its Protocols, and in particular of the Protocol on Integrated Coastal Zone Management. PAP/RAC is oriented towards carrying out of the activities contributing to sustainable development of coastal zones and strengthening capacities for their implementation. Thereby, it co-operates with the national, regional and local authorities, as well as with a large number of international organisations and institutions.

PAP/RAC