This is a pre-published version. For final version see:
Santos-Lacueva, R., Anton Clavé, S. & Saladié, Ó (2017). How is the Riviera Maya tourism industry dealing with climate change? An overview of non-climatic stressors that determine the destination's vulnerability to climate change, in Climate Change and Coastal Tourism: Recognizing Problems, Managing Solutions & Meeting Expectations, A Jones & M Phillips (Eds), CABI

CASE STUDY MEXICO: RIVIERA MAYA – HOW IS THE RIVIERA MAYA TOURISM INDUSTRY DEALING WITH CLIMATE CHANGE? AN OVERVIEW OF NON-CLIMATIC STRESSORS THAT DETERMINE THE DESTINATION'S VULNERABILITY TO CLIMATE CHANGE

R. SANTOS-LACUEVA*, S. ANTON CLAVÉ AND Ò. SALADIÉ

raquel.santos@urv.cat

Rovira i Virgili University, Spain

INTRODUCTION: THE RIVIERA MAYA

The Riviera Maya is a well-known Caribbean coastal destination in the state of Quintana Roo (Mexico), as shown in the location map (Fig. 14.1). It has a wealth of natural and cultural resources. The Mesoamerican Barrier Reef (the second largest in the word), the Sian Ka'an Biosphere Reserve, the Tulum National Park and, in general, the white-sand beaches, underground rivers, mangroves and rainforests all form a rich collection of biodiversity. Its Mayan heritage, which can be observed at various archaeological sites (e.g. Fig. 14.2) and experienced as part of the living culture, also makes the Riviera Maya especially attractive.

[Fig. 14.1 near here]

[Fig. 14.2 near here]

Quintana Roo was one of the most underdeveloped and marginalized territories in Mexico until the late 1960s (Torres and Momsen, 2005) when Cancun was selected to be the site of the first planned tourism development in Mexico (Ambrosie, 2015). Riviera Maya, previously known as the Cancun-Tulum corridor, emerged in the middle of the 1980s as a response to the massive development of Cancun. It was conceived to provide nature and exclusivity, and benefit from the pulling power of Cancun, which by then had become well established. It started out as an integrated destination in 1997, with the creation of the Fideicomiso de Promoción Turística de la Riviera Maya (Riviera Maya Destination Marketing Office). Within a few years it became one of the most famous coastal destinations and a major source of income for the state. In 2014 it was host to more than 4 million tourists (43.4% of the total for Quintana Roo); it had 394 hotels (42.3% of Quintana Roo) and a total of 42,011 rooms (47.6% of Quintana Roo). The average rate of occupancy was 81.6% (Riviera Maya Destination Marketing Office, 2015).

Riviera Maya consists of two municipalities – Solidaridad and Tulum – both of which are made up of several localities. Playa del Carmen is the capital city of Solidaridad, and Tulum village is the capital of Tulum. A total of 65.7% of all the hotels and 84.9% of all the rooms in Riviera Maya are in Solidaridad. Most of the hotels are in Playa del Carmen (43.1%) even though they only represent 18.2% of the rooms. In Riviera Maya, 80% of the rooms (24% of the hotels) are in the five-star or special category. A total of 73 hotels (75.3% of the rooms) offer all-inclusive plans. Most rooms (83%) are in the larger hotels (more than 100 rooms) (Riviera Maya Destination Marketing Office, 2015).

The valuable natural resources of Riviera Maya are highly vulnerable to climate change. Although Riviera Maya has a tropical climate with nearly 250 days a year of sun, its geographical position exposes it to extreme meteorological events during the rainy season. Additionally, its competitiveness also depends on the quality of its natural resources – the coral reef, the underwater biodiversity, the pristine white beaches, the jungle and the mangroves – all of which are potentially affected by global warming. Quintana Roo also has a special hydrological system made up of underground rivers and cenotes (Fig. 14.3), which, being an important tourist attraction, complicates water and waste management.

[Fig. 14.3 near here]

Otherwise, one of the most distinctive features of Quintana Roo's society is its duality. In fact, rapid economic and urban growth have reinforced inequality (Torres and Momsen, 2005). Throughout the state the rural settlements of the native Mayan inhabitants predominate and contrast with the few urban tourist poles that have developed along the coast. The former are marginalized and lack basic services and infrastructures, while the latter concentrate foreign and national immigrants, investment and modern infrastructures and services. Duality is also a feature in cities, where the tourist areas are clearly differentiated from the rest of the urban area. These no-tourist areas usuallylacks even the most basic of services and are undergoing rapid growth.

Despite these situations, Riviera Maya has been recognized as a committed destination that promotes sustainability in tourism planning and it has been recognized by the Global Sustainable Tourism Council in 2014 as one of the fourteen Early Adopter destinations in the world.

RESEARCH CONTEXT

Research on vulnerability to climate change has evolved from a focus on the biophysical impact of mitigation policies and hazards (Thywissen, 2006; Füssel, 2010; Hinkel, 2011) to an analysis of adaptation strategies from economic policies and resilience scope (Eakin and Luers, 2006; Füssel and Klein, 2006). In order to be evaluated, there have been increases in the number of local studies, more analyses of the implication of stakeholders and a greater

focus from the social sciences on the significance of non-climatic factors (Füssel, 2007; Moreno and Becken, 2009; O'Brien and Wolf, 2010; Huebner, 2012).

The present research has reviewed policy reports and undertaken 16 interviews with stakeholders to study the extent to which stakeholders perceive policies and strategies on climate change to be factors that determine the ability of a destination to adapt to and mitigate it from a contextual perspective (Füssel, 2010; O'Brien and Wolf, 2010). The case of Riviera Maya is relevant because perceptions, decisions and actions are heavily influenced by socio-economic and political factors, and because of the physical characteristics that increase the destination's exposure to natural disasters and climate change-related hazards.

The interviews were held in person between November 2014 and January 2015. Participants were selected for their relevance, due to their role at the destination, their position and affiliation, and also their policy area, administrative level, professional profile and gender (see Table 14.1). The interviews combined open and closed questions in four blocks of information: climate change and tourism; obstacles to successful adaptation and mitigation; role of stakeholders in adaptation and mitigation; and coordination of decision-making between the tourism and environment authorities.

Table 14.1. Relevance of participants.

Position	**Affiliation**
Director of Tourism Planning and Development	Secretariat of Tourism, Quintana Roo State
Director of Climate Change and Environmental Management	Secretariat of Ecology and Environment, Quintana Roo State
Head of Environmental Risk Department	Impact and Environmental Risk Institute, Quintana Roo State
General Director of Tourism	Municipality of Solidaridad
General Director of Environmental and Urban Planning	
General Director of Economic Development and Attracting Investments	
Director of ZOFEMAT (Federal Maritime Land Area)	
Director of Tourism	Municipality of Tulum
General Director of Urban Development and Ecology	
General Director	Riviera Maya Destination Marketing Office
Executive Director	Riviera Maya Hotels Partnership
General Manager of Sustainable Hospitality Initiative of MARTI (Meso American Reef Initiative)	
Director	Amigos de Sian Ka'an
Deputy director of the Climate Change Programme	
Founder and Director	Sustainable Riviera Maya
Professor of Sustainable Tourism	Caribe University

CLIMATE CHANGE: ASSESSING PROBLEMS AND CHALLENGES: FROM SCIENTIFIC REPORTS TO STAKEHOLDERS' PERCEPTIONS

Climate change in Riviera Maya: scientific reports

The Government of Mexico is aware that climate change has had an impact on coastal destinations (SEMARNAT and PNUMA, 2006; INE, 2008). SEMARNAT *et al*. (2011) and SEMARNAT (2012) point out that Mexico is particularly threatened by extreme meteorological events such as hurricanes, cyclones (IMTA and SEMARNAT, 2009), floods and heatwaves. Natural disasters caused 154 deaths per year on average between 1999 and 2011 and this century the cost of damage is expected to increase from 3.2% to 6% of GDP. This is because extreme events are more intensive and more frequent and because human settlements and economic activities are more exposed (SEMARNAT, 2012). Between 1970 and 2009 hurricanes increased in both frequency and intensity, especially in the Gulf of Mexico and on the Caribbean coast (SEMARNAT, 2012).

Riviera Maya is located in the area with the greatest risk of hurricanes and storm surges (Fig. 14.4) (Government of Quintana Roo, 2013). Since tourism became a flourishing industry there, four hurricanes have impacted: Gilbert (1988), Roxanne (1995), Emily (2005) and Wilma (2005). The last one was the most severe and caused damage valued at more than 18 million pesos, mostly due to losses in tourism (IMTA and SEMARNAT, 2009). Additionally, in Riviera Maya a temperature increase of 1–1.1°C is expected by 2020, 1.9–2°C by 2050 and 2.9–3.3°C by 2080 (SECTUR, 2013). SECTUR (2013) also argues that precipitation in Riviera Maya will decrease and envisage that sea level will rise by 3.1 cm/year and states that coastline erosion between 2004 and 2012 was 1.22m/year. This report qualifies physical vulnerability as being very high.

[Fig. 14.4 near here]

The potential effects of these changes are (SECTUR, 2013): floods; beach erosion; damage to urban areas and populations, infrastructure (housing, communications, and energy and water supplies) and the environment; economic losses; fires; health problems (increased heart rate and an increase in dengue, cholera and paludism); a scarcity of potable water and waste accumulation due to extreme weather; deterioration of cenotes and proliferation of invasive species, such as Sargasso algae (Fig. 14.5).

[Fig. 14.5 near here]

Climate change in Riviera Maya: stakeholders' perceptions

Stakeholders influence decision and non-decision making and determine policies, strategies and plans to deal with climate change. So, what they think about this issue is important because their perceptions of risk might not be the same as the perceptions of scientists. The

stakeholders interviewed consider that climate change influences tourism in Riviera Maya 4.13 out of 5. The worst effects they identify are with the rise in sea level, the extreme meteorological events and coral bleaching (see Table 14.2). Interestingly, most of them think that climate change events are already having a negative effect on tourism in Riviera Maya (see Table 14.3).

Table 14.2. Answers to the question 'What are the worst effects of climate change in Riviera Maya? (Select three)'

Effect of climate change	**Mentions (%)**
Sea level rise	29.2
Extreme meteorological events (heatwaves, storms, hurricanes, etc.)	27.1
Coral bleaching	20.8
Rise in temperature	12.5
Migration of species	6.2
Acidification of the ocean	4.2
Increase in organisms, illness, insects, etc.	0.0
Drought	0.0
Others	0.0

Table 14.3. Perception of the risk of climate change impacts in Riviera Maya.

	Mentions (%)		
Effect of climate change	**It does not affect tourism and it will not affect it**	**It is already affecting tourism**	**It does not affect tourism yet but it will affect it in (years according to average answers)**
Sea level rise	6.2	87.6	6.2 (15 years)
Extreme meteorological events (heatwaves, storms, hurricanes, etc.)	6.4	81.2	12.4 (7 years)
Coral bleaching	0.0	62.5	37.5 (10 years)
Increase in temperature	18.7	62.6	18.7 (15 years)
Migration of species	18.7	56.3	25.0 (13 years)
Acidification of the ocean	18.7	50.0	31.3 (14.5 years)
Increase in organisms, illness, insects, etc.	6.2	50.0	43.8 (9 years)
Drought	68.7	18.7	12.6 (6 years)
Others	62.5	31.3	6.2 (10 years)

As can be seen in Table 14.4, stakeholders point out that the main difficulty of responding to the problems identified is the scarcity of economic resources, the lack of awareness, and the poor coordination between different public authorities, and between the authorities and the private sector. There are also significant differences in answers according to the profile – lobbyist or politician – and the policy area – environment or tourism – of the respondents. Non-governmental participants are more critical of the scarcity of economic resources than

politicians and the difference in their opinions about limitations of human resources is even greater. The opinions of lobbyists and politicians about awareness are also quite opposite. The problems of poor coordination between institutions and organizations are also regarded as greater by those who are not politicians. As far as the policy area is concerned, those participants from the environmental sector are most negative about economic resources, private sector support, public sector capacity and coordination between the public authorities and the private sector. Finally, the tourism sector considers that the greatest problems are those of awareness.

Table 14.4. Affirmative answers about problems according the participant's profile and policy area.

	Affirmative answer (%)				
	Profile		Policy area		
Problem	Lobby	Politician	Tourism	Environment	Total
Economic resources are limited.	85.7	66.7	66.7	85.7	75
There is not enough awareness.	100.0	44.4	77.8	57.1	68.7
There is a lack of coordination between decision-makers and the private sector.	85.7	44.4	55.5	71.4	62.5
Techniques and knowledge about the issue are limited.	57.1	55.6	55.6	57.1	56.2
Human resources are limited.	85.7	22.2	55.5	42.8	50.0
Data and information are insufficient.	85.7	22.2	55.5	42.8	50.0
Future implications are uncertain.	42.9	44.4	42.9	44.4	43.7
There is a lack of coordination between public authorities.	85.7	11.1	42.8	44.4	43.7
Public sector capacity is limited.	57.1	33.3	22.2	71.4	43.7
Private sector support is not enough.	42.8	11.1	11.1	42.8	25.0

CLIMATE CHANGE: MANAGING SOLUTIONS: POLICY CONTEXT, KEY ACTORS, ROLES AND COORDINATION

Policy context

The first steps to establishing a climate-change policy took place in Mexico with the signature of the United Nations Convention in 1992. In 2005 the federal government established the Inter-Secretarial Commission for Climate Change, the aim of which was to construct the policy framework for adaptation. This institution developed the National Strategy for Climate Change (ISCCC, 2007) and the Special Programme on Climate Change for the period 2009–2012 and 2014–2018 (ISCCC, 2009, 2014). The National Development Plan 2007–2012 (Government of Mexico, 2007) included climate change for the first time, and it is still a feature of the current National Development Plan 2013–2018 (Government of Mexico, 2013). The Climate Change Advisory Council developed the Policy Framework for Medium Term

Adaptation (Climate Change Advisory Council, 2010) with a time-horizon up to 2030. Moreover, other federal programmes include issues related to climate change (e.g. the Sectorial Environment and Natural Resources Program 2007–2012, 2013–2018) (SEMARNAT, 2007, 2013).

In 2012 Mexico approved the General Law of Climate Change (2012), which grants states and municipalities the competency to take adaptation and mitigation actions. In 2010 Quintana Roo created the State Commission on Climate Change and drew up the State Program of Action on Climate Change (2013), under the State Development Plan 2011–2016 (Government of Quintana Roo, 2011), which makes climate change one of the priority projects in the Quintana Roo's Axis Green. The state also drafted instruments such as the REDD+ (Reduction of Emissions of Deforestation and Degradation) Technical Advisory Council of Quintana Roo (2012), the Law of Climate Change Action (2012), the Law of Ecological Equilibrium and Environmental Protection (2001), the Quintana Roo Inventory of Greenhouse Gas Emissions (2013) and the Quintana Roo Centre for Climate Change Education (2011). Other state programmes reinforce this policy: for example, the State Urban Development Program, the State Program for Territorial Management, the State Territorial Zoning Program and the Environmental Preservation and Natural Resources Sector Program. Moreover, Quintana Roo has entered into innovative regional agreements for the country, such as the Declaration of Campeche, by which Yucatan and Quintana Roo agree to combat climate change together (2011).

The General Law of Climate Change expects municipalities to draw up a Municipal Action Plan for Climate Change. Although Solidaridad and Tulum have not drawn up their plans yet, they have other instruments that help to cope with the effects of climate change even though they were not designed with this purpose (for example, municipal regulations and plans about civil defence, urbanism and construction).

Key actors and roles

The policies implemented by the administration aside, the stakeholders interviewed for this research consider that the most important organizations fighting against climate change in terms of adaptation and mitigation are: Amigos de Sian Ka'an, an NGO focused on environment protection throughout Quintana Roo; the Riviera Maya Hotels Partnership (AHRM), a non-governmental organization (NGO) that represents the hotel sector in Riviera Maya; and the Secretariat of Ecology and Environment (SEMA), a Quintana Roo governmental organization. This gives some idea of the relative importance of NGOs, the state administration and environmental policy for the stakeholders involved.

Therefore, in Riviera Maya NGOs play an important role in promoting significant strategies, which then are sometimes taken up by the public authorities. One example is the contribution of Amigos de Sian Ka'an to the State Action Plan for Climate Change (SAPCC) in Quintana Roo (2013), coordinated by the SEMA. Quintana Roo University was also involved.

Amigos de Sian Ka'an developed the strategies for adaptation and mitigation concerning the tourism sector. In fact Quintana Roo was the first Mexican state to incorporate a section specifically on tourism. Amigos de Sian Ka'an and MARTI, in alliance with the Secretariat of Tourism of Quintana Roo, also launched the Guide for Planning, Design and Sustainable Construction in the Mexican Caribbean (2012). This led to the Mexican law that established that new tourism urbanizations had to be sustainable and respect requirements such as design, building, management and cessation of activity.

The AHRM also plays a key role. It is in charge of the Sustainable Management Programme for Accommodation of MARTI initiative. The programme started in 2007 and aims to give advice on and encourage good environmental practices in hotels, such as saving energy or improving waste management. AHRM is one of the organizations with the most experience in the destination. Ever since the beginning of Riviera Maya as a tourism project promoted by the Government of Quintana Roo, it has proved the strength of the private sector as a lobby.

A final example is Riviera Maya Sostenible, an NGO that seeks to get companies, government, society, other NGOs and academia to work together. It is closely connected with the Global Sustainable Tourism Council. In fact, in December 2014 both organizations arranged a workshop on the global criteria of sustainable tourism which resulted in the creation of a council to promote the sustainability of Riviera Maya. This council has become a strong lobby that represents more than 50 entities and they meet once a month.

As well as SEMA, which coordinated the SAPCC and gathers the Direction of Climate Change of the state, there are other important government actors. Among them, the Riviera Maya Destination Marketing Office plays an important role in fostering the image of Riviera Maya as a destination committed to sustainability. Two federal institutions – the Secretariat of the Environment and Natural Resources and the Secretariat of Tourism – are also involved. The latter has carried out recent studies on the vulnerability to climate change of ten strategic destinations in Mexico including Riviera Maya (SECTUR, 2013). Nevertheless, stakeholders interviewed do not recognize it as a key actor in dealing with climate change.

Coordination

The stakeholders regard the coordination between organizations as the main barrier to dealing effectively with climate change in Riviera Maya. In fact, more than 60% state that the coordination between tourism and environmental areas does not work properly. We also asked them to say to what extent stakeholders from the environmental area take into account tourism issues, and vice versa. Even though differences are slight, environmental authorities take more notice of tourism (3.4 out of 5) than tourism authorities of the environment (2.7 out of 5). On the other hand, most tourism stakeholders think that they take the environment into account (3.1 out of 5) and most environmental stakeholders thank that they take tourism into account (2.9 out of 5).

CONCLUSIONS: FUTURE EXPECTATIONS

Mexico is highly exposed to natural disasters, which are expected to become more intense and frequent due to climate change. This has led to climate change being added to the political agenda and a federal normative and policy framework being developed. This includes the General Law of Climate Change, which is encouraging the involvement of states and municipalities. Nowadays, the Quintana Roo state has already assumed its role but local limitations prevent the Municipal Action Plans from being put into practice. In Riviera Maya, the main obstacles are socio-economic and political (for example, the lack of awareness, the extreme economic dependence on tourism, the scarcity of economic resources and the weakness of the local public administration).

Our research reveals some key points that policy makers need to consider if they are to reinforce adaptation and mitigation strategies in Riviera Maya.

1. Some NGOs are sufficiently important to lead actions not only because of the role they play at the destination, but also because of their long expertise and knowledge in the field.

2. The lack of awareness in the tourism and local political spheres must be corrected if coordination is to be improved between the tourism and environmental sectors and the local institutions are to get more involved.

3. Stakeholders consider that the most urgent impacts that need to be dealt with are the rise in sea level rise, extreme meteorological events and reef bleaching.

Finally, this research reveals that it is of the utmost importance to take heed not only of scientific reports on physical features and climate projections but also stakeholders' perceptions if the power dynamics, priorities and difficulties destinations have in coping with climate change are to be fully understood.

References

Ambrosie, L.M. (2015) Myths of tourism institutionalization and Cancún. *Annals of Tourism Research* 54, 65–83.

Climate Change Advisory Council (2010) *Policy Framework for Medium Term Adaptation*. Climate Change Advisory Council and Secretariat of Environment and Natural Resources, Mexico. Pp 55. (In Spanish) http://gia.imta.mx/geoportal/docs/Marco_Politicas_Adaptacion_Mediano_Plazo.pdf

Amigos de Sian Ka'an, MARTI and Secretariat of Tourism of Quintana Roo (2012) Guide for Planning, Design and Sustainable Construction in the Mexican Caribbean http://sedetur.qroo.gob.mx/marti/index.php (In Spanish)

Eakin, H. and Luers, A.L. (2006) Assessing the vulnerability of social-environmental systems. *Annual Review of Environment and Resources* 31(1), 365–394.

Füssel, H.-M. (2007) Vulnerability: a generally applicable conceptual framework for climate change research. *Global Environmental Change* 17(2), 155–167.

Füssel, H.-M. (2010) Review and quantitative analysis of indices of climate change exposure, adaptive capacity, sensitivity, and impacts. In: *Word Development Report 2010*. World Bank, Washington.

Füssel, H.-M. and Klein, R.J.T. (2006) Climate change vulnerability assessments: an evolution of conceptual thinking. *Climatic Change* 75(3), 301–329.

Government of Mexico (2007) *National Development Plan 2007–2012.* Government of Mexico, Mexico D F. Pp 323 (In Spanish)

Government of Mexico (2013) *National Development Plan 2013-2018*. Government of Mexico, Mexico D F. Pp 184. (In Spanish) http://www.itesa.edu.mx/pdf/PND.pdf

Government of Quintana Roo (2011) *State Development Plan 2011–2016.* Government of Quintana Roo. Pp 104. (In Spanish) http://www.cidge.gob.mx/wp-content/uploads/2013/05/QUINTANA-ROO2.pdf

Government of Quintana Roo (2013) *State Program of Action on Climate Change.* Government of Quintana Roo, INECC-AECID and University of Quintana Roo, Chetumal. Pp 116. (In Spanish) http://www.ccpy.gob.mx/pdf/agenda-qroo/PEACC_2013_ESPAnOL.pdf

Hinkel, J. (2011) Indicators of vulnerability and adaptive capacity: towards a clarification of the science–policy interface. *Global Environmental Change* 21(1), 198–208.

Huebner, A. (2012) Public perceptions of destination vulnerability to climate change and implications for long-haul travel decisions to small island states. *Journal of Sustainable Tourism* 20(7), 939–951.

IMTA and SEMARNAT (2009) *Análisis de la frecuencia e intensidad de los ciclones tropicales para prevenir los efectos, presentes y futuros, debidos a la variabilidad y al cambio climático en México*. Mexican Institute of Water Technology (IMTA) and Secretariat of Environment and Natural Resources (SEMARNAT). Pp 96. http://www.inecc.gob.mx/descargas/cclimatico/2009_estudio_cc_va4

INE (2008) *Evaluación de la afectación de la calidad del agua en cuerpos de agua superficiales y subterráneos por efecto de la variabilidad y el cambio climático y su impacto en la biodiversidad, agricultura, salud, turismo e industria*. National Institute of Ecology (INE), Mexican Institute of Water Technology (IMTA) and Secretariat of Environment and Natural Resources (SEMARNAT). Pp 108. http://www.inecc.gob.mx/descargas/cclimatico/ev_calidad_agua_cc.pdf

ISCCC (2007) *National Strategy for Climate Change*. Government of Mexico and Secretariat of Environment and Natural Resources, Mexico D F. Pp 60. (In Spanish) http://www.inecc.gob.mx/descargas/cclimatico/2012_est_nal_cc.pdf

ISCCC (2009) *Special Program on Climate Change 2009–2012.*Government of Mexico and Inter-Secretarial Commission for Climate Change. Mexico D F. Pp 118. (In Spanish) http://www.semarnat.gob.mx/archivosanteriores/programas/Documents/PECC_DOF.pdf

ISCCC (2014) *Special Program on Climate Change 2014–2018.*Government of Mexico, Mexico D F. Pp 151. (In Spanish)

http://www.semarnat.gob.mx/sites/default/files/documentos/transparencia/programa_especial_de_cambio_climatico_2014-2018.pdf

Moreno, A. and Becken, S. (2009) A climate change vulnerability assessment methodology for coastal tourism. *Journal of Sustainable Tourism* 17(4), 473–488.

O'Brien, K.L. and Wolf, J. (2010) A values-based approach to vulnerability and adaptation to climate change. *Wiley Interdisciplinary Reviews: Climate Change* 1(April), 232–242.

Riviera Maya Destination Marketing Office (2015) *Barómetro turístico de la Riviera Maya*. (Not published)

Santos-Lacueva, R. *et al*. (2015) A theoretical framework to evaluate coastal destinations vulnerability to climate change through policy analysis. In: *Proceedings of the International Conference on Tourism (ICOT 2015)*. ISBN 978-618-81503-0-0, London.

SECTUR (2013) *Estudio de la vulnerabilidad y programa de adaptación ante la variabilidad climática y el cambio climático en diez destinos turísticos estratégicos, así como propuesta de un sistema de alerta temprana a eventos hidrometeorológicos extremos.* Secretariat of Tourism. http://www.sectur.gob.mx/programas/planeacion-y-politica-turistica/ordenamiento-turistico-sustentable/cambio-climatico/estudio-de-vulnerabilidad-al-cambio-climatico-en-el-sector-turistico/

SEMARNAT (2007) *Programa Sectorial de Medioambiente y Recursos Naturales 2007–2012*. Government of Mexico,Mexico D F. Pp 138. http://www.semarnat.gob.mx/archivosanteriores/Documents/PROMARNAT%202013-2018.pdf

SEMARNAT (2012) *Adaptación al cambio climático en México: visión, elementos y criterios para la toma de decisiones.* Secretariat of Environment and Natural Resources (SEMARNAT), Mexico D F. Pp 186. http://biblioteca.semarnat.gob.mx/janium/Documentos/Ciga/libros2009/CD001364.pdf

SEMARNAT (2013) *Programa Sectorial de Medioambiente y Recursos Naturales 2013-2018.* Government of Mexico, Mexico D F. Pp 138. http://www.semarnat.gob.mx/archivosanteriores/Documents/PROMARNAT%202013-2018.pdf

SEMARNAT and PNUMA (2006) *El cambio climático en América Latina y el Caribe.* Secretariat of Environment and Natural Resources (SEMARNAT) and United Nations Environmental Program (UNEP). Pp 140.

SEMARNAT, INE and CCTA (2011) *Diagnóstico de las Tendencias actuales de fenómenos meteorológicos extremos y proyección de su actividad al clima futuro cercano 2030 y clima futuro lejano 2080. Considerando los efectos del cambio climático global y otros efectos locales*. Secretariat of Environment and Natural Resources (SEMARNAT) and National Institute of Ecology (INE). Pp 85. http://www.inecc.gob.mx/descargas/cclimatico/2011_creaas_inf_final.pdf

Thywissen, K. (2006) *Components of Risk. A Comparative Glossary.* United Nations University Institute for Environment and Human Security, Bonn.

Torres, R. and Momsen, J. (2005) Planned tourism development in Quintana Roo, Mexico: engine for regional development or prescription for inequitable growth? *Current Issues in Tourism* 8(4), 259–285.