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CLIMATE CHANGE IMPACT ON THE TOURISM SECTOR IN THE SOUTHERN MEDITERRANEAN

Foreseen developments and policy measures

FINAL REPORT

July 2018

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Contents

Executive summary

This study assesses the effects of climate change on the tourism sector across the southern Mediterranean countries and evaluates relevant policy measures addressing these challenges for the region. Tourism is an essential sector for the economy of these countries and it has a huge potential for growth and impact on job creation, development of sustainable infrastructures and understanding of how turning Climate Change issues into adaptation opportunities across the Mediterranean. The sector is nevertheless still facing a number of policy challenges that, to be fully addressed, require further action by all stakeholders at different levels of governance across institutions, research centres, operators and the civil society at large.

Based on the review of publicly available secondary evidence, this paper goes beyond the current assessment on the impact of tourism on climate change and environmental sustainability. It addresses the issue from the angle of the less explored but equally worrying threat posed on the tourism sector by the effects of climate change. The evidence provided suggests the need for more effective adaptation measures for the tourism sector across Eastern (Egypt, Israel, Jordan, Lebanon and Palestine) and Western (Algeria, Morocco and Tunisia) southern Mediterranean countries.

As emerging from this study, climate change pressures on the tourism sector are only partially felt today, but are bound to rapidly intensify in the coming years. Local operators are nevertheless not always fully able to respond to such pressures, due to the limited capacity to act in the longer term (beyond an annual, seasonal if not even quarterly timeframe) and as a result of an often fragmented and micro-SMEs dominated sector lacking of substantial innovation and adaptation capacity. Some degree of "market failure" in the sector therefore emerges, calling for an effective policy intervention to boost adaptation.

And yet, local policy response is nowhere near to be optimal at present. Even when some good practices have emerged, they are often partial and "on paper" rather than fostering systemic change and adaptation "in practice". Also, some valuable climate change policies that exist in many countries are not specifically translated into sectoral tourism policies, and vice-versa. In such context, the Union for the Mediterranean can play an important role in fostering more concrete and effective measures by pushing for greater exchanges amongst local and regional sectoral stakeholders across the seabasin, as further discussed in the recommendations section of this paper.

Chapter 1

Setting the stage for this study

Scope and objectives of the study

This study assesses the extent to which the effects of climate change are impacting the tourism sector across the Southern Mediterranean countries and the relevant policy measures tackling these challenges across the region. Promoted as part of the support actions for the Climate Change Expert Group (CCEG) in the Union for the Mediterranean (UfM), the study focuses on eight UfM Member States of the Southern Mediterranean region, which are part of the European Neighbourhood Instrument (ENI) - namely Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Palestine and Tunisia. It will serve as support for discussions on future challenges of climate change and on concrete joint actions to address gaps and improvements for the policy measures currently in place.

Background and challenges at stake

The UfM recognises the importance of tourism for the economy of the countries of the region as well as the potential for growth and its impact on job creation, infrastructure and cultural understanding across the Mediterranean (Roadmap for Action, p. 16)[2]. The relevance of the sector for the Mediterranean is also reported by other regional sources (Plan Bleu, 2017)[3]. The sector, nevertheless, is facing a number of challenges, which require further action by all stakeholders at different governance levels, as discussed in recent studies (West Med Initiative, Context Analysis[4], p. 14).

In this context, the effect foreseen for climate change in the region could further affect tourism destinations, their competitiveness and sustainability, through a range of direct and indirect impacts:

- Direct impacts due to changes in operating costs (structural damages, insurance premiums, etc.), as a result of geographic and seasonal redistribution of climate resources (heating-cooling degree days, etc.);
- Indirect impacts due to climate-induced changes in assets of the tourism sector (biodiversity loss, decline of landscape aesthetic, increase in vector-borne disease), services (water shortages) and damage to infrastructure;
- Broader impacts due to mitigation policies, including changes in tourist flows caused by increased travel prices, alterations to aviation routes, changes in the proportion of short-haul and long-haul flights, etc.

As discussed in this study, such effects are in part already felt but mostly bound to intensify in the coming years, thus there is a need to mobilise all actors to ensure that current challenges are turned into opportunities. The UfM can play a central role in supporting such a change and adaptation across the Mediterranean (Annual Report 2016, p.32), by acting as a regional platform coordinating and promoting initiatives and concrete projects related to tourism within UfM activities (Roadmap for Action, p. 16).

Methodological overview

The study builds on publicly available secondary sources across ENI South Countries and the specific insights provided by the national Focal Points for the UfM-CCEG. It also reflects upon the discussion and feedback received during the UfM-CCEG meeting held in Barcelona on the 24-25 of April 2018.

This paper builds on the analysis provided in a series of Country Fiches, discussed with National Focal Points. The fiches discuss more detail items and challenges, while for sake of synthesis and readability the assessment provided in this document is grouping some specific items together (e.g. risks/costs/economic-losses, biodiversity-losses/diseases/temperature-rising).

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[1] *European Neighbourhood Instrument South partners are Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Syria, Tunisia.*
[2] *http://ufmsecretariat.org/wp-content/uploads/2017/07/UfM-Roadmap-for-action-2017.pdf*
[3] *http://planbleu.org/sites/default/files/publications/cahier17_tourisme_en_web.pdf*
[4] *http://www.westmed-initiative.eu/wp-content/uploads/2016/07/WestMed-Maritime-Initiative-Report1(public).pdf*

Furthermore, the data and analysis provided is aggregated at the sub-regional level in the Eastern and Western countries, so to highlight similarities and differences amongst at regional and sub-regional levels. A number of strategic conclusions and related action-points are then identified, as discussed with UfM-CCEG Members, aiming to strengthen the response capacity of the tourism sector across the region.

The information provided is proposed as a "starting point" for a more consistent scientific and policy dialogue on this relevant and yet relatively neglected area of policy support (i.e. impacts of and adaptation needs for the tourism sector). Our findings therefore aim at triggering national and regional actions and further improvements, rather than providing the ultimate assessment on the current and future state of play.

Contents of the chapters in this study

The study is structured into the following sections:

- Chapter 2 provides an overview of findings in terms of the impacts of climate change on tourism
- Chapter 3 reviews the most relevant policy measures currently in place and the emerging gaps
- Chapter 4 offers an overview of the areas where further actions are needed to sustain local capacity
- Chapter 5 provides a conclusion and list of recommended actions with concrete next steps.

UfM Climate Week 2018, Barcelona

Chapter 2

Climate Change impacts on Tourism in ENI South Countries

Overview of impacts and threats for the tourism sector

A substantial range of literature is available[5] for the assessment of the impact that the tourism sector has in the production of Greenhouse Gasses (GHG) and also on Climate Change, focusing on the possible climate change mitigation measures for the sector, both globally[6] and in the Southern Mediterranean[7]. Nevertheless, the proportion of grey literature and scientific studies on the potential effects that climate change is having on the tourism sector[8], and that it is expected to have in the future, remains relatively limited. This analysis aims at addressing such shortage and provides initial evidence on this aspect, as a basis for more effective adaptation measures for the sector across the region[9]. The analysis is provided with an overview of differences and similarities across the Eastern (Egypt, Israel, Jordan, Lebanon and Palestine) and Western (Algeria, Morocco and Tunisia) ENI South countries[10].

The assessment is based on the most recently available and relevant secondary sources (2017), as well as expert judgment and available sources for possible evolution towards the mid (2030) to longer (2050) terms. Based on the sources consulted, the sector appears already exposed to certain pressures related to the effects of climate change, although with some differences across the two shores and across countries. Although such impacts are not yet perceived as relevant, though they are expected to rapidly grow in the near and longer-term. The cross-analysis of the patterns emerging across countries allows to identify the different degrees of threats for the sector due to climate change pressures throughout the countries assessed in this study. An illustrative overview is provided by Figure 1 below, with an overview of the impact on revenues, assets and services presently and its intensification in the mid to long-term future.

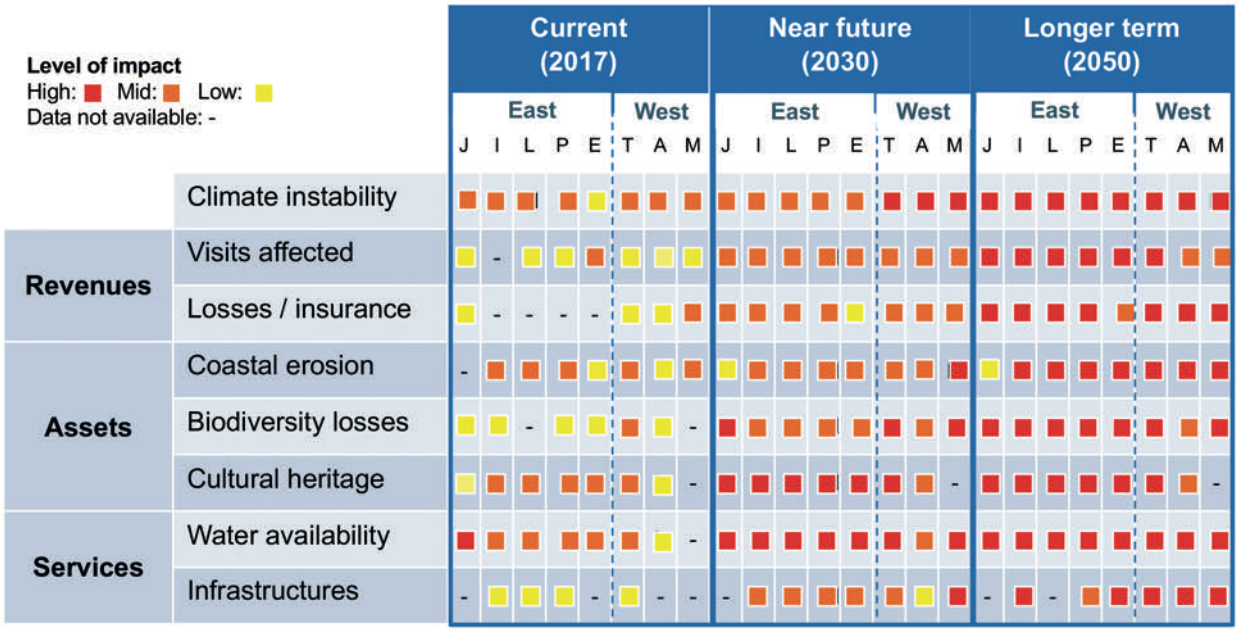

Fig. 1. Overview of the impact of climate change on the tourism sector through time
Source: Country Fiches

Commonalities and differences are discussed in greater details in the next sections of this chapter.

[5] *ideas.repec.org/a/gam/jsusta/v10y2018i3p590-d133424.html*
[6] *www.sciencedaily.com/releases/2018/05/180507111914.htm*
[7] *www.medecc.org/?p=815*
[8] *sdt.unwto.org/en/content/climate-change-tourism*
[9] *www.iemed.org/observatori/arees-danalisi/arxius-adjunts/anuari/med.2016/IEMed_MedYearBook2016_The%20Plan%20Bleu%20Tools_Antoine_Lafitte.pdf*
[10] *The visualisation of individual countries does not follow any specific order, as the purpose is to 'compare' and not 'confront' those practices.*

Relevant assets and services for the sector are already affected by climate change

A number of factors are already affecting tourism operators and stakeholders in the sector across the selected Southern Mediterranean countries as a result of climate change - e.g. through increasingly unpredictable fluctuation of the volume of seasonal visits which can have an impact on operators' revenues where tourism destinations are highly dependent on seasonal factors. Nevertheless, the areas of higher impact that emerged from the country analysis are those related to essential assets and services for the tourism sector. The effects of climate change with respect to coastal erosion, for example, are already relatively noticeable across the southern Mediterranean (and the Red Sea for the Eastern countries). As such, they pose increasing challenges to all ENI South countries, which important tourism attractions rely on rich coastal and marine ecosystems, biodiversity assets and cultural heritage[11] sites. Climate change is also, and importantly, already posing significant indirect pressures in terms of increased scarcity of water resources and, to some extent, degradation through floods and coastal erosion. This is particularly a threat for the Eastern countries assessed for this study, traditionally exposed to such a challenge and more vulnerable than others to such impact, but the pressure is expected to rapidly escalate across the region. An overview and comparison of threats and differences discussed is provided in Figure 2.

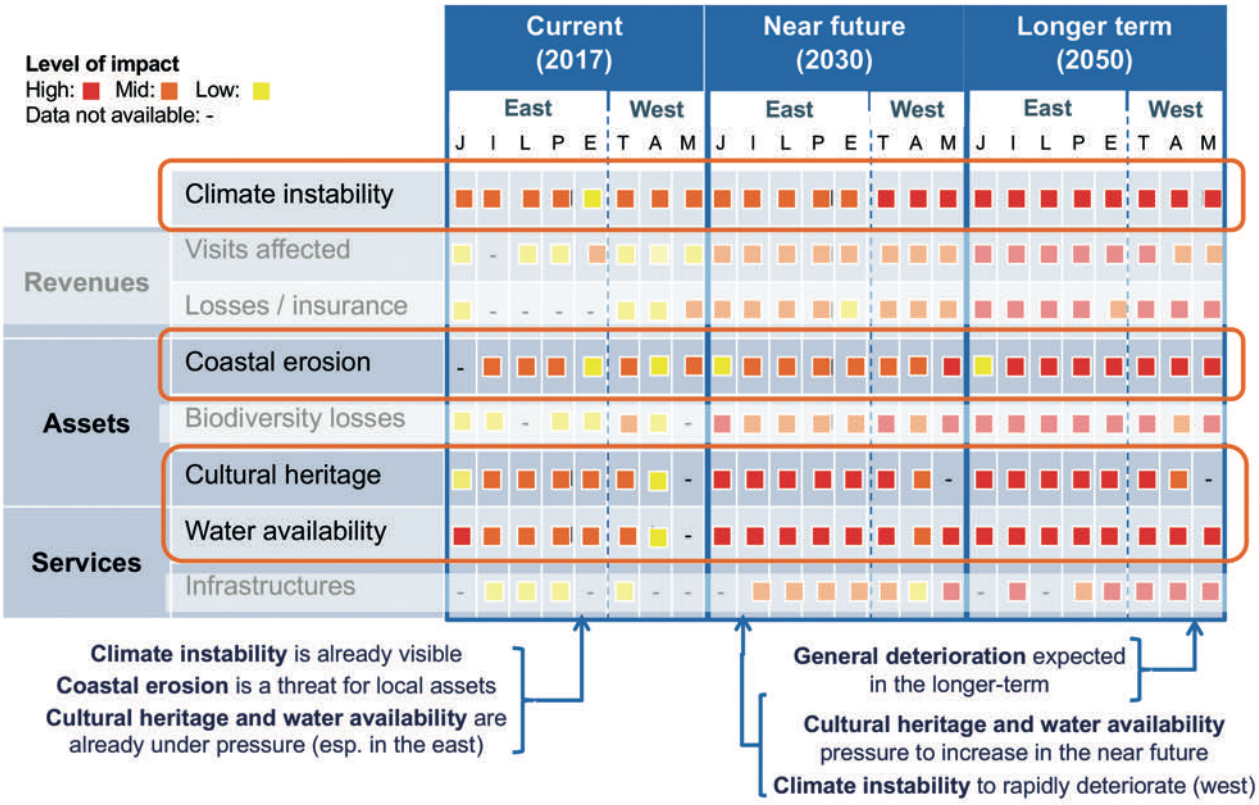

Fig. 2. Areas of impacts of CC already affecting the sector and expected to increase through time

Selected examples of these pressures across the assessed countries are provided in the box below.

[11] *http://whc.unesco.org/document/139944*

Box 1. Examples of current pressures on assets and services emerging across selected countries

Data collected are often heterogeneous and it is difficult to suggest relevant and representative examples across the entire region. Nevertheless some examples can be provided to give a hint on the relevance of the challenges discussed in this section, with greater details provided in the Country Fiches. These are findings from a preliminary assessment, to be further discussed and expanded in future UfM activities.

The growing instability of water precipitation throughout the year exposes the tourism sector to the risk of limited access to fresh-water resources, which are a specific threat especially in those areas (Western Mediterranean) where lack of fresh water is already a challenge. The threat is particularly severe in the lack of adaptation of the sector to reduce its need and consumption of fresh water. The review of publicly available statistics has pointed out a particular current pressure on water availability in Jordan, while more limited pressure in Algeria, inter alia due to desalination activities and with no publicly available data for Morocco. This is nevertheless a challenge which is expected to become increasingly relevant for all the assessed countries in the Southern Mediterranean.

Coastal erosion is another area of concern for the tourism sector, due to the relevant value of local coastal assets in most of the assessed countries, including relevant cultural heritage sites. In Lebanon, for example, sea level is expected to rise by 12 cm to 25 cm per year by 2030 and 22 cm to 45 cm by 2050. This is just an example of the data emerged across the region, but gives an insight of the real challenge it poses to local tourism operators and other sectoral stakeholders. Lower pressure on coastal erosion has emerged for Egypt and Algeria, with no publicly available data identified for Jordan and no data related to the pressure on cultural heritage sites in Morocco. Future available trends and scenarios, instead, point out a general growing pressure in the mid (2030) to longer term (2050). Jordan seems less exposed to such pressure when it comes to coastal erosion, both in the mid to longer term, while Morocco seems more exposed than all other countries by 2030 due also to its exposure on the Atlantic.

Source: Country Fiches

Climate pressures resulting in coastal erosion require strategic investments and collaboration across the various stakeholders to be duly addressed - e.g. through sustainable infrastructures and strategic plans for the use of the land. As impacts are emerging mildly so far, though, there is a concrete risk that these are not perceived as particularly important by operators and policymakers, distracted by a range of other relevant short-to-mid-term impacts on the sector. Water availability seems instead to be a specific area where relevant impacts are already emerging, and are expected to increase in the mid-term, and as such is more visible to the sector stakeholders. We therefore expect the latter to be an area where policy responses are generally available, compared to other impacts described. These aspects are nevertheless to be further discussed in Chapter 3, when assessing the existing policy measures.

In the next section, we review those impacts of climate change that are still not perceived as relevant but are expected to rapidly grow in the future across the Southern Mediterranean.

Other impacts are still limited but expected to increase rapidly

If we look at the other potential areas of impacts that are considered under this study, the findings are striking and worrying. A number of impacts currently not perceived as particularly relevant, although already occurring, are in fact expected to rapidly grow in the mid to longer term. These are impacts affecting the economic performance of the sector either directly (i.e. losses of visits and increasing direct costs due to high climate instability discouraging local and particularly international visitors), or indirectly (i.e. losses related to local biodiversity which characterise the majority of the tourism appeal of local destinations, as well as deterioration of local essential infrastructures due to floods pressure, etc.).

The impact on visits due to climate instability, for example, still appears to be relatively limited across the assessed countries - with some notable exceptions. It is nevertheless expected to rapidly increase in the mid-term across all countries, so as to become extremely relevant in the longer term. Similarly, revenues are increasingly affected by the rising costs for local operators in response to losses in visits as well as increasing insurance costs to be paid to address the volatility of both incomes and costs caused by more severe climate conditions - including the damages due to floods and other environmental pressures.

These longer-term impacts are therefore reinforcing themselves in a negative downward spiral:

- Losses incurred in local ecosystems and cultural heritage sites affect the quality of tourism assets and the appeal to local and importantly international visitors, with potential severe losses in economic gains for local operators, while;
- Severe weather and climatic conditions threaten the quality and reliability of available infrastructure, in turn increasing direct costs for reparation by local operators and the availability of basic services for tourists, particularly international visitors needing reliable infrastructure to access local destinations.

An overview and comparison of the threats and the differences discussed is provided in Figure 3 below.

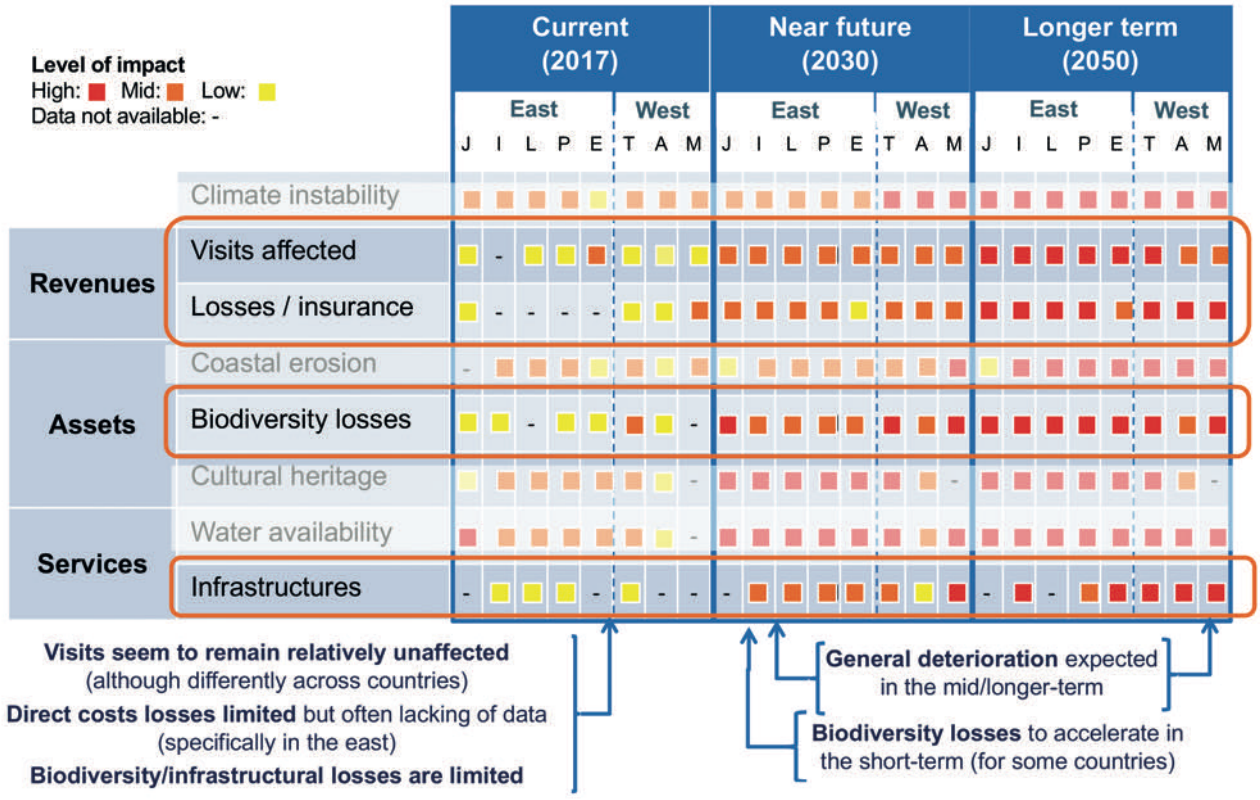

Fig. 3. Areas of impacts of CC not yet perceived as threats by the sector but expected to grow rapidly

Selected examples of these pressures across the assessed countries are provided in the box below.

Box 2. Examples of areas with increasing pressure across selected countriess

Climate change is not currently the main factor of concern for operators in the tourism sector in Southern Mediterranean countries. Although global and regional trends suggest a recovery from the past severe crisis[12], the regional sector is still largely threatened by the persisting geo-political instability[13].

Nevertheless, publicly available evidence suggests impacts of climate change in the longer terms might be disruptive. High temperatures in the tourist areas, for example, may alter the attraction of some coastal areas that rely on moderate weather during the summer season such as Egypt, but also a rising temperature might affect internal demand in the Western Mediterranean, which will require a shift in the current services and business models to capture opportunities and mitigate risks of losses for climate volatility during summer "peak seasons". In countries where diving tourism depends on local ecosystem assets, such as coral reefs in Egypt on the Red Sea, the expected rising water temperature is leading to the bleaching of such asset, a fact that could in turn reduce the sector's attractiveness for many international visitors.

These examples offer some indications on the potential disruptive impact of climate volatility for the sector, in the absence of adequate policy and sectoral responses. They emerge from our preliminary assessment and as such must be further discussed and expanded in future UfM activities with all relevant national and regional stakeholders.

Source: Country Fiches

The intricate interplay amongst those factors, coupled with the fact that these resulting challenges are not perceived as particularly pressing at present and in the mid-term, may nevertheless result in the absence or a limited capacity to foster an adequate policy response in those areas. This is a particularly unfortunate situation, as the direct impacts for the sector are expected to be severe even though not immediately perceived. Moreover, the adequate response to such challenges requires a complex sectoral and crosscutting adaptation capacity, which cannot be fully achieved in a short period of time. As such, the set-up of a strategic framework for action in the sector is required for the policy response to be effective in the mid-to-long term. These aspects will be discussed in the next chapter (Chapter 3), as part of the overall assessment of existing measures in addressing the challenges discussed so far (Chapter 2).

[12] *media.unwto.org/press-release/2018-01-15/2017-international-tourism-results-highest-seven-years*
[13] *www.tourism4development2017.org/knowledge/sustainable-tourism-in-the-mediterranean-state-of-play-and-strategic-directions/*

Chapter 3

Existing policy measures in addressing the emerging challenges

Overview of existing policy measures: strengths and gaps

The number of policy measures to be put in place to address the impacts presented in the previous chapter can be very broad and ideally promoted under the responsibility of a wide range of actors at local, national and regional levels. Given the limited scope of analysis it has been essential to focus the analysis on a relatively narrow but relevant range of measures and strategic policy documents. As in the previous chapter, the analysis provides an overview of the differences and similarities amongst the Eastern (Egypt, Israel, Jordan, Lebanon and Palestine) and Western (Algeria, Morocco and Tunisia) countries[14]. An overview of the findings is provided in Figure 4 below.

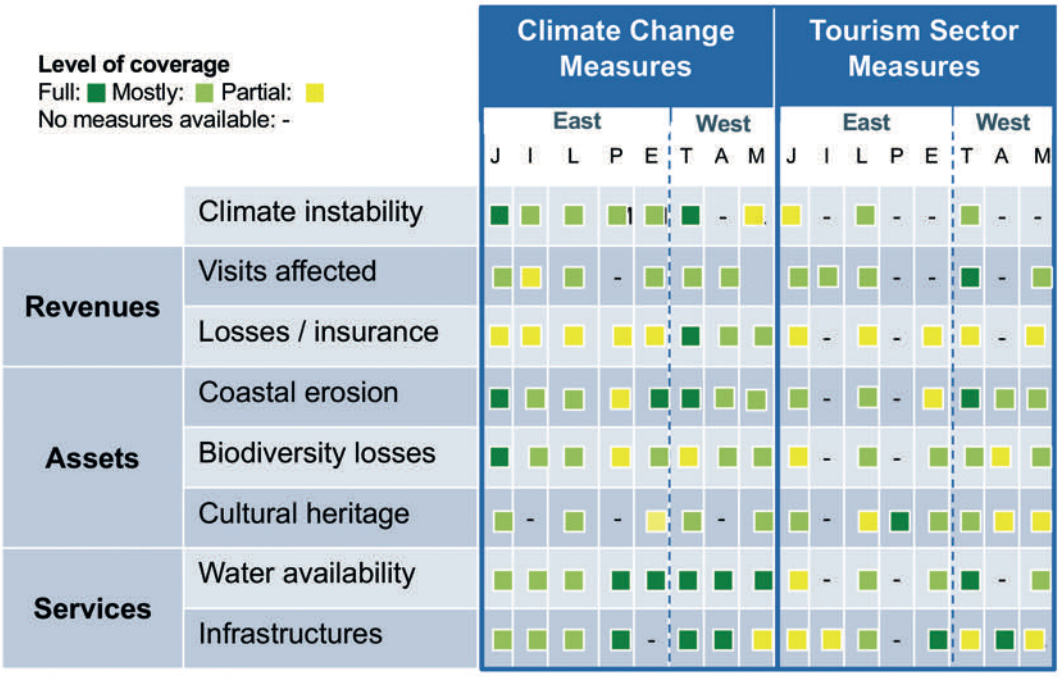

Fig. 4. Overview of the policy measures available across various areas of impacts (revenues, assets, services)
Source: Country Fiches

The policies domains have been initially selected on the basis of those addressing climate change more broadly and those focusing on the tourism sector specifically. In this respect, to make the analysis manageable, the following documents have been scrutinised: i) Climate Change National Policy (i.e. National Communication & Intended Nationally Determined Contributions under the UNFCCC)[15]; ii) Tourism National Strategies (Action Plans, and ad-hoc CC-Tourism adaptation measures)[16]. Commonalities and differences amongst countries are discussed in greater detail in the following sections of this chapter.

Specific strengths and weaknesses that characterise certain countries

A first element of cross-analysis is the extent to which the national tourism policies in each country address, either specifically or more generically, the potential impact on climate change and the resulting pressure due to severe weather conditions, temperature rising and climate volatility. On the west one country shows a

[14] *The visualisation of individual countries does not follow any specific order, as the purpose is to 'compare' and not 'confront' those practices.*
[15] *https://unfccc.int/documents*
[16] *Based on publicly available documents on the countries official websites, and revised by national Focal Points for each country.*

relatively narrow approach to the challenges posed by climate change to tourism, focusing only on a few structural pressures on services and infrastructures, while two countries in the east seem to be lacking of targeted sectoral policy. These gaps specific are illustrated in Figure 5 below.

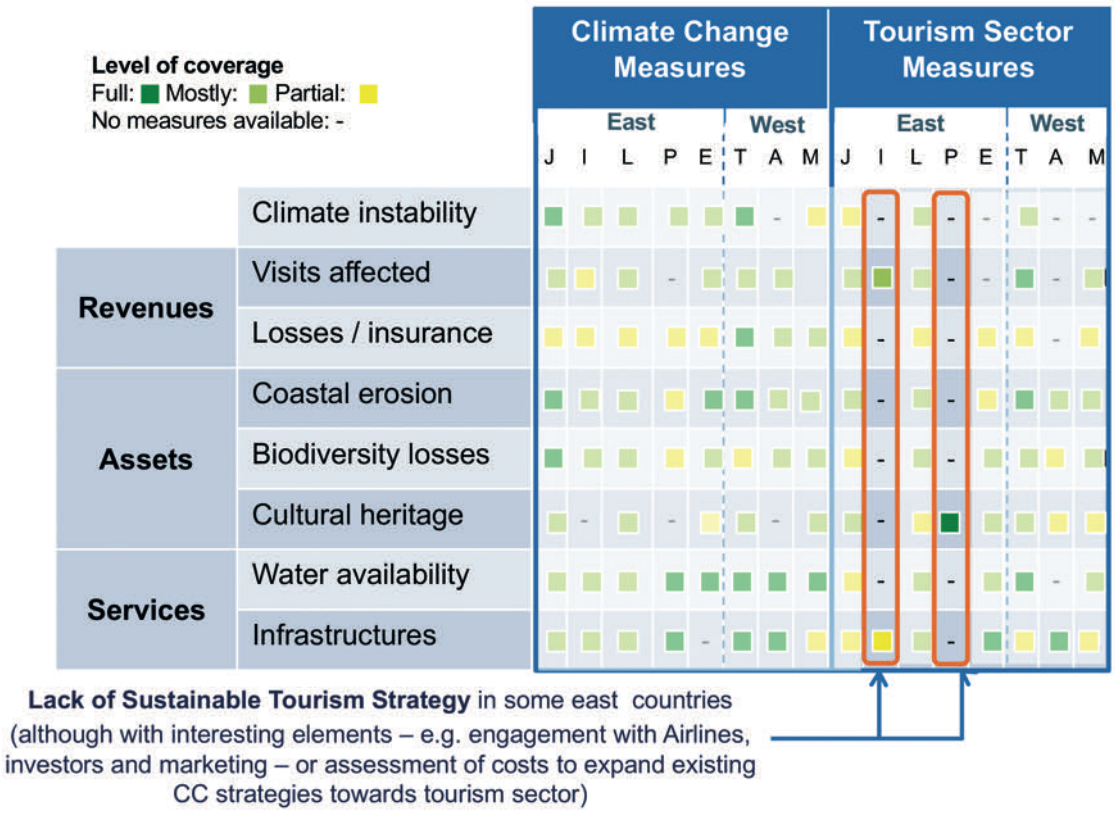

Fig. 5. Climate-related tourism measures remain largely underdeveloped only in few countries

The emerging policy limitations are at times justified by the fragile institutional context of some countries (for instance, Palestine), where nevertheless great efforts have been made in recent years to catch up with climate change policy responses. It is therefore understandable that delays are shown in addressing the specific challenges for the national tourism sector. Conversely other countries where limited climate-related tourism policy measures have emerged, such as Israel, are able to pursue an interesting dialogue with carrier operators to foster new services and address the need for enlarging the number of potential foreign visitors. This is a very interesting and unique policy element emerging across the region, and could be further expanded to address the broader climate change impacts. It is unfair therefore to be categorical in judging the absence of relevant policies, while it is fairer to point out certain strengths and weaknesses emerging country by country.

Moreover, a range of positive policy measures exist across the countries assessed, both on the east and west side of Southern Mediterranean. But even when sectoral strategies refer to climate change, though, they remain at a relatively general level of intervention. Countries like Tunisia and Lebanon, for example, promote relevant linkages between climate change and tourism measures, and signal promising developments for sectoral measures in the region. In Tunisia, an overall strategy addressing the impact of climate change for the tourism sector is in place, although still relatively embryonic and with room for more analytical specifications. However, to be effective and efficient and operational, this framework requires complementary measures, in particular the improvement of institutional coordination, a better visibility among stakeholders of the strategy and action plans put in place, a quantitative and qualitative reinforcement of human resources at different levels. In Lebanon there is an assessment of climate change impacts for tourism as part of 'cross-cutting' measures, but their intervention remains at a relatively general level.

An overview of the main areas of strengths in the two cases is provided in the next figure (Figure 6).
A selection of features and areas of improvements across the practices assessed is provided in box 3 below.

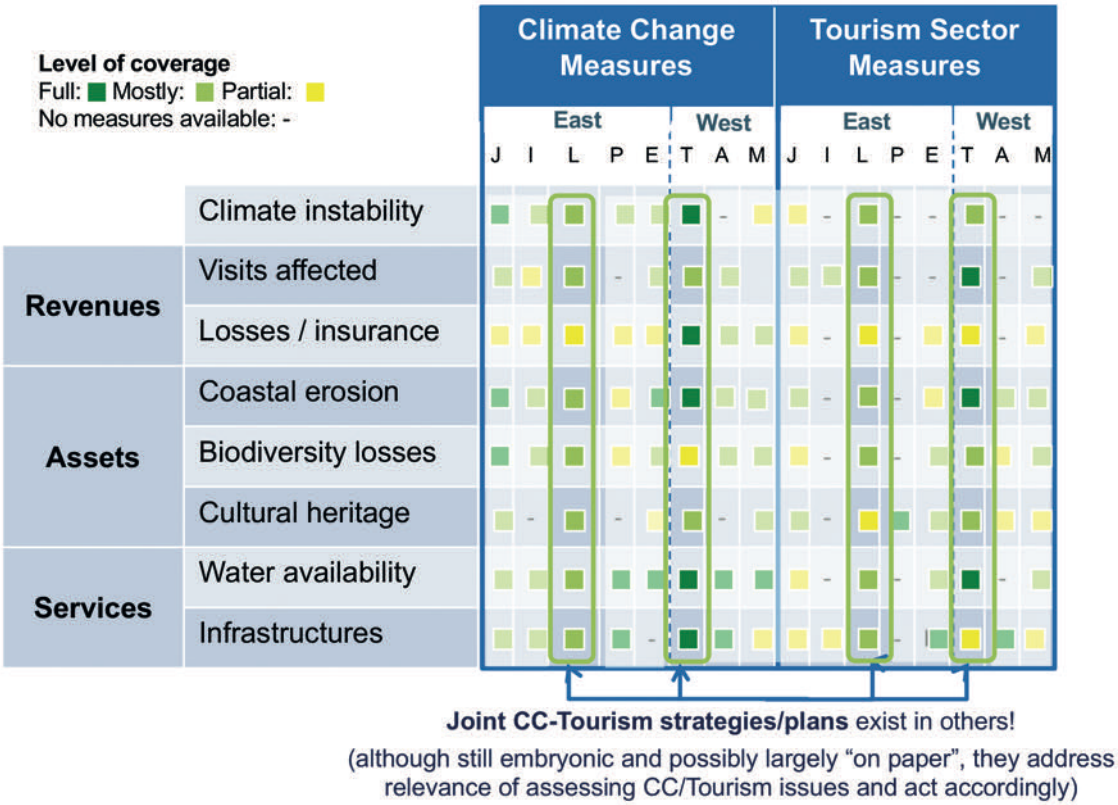

Fig. 6. More effective coverage across various impacts emerges in some countries

Box 3. Examples of measures and stakeholders involved in selected countries

The Tunisian National Adaptation Strategy of the Tourism Sector to Climate Change (SNATCC) has been promoted by the Ministry of Equipment, Territorial Development and Sustainable Development (MEATDD) in 2001, with the aim to: i) reduce the vulnerability of the tourism sector to the adverse effects of climate change, and ii) maintain the competitiveness of the sector by building on sustainable natural and landscape resources. The strategy, supported by GIZ, has been defined through a large participatory process involving all relevant tourism stakeholders, including professionals in the private sector, scientific actors and the civil society at large. This process was supported by the German Cooperation Agency. The document also relied on the main strategic documents related to the effects of climate change since 2010 - National Strategies Addressing Climate Change (SNCC) - on the basis of data from three main sources: (i) the sectors themselves (environment, industry, agriculture, tourism, etc.); (ii) scientific research, and (iii) simulation data, particularly for climate change scenarios (temperature and precipitation, sea-level rise, energy consumption). The strategy appears therefore largely relevant in setting a national strategic policy framework to foster sectoral adaptation and crosscutting actions to address the impact of climate volatility on the tourism sector in Tunisia. It is not clear, nevertheless, the extent to which such strategy has resulted in concrete support actions and measures.

Although to a lesser extent than in Tunisia, the National strategy on Climate Change in Lebanon addressed also the actions related to a number of relevant sectors in the Country. Here, tourism is included but without strong focus nor details specific to the sector (as it appears under "others"), while several of the specific challenges discussed in this paper are largely overlooked. In this respect, the 3rd National Communication to UNFCCC (2016) specifically highlights that "very little work seems to be done to comprehensively understand the impacts of climate change

on the touristic activities and areas". Interestingly, though, the 2015 National Strategy on Rural Tourism - designed to enhance economic opportunities in Lebanese rural areas - focuses on the support of sustainable tourism offers (although leaving skiing and coastal tourism aside). This document could be expanded to include a broader range of tourism related activities and could be better linked to the challenges posed by climate change to the sector, and the possible resulting mitigation/adaptation measures. It is therefore a good start, but more ambitious concrete actions are required to effectively address the challenges discussed in this paper.

Source: Country Fiches

Common gaps and challenges that emerge across the region

In general terms, the tourism measures reviewed seem to be relatively weak in addressing the possible impacts of climate change on essential services and infrastructure for the tourism sector. Although the extent to which existing policy measures are effectively addressing the areas of impacts discussed in the study varies from country to country, in fact, these are either non-existent or partial.

As discussed, some impacts are potentially addressed by 'cross-cutting' climate change measures. But the relevance of such measures for the tourism sector is often limited, with the strongest support provided toward addressing coastal erosion, water availability and infrastructural needs/damages. Climate impacts on water availability and infrastructural pressures are better addressed by Western countries, while impacts are mostly experienced (and expected to grow faster in the future) on the Eastern side, where policy response appears weaker. Also, and worryingly so, the impact of climate change on tourism assets, such as biodiversity - including pressure of non Indigenous species suspected to be related to climate variability - and cultural heritage sites, seems to remain only partially addressed by existing climate change measures and often neglected by tourism measures. Gaps and limitations are illustrated in Figure 7 below.

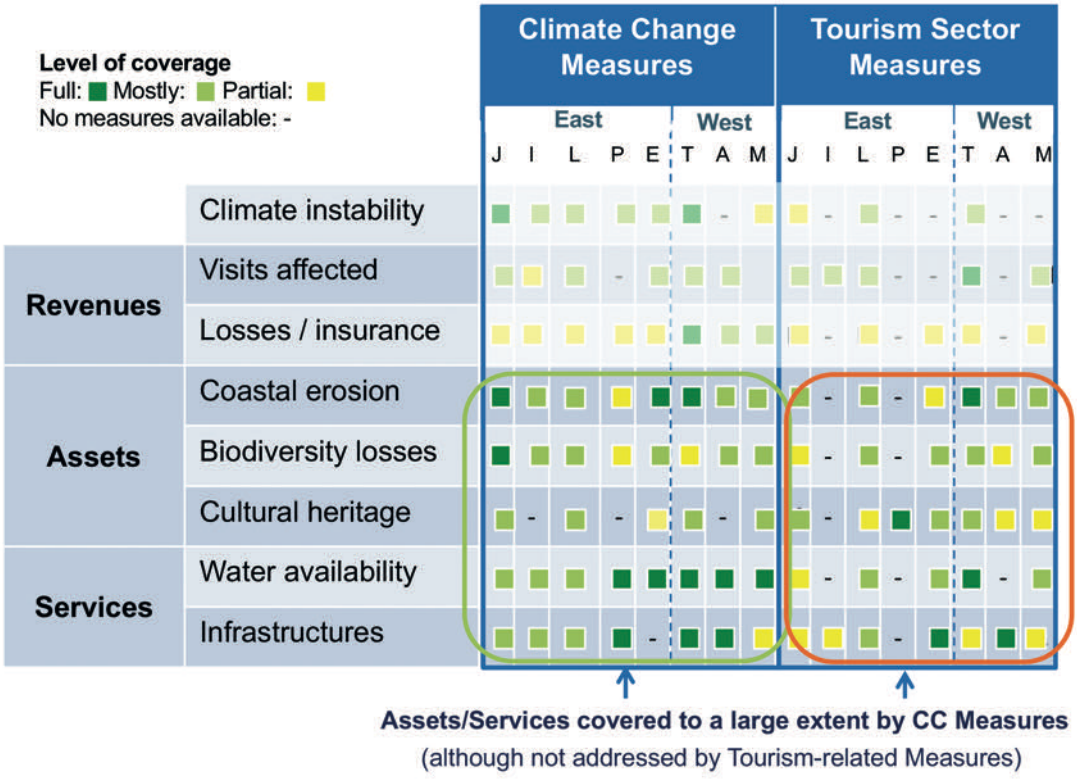

Fig. 7. Impacts on tourism services and assets are mostly addressed through climate change measures

A selection of features and areas of improvements of the practices assessed is provided in Box 4 below.

Box 4. Examples of measures and stakeholders involved in selected countries

A number of measures addressing climate change are indirectly providing a basis to support adaptation measures relevant for a sustainable development of the sector, including greater resilience of local infrastructure and ecosystem assets which are pivotal for the sector.

In Algeria, for example, the National ICZM strategy (2015) is clearly identifying coastal erosion as one of the main risks in coastal zone and five priority actions have been dedicated to this issue. These include: i) regulation in the occupation of coastal zone at 10/300/800/3000m from the sea; ii) ICZM strategy with component dedicated to coastal risks and coastal erosion; iii) monitoring programme of progress of erosion and related impacts; iv) evaluation of losses and damages caused by coastal erosion, including on tourism related infrastructures; v) adaptation measures to climate change impacts on coastal zone such as SLR, erosion, submersions (harbours, public works, industry, tourism). This is certainly a relevant set of measures, which could be better tailored to the needs and challenges of the tourism sector by expanding the measures towards a more specific and tailored sectoral approach.

Similarly, Morocco has identified coastal erosion as one of the main coastal issues, especially for its implications on tourism related infrastructure. Related measures include: i) removing beach sand and riverbed aggregates to be used as building materials; ii) restricting the urbanisation of the coasts (strict control of coastal building development); iii) introducing beach monitoring programmes, protection and regeneration of some of the remaining dunes iv) strengthening of watershed erosion protection programme through upstream of dams. These are important activities but should be designed in close coordination with all stakeholders in the tourism sector with the aim of strengthening their resilience and sustainability and avoiding measures which could further affect and deteriorate local touristic attractions. Such measures will contribute to a common focus on ecosystem and environmental sustainability as well as the promotion of sustainable and long-term local jobs for the sector.

With respect to the protection of cultural heritage national sites, only Palestine put specific efforts on addressing issues related to flood and erosion of such relevant assets, while in general the focus is on the broader preservation or the valorisation of such sites. This is therefore an area where further efforts should be put, given the high exposure it is expected to face and the high relevance for touristic purposes.

Source: Country Fiches

A very critical area of exposure for the tourism sector in all countries remains the threats that climate volatility poses to the revenues and the longer-term profitability for the sector. The reference to potential impact of climate change on the sector remains largely non-existent. While the focus of sectoral measures remains on the more general issue of boosting the 'attractiveness' and global competition, in fact, the relevance of climate volatility that is increasingly reshaping the tourism sectors in the region seems to be consistently neglected. An overview of the described gaps in all assessed countries is provided in Figure 8.

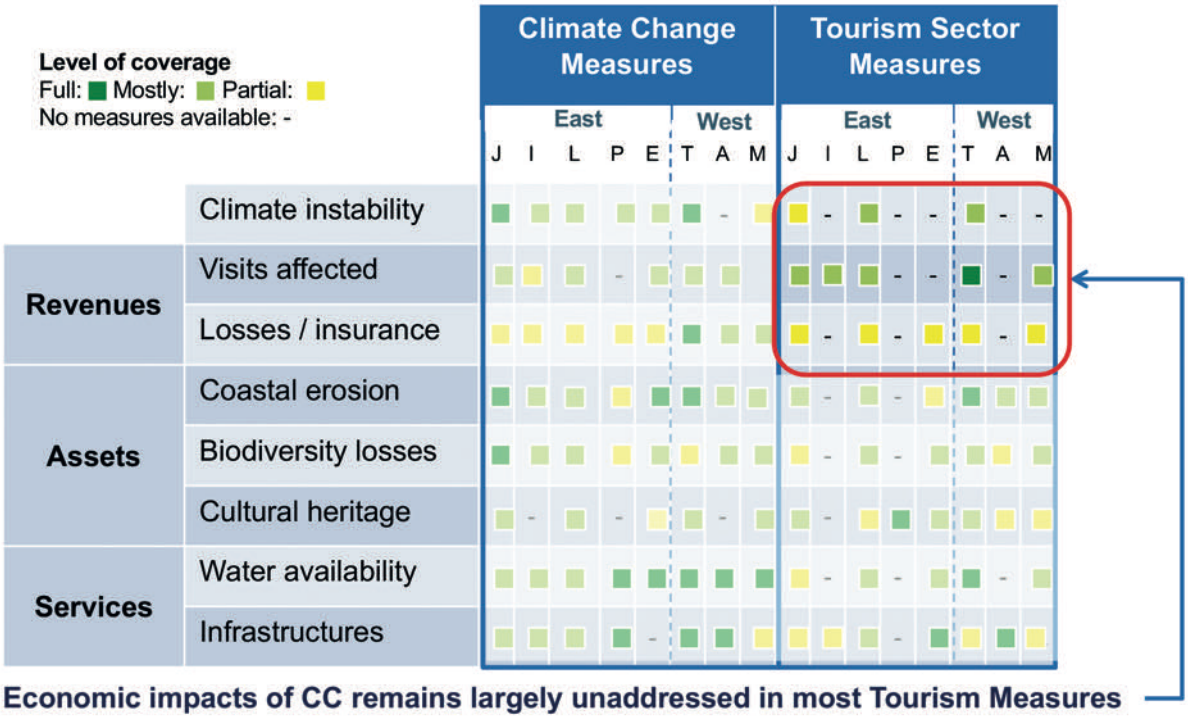

Fig. 8. Direct Impacts (losses/visits) and strategic analysis of impact on the sector are largely unaddressed

Worryingly, the growing pressure on the turnover of operators in the sector resulting from direct costs and losses due to climate change effects remains largely unrecognised. This is the case for both Tourism and Climate Change measures, with some notable exceptions, as illustrated in the Figure 9 below.

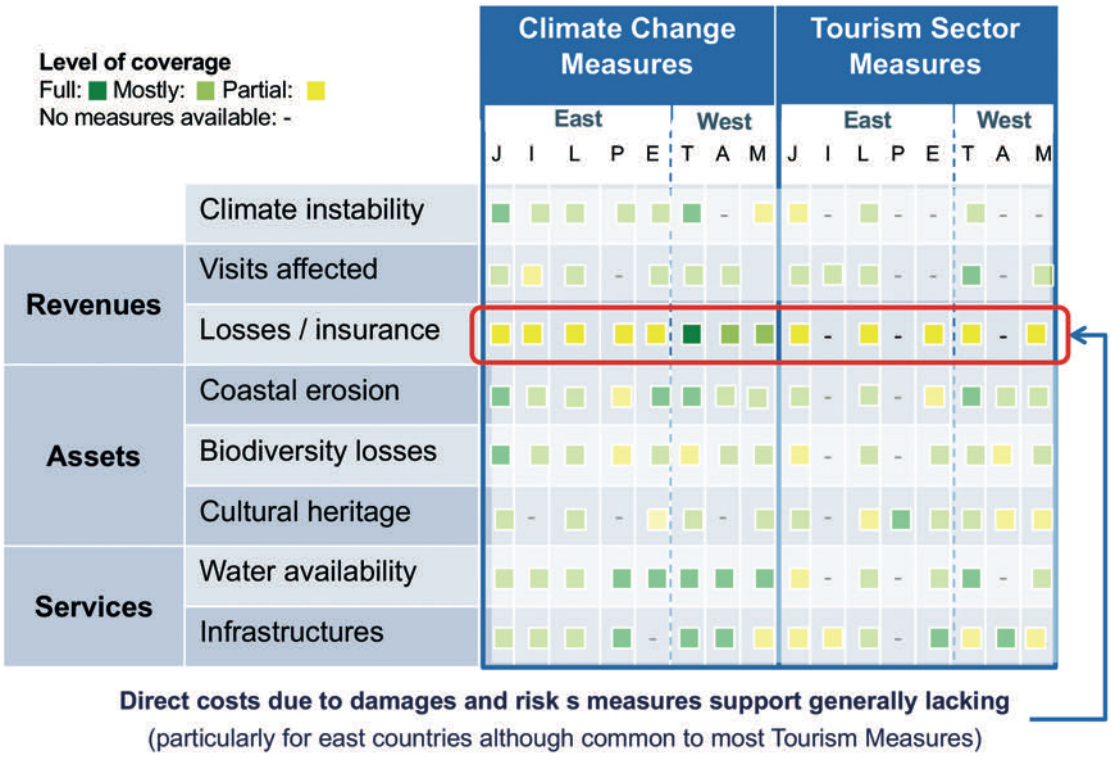

Fig.9. General lack of clear support measures addressing losses induced by Climate Change impacts

A selection of the interesting features and areas of improvements amongst the practices assessed is provided in Box 5 below, including the data used and the process set-up to engage with local stakeholders.

Box 5. Examples of measures and stakeholders involved in selected countries

The National Strategy on Climate Change in Tunisia, promoted in 2012 by the Ministry of Environment and supported by GIZ, includes a number of measures that address the growing risks of climate change related to the agriculture sector, which could also provide a reference for the tourism sector. In particular, Action 12, on "Insurance against effects of extreme climate events (economic and financial tools)", is the result of the discussion between insurance providers, the Ministry of Agriculture and the Ministry of Finance. The measure consists of a specific insurance to cover the risk of increasing extreme climate events resulting from climate change that may impact local agriculture value-chains. These risks can be either in isolated areas (flooding) or more widespread (extreme events, drought affecting an entire region for example). For isolated natural damage affecting farms, this involves the use of private insurance and reinsurance services covering the financial risks brought about by climate change. The optimal coverage profile for natural damage typically rests on solidarity between policyholders and insurers, measured premiums, sufficient market capacity and appropriate prevention. For more widespread natural damage (drought), an insurance system indexed to the drought index is recommended. Compensation is paid when a predefined climatic event, of specified severity, has occurred. In such cases, the state may review support measures.

In Israel a series of measures are adopted to: i) promote investments in the country's hotel industry - e.g. by encouraging capital investment, providing grants to projects in the hotel industry, maintaining contact between investors, Government offices and other authorities, providing information on capital investment and assisting investors in the implementation of their projects; ii) adopt a marketing programme for the creation of a tourism demand for Israeli destinations, and iii) collaborate with international airlines to encourage new direct routes to Israel. These activities are not necessarily focusing on the challenges described in this paper, as they are addressing tourism competitiveness in general, nevertheless they could provide a framework through which a better way of identifying and addressing the possible vulnerabilities of the sector to possible future impact of climate change.

Engagement with international carrier operators, for example, might help discussing possible issues of increasing prices due to climate mitigation measures - and more broadly challenges in the economic models of low-fair air transport - and discuss more sustainable means of multi-modal transport across the country and maybe even across the Southeast Mediterranean (i.e. in coordination with neighbouring destinations). Importantly, Israel is aware of its "tourism gap" regarding climate change policies, and a list of possible/potential measures is foreseen to address such gap, namely by: i) addressing vulnerable areas not yet studied within the national framework including tourism; ii) conducting economic research and business cases at sectoral level; iii) conducting research on climate change impacts on tourist decision-making; iv) conducting research on areas of uncertainty and adaptation costs and policy, including the insurance sector, and v) achieving a balanced approach between tourism and conservation of local resources and heritage sites (including issues related to climate change in this areas).

In general, therefore, the countries assessed seem to be aware of the gaps (technical and financial, but also in terms of policies). Some of them have even calculated the related costs and have designed optimised climate change national strategies to afford as many measures as possible (e.g. Palestine). It would be therefore important to further discuss and assess such broader gaps and the example of practices emerging throughout the region, so as to provide a reference for a common policy framework and specific measures to be promoted for a more resilient and adaptive tourism sector across the Mediterranean Sea basin.

Source: Country Fiches

Chapter 4

Need for action for a fast-growing and the relatively ignored challenge

A mismatch between the identified impacts and the existing sectoral response

As discussed in Chapter 2, the socio-economic impacts of climate change are expected to be substantial for the tourism sector affecting all countries assessed in this paper. Even when currently limited, in fact, **impacts will exponentially grow in the (near) future. Adaptation to such impacts is therefore a strategic need** for operators in all countries, so as to ensure a resilient, innovative and sustainable sector.

Local operators are nevertheless not fully aware and/or able to respond to such challenges, due to the interplay of currently limited perception of such impacts by local operators and their limited capacity to plan in the longer term (beyond an annual, seasonal if not even quarterly timeframe). The sector is in fact largely fragmented between small and micro operators, which are poorly networked and often lacking the financial means and managerial capacity needed for longer-term planning. Some degree of **"market failure" in the sector calls therefore for an efficient and effective policy intervention.**

And yet, as emerging from Chapter 3, **policy response to such challenges - and support to the sector's adaptation and response capacity to climate change impacts - is nowhere near to be optimal at present.** Some good sectoral practices have emerged as discussed in this paper, although they are still largely partial and often more existing "on paper" than "in practice". **Good practices may also emerge in the context of general climate change policies, but are not specifically translated into sectoral tourism policies, and vice-versa.** Moreover, although countries are mostly aware of the existing gaps, it is challenging for them to foster integrated policies for a sector remaining highly fragmented into small or even micro enterprises and in areas where encompassing sectoral policy dialogue is still relatively limited.

Regional actions and initiatives needed to strengthen local responses

The main areas of policy gaps and concerns in the country assessed appear to be the following:

- **Lack of a strategic vision in acknowledging and addressing the potential impacts of climate change** in reshaping future visits in each country and across the region, also resulting from the high fragmentation and poor networking and cooperation of (small and micro) stakeholders in the sector. Impacts to address include the effects of climate volatility in threatening seasonal visits, as well as the effect on international visitors from the potential price rises in long- and mid-haul air transport.
- **Lack of capacity and capability in the mitigation of business risks and costs resulting from the damages and losses caused** by climate change impacts (infrastructural damages, missing "seasonal gains", etc.) - some experiences emerge in relation to other sectors (e.g. agriculture) or in sectoral policies in other countries across the Mediterranean (including northern countries), but cross-fertilisation is limited.
- **Limited if non-existing cross-reference of climate change/tourism policies reducing effective integrated policies** - some of the relevant threats posed by climate change to tourism operators and stakeholders are potentially addressed through crosscutting policies (coastal erosion, infrastructural resilience, ecosystem preservation, etc.), but the full support to tourism is hindered by a lack of specific inclusion of the sector in climate change policies.

Support actions can be fostered by sharing a number of existing positive practices across the region:

- Local practices at city-level in the region and beyond - although beyond the scope of this paper;
- National good practices which can be further specified and improved - as discussed in this paper;
- Additional regional good practices - such as the Caribbean Catastrophe Risk Insurance Facility (CCRIF) ;
- Other actions to be discussed in coordination with regional and international organisations (EU, UNEP-MAP, UN-WTO on general tourism adaptation strategies, ICAO and IMO for engaging with Air and Maritime Transport Operators, UNESCO and IUCN with respect to heritage sites preservation, etc.).

[17] *climate-adapt.eea.europa.eu/metadata/guidances/guide-to-climate-change-adaptation-in-cities/11237802*
[18] *www.ccrif.org/content/about-us*

Chapter 5

Conclusions and recommendations

The assessment of relevant publicly available sources confirms that:

- **Tourism is amongst the most important economic activities** for all countries assessed, both in terms of jobs and economic returns both at the present and potentially in the future;
- **Socio-economic negative impacts of climate change for the sector are nevertheless substantial;**
- Even if currently limited, in fact, **such impacts are expected to exponentially grow** in the near- (2030) to longer-term (2050) future;
- **Adaptation is therefore a strategic need** for operators in the sector in all countries assessed, while climate change threats could also provide an opportunity for innovation across the tourism sector's socio-economic ecosystem and instigate a way to change models that are not sufficiently resilient;
- **Nevertheless, the strategies and action plan publicly available**, both for the sector and addressing climate change more in general, **do not take such challenges and needs into adequate account.**

Furthermore, our assessment also suggests that:

- **Operators are largely unaware or unable to adequately respond** to such challenges;
- Some degree **of "market failure" calls for public intervention, but it appears that planners and policymakers are also often unaware of such challenges** - at least in existing documents.

As a result, as emerging from the review of publicly available policy measures:

- **Policy response is currently nowhere near to the level required to support sectoral adaptation.**

It is therefore pivotal for the Union for the Mediterranean (UfM) to foster greater exchanges and more concrete actions involving local and regional sectoral stakeholders across the Mediterranean. The main recommendations for the UfM follow-up are therefore the following:

- **Valorise and disseminate the findings of this paper** and other emerging sources of information and good practices throughout the region, as a basis for in-depth and fine-tuned analysis;
- **Promote a regional dialogue through a Regional Workshop** with experts, practitioners and planners, as well as policymakers at the local, national and regional levels;
- **Engage more actively with decision and opinion-makers** in the region, including national and regional media, the private sector, NGOS/CSOs, authorities and institutions - including regional associations and network of operators and sectoral stakeholders, such as Eurochamber[19] or the International Chamber of Commerce with whom UNFCCC is in dialogue to achieve the Paris Agreements Goals[20];
- **Promote specific research, studies and business cases** on economic costs of climate change on the sector and returns on investments (RoI) of sectoral adaptation within and across countries (Jordan ecosystem assessment), including ways to shift current value-chains and ecosystems into resilient, profitable and sustainable models (e.g. distributed, less dependent on heavy infrastructures, etc.);
- **Foster more effective and data-based sectoral measures within and across the Mediterranean countries,** including the link of "early warning systems" to the possible range of impact it can cause to the sector, as well as the access to public support and private investments for strategic sectoral adaptation - to foster innovation, resilience and sustainability of the sector in the entire sea basin;

[19] *http://www.eurochambres.eu/Content/Default.asp?*
[20] *https://unfccc.int/news/innovative-ideas-in-action-to-get-on-track-to-paris-goals*
[21] *Also with reference to the UNWTO 2010 statement on the mitigation of greenhouse gas emissions from air passenger transport*

- **Encourage adapted management responses** in the light of the most up-to-date knowledge on tourism site vulnerability and the latest climate knowledge and projections, including through the:

    - Identification and promotion of good practices in insurance incentives for damages and losses, as developed for other sectors (e.g. agriculture) or in other regions (e.g. EU countries in the Mediterranean);
    - Engagement with Air and Marine Transport Operator to address sustainable means of transport[21], and promotion of regional alternative transport means with higher local value-added (e.g. small-scale cruising);
    - Fostering greater availability and better use of Climate Change adaptation funds and financing in dialogue with public and private investors across the region and more globally, to accelerate the sectoral innovation;
    - Promotion of Integrated Coastal Zone Management (ICZM) and other Spatial Planning tools including the tourism sector to improve the resilience of sectoral activities and maintain high quality of ecosystem services
    - Development of practices linking climate change "early warning" systems to tourism socio-economic impact.

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ANNEXES

Country Fiches

ALGERIE

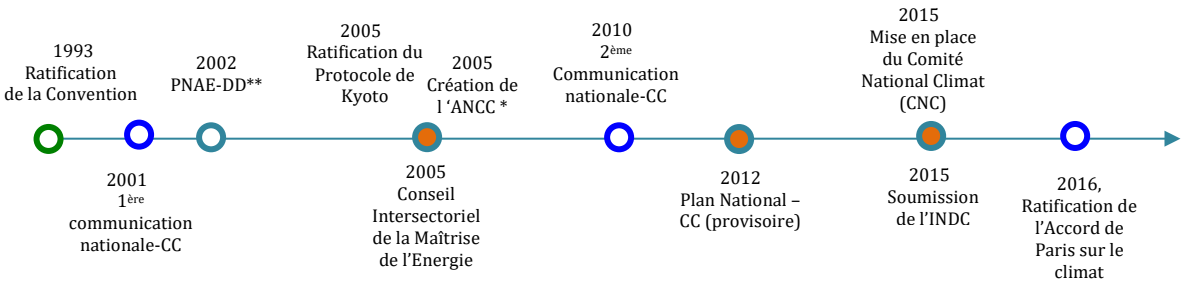
1. Contexte de l'impact du changement climatique

Depuis sa ratification de la Convention Cadre des Nations Unies sur les Changements Climatiques en 1993[1] et la ratification[2] du Protocole de Kyoto en 2005, l'Algérie n'a cessé d'organiser son cadre législatif et institutionnel pour se donner la possibilité de lutter efficacement contre les effets adverses des changements climatiques et d'adapter ses secteurs socio-économiques à ce nouveau contexte climatique.

L'Algérie a soumis au secrétariat de la UNFCCC sa communication Nationale Initiale (CNI)[3] intitulée « Elaboration de la stratégie et du plan d'action national des changements climatiques » en Mars 2001. Sa Seconde Communication Nationale (SCN)[4] sur les changements climatiques a été élaborée en 2010. Entre ces deux communications, l'Algérie a créé l'Agence[5] Nationale sur les Changements Climatiques, suivie par la désignation, le 2 février 2006 de l'Autorité[6] Nationale Désignée – MDP.

L'Algérie a soumis sa Contribution Prévue Déterminée au niveau National (en anglais INDC) en septembre 2015. Cette INDC a été adoptée par le Conseil des Ministres qui l'a entérinée lors de sa réunion du 24 mai 2015. Le 13 octobre 2016, l'Algérie a procédé à la ratification[7] de l'accord de Paris sur le Climat de 2015 (APPC). Lors du processus de préparation de l'Accord de Paris sur le Climat, l'Algérie a pris, en 2015, de deux décisions fortes, la mise en place le comité interministériel –INDC ainsi que le Comité National Climat (CNC).

Figure 1. Principales étapes et dates des changements climatiques en Algérie



* Agence Nationale des Changements Climatiques.
** Plan National d'Actions pour l'Environnement et le Développement Durable.

Les organisations internationales dont celles relevant des Nations Unies (PNUD), les agences de financement (FEM), l'Union Européenne ; ainsi que les agences de coopérations bilatérales, en particulier, l'Agence de coopération allemande (GIZ) ont contribué et continuent à soutenir les efforts de l'Algérie pour construire et parfaire son cadre national de lutte contre les changements climatiques, notamment à travers le programme de renforcement des capacités.

[1] L'Algérie est partie à la CCNUCC par décret présidentiel 93-99 du 10 Avril 1993 portant ratification de la Convention Cadre des Nations Unies sur les CC.
[2] Décret présidentiel n°04-144 du 28 avril 2004 portant ratification du Protocole de Kyoto à la convention cadre des nations unies sur les changements climatiques, fait à Kyoto le 11 décembre 1997 (instruments de ratification déposés le 16 Février 2005)..
[3] Projet national ALG/98/G31/Ministère de l'Aménagement du Territoire et de l'Environnement/ Direction Générale de l'Environnement/Financement-FEM).
[4] Projet GEF/PNUD : 00039149/ Ministère de l'Aménagement du Territoire et de l'Environnement
[5] Décret exécutif n° 05-375 du 26 septembre 2005.
[6] Arrêté Interministériel du 2 février 2006, relatif à l'autorité nationale désignée (AND) dans le cadre des mécanismes de développement propre – MDP du Protocole de Kyoto (JO n° 12 – 2006).
[7] DP. n° 16-262 du 13 octobre 2016 portant ratification de APCC, adopté Paris le 12.12.2015.

Tableau 1. "Fiche d'évaluation" de l'impact du changement climatique

Impact élevé (impact important, nécessitant des mesures majeures et une action immédiate)		*Impact négligeable (l'impact est limité mais nécessite un suivi)*	
Impact moyen (impact croissant, nécessitant des mesures mineures, suivi et action à moyen terme)		*Incidence incertaine (pas assez de preuves et nécessité d'un suivi et d'une analyse plus poussés)*	

Impact	Actuellement (2017)		Moyen terme (2020-2030)		Long terme (2030-2050)	
Risques et assurances	En Algérie, les coûts de l'inaction des CC sont estimés entre 1.3% et 4.3% du PIB-2009 selon les hypothèses retenues.		Augmentation des risques et coûts d'assurance en raison des évènements extrêmes		Augmentation des frais liées aux risques sur les infrastructures du fait de l'érosions côtière et de la perte des activités agricoles (submersion marine, intrusion de sel dans les nappes et des aquifères côtiers & sécheresse et désertification au sud et dans la steppe).	
Variabilité climatique[8]	Les données de la station d'Oran (1926-2006) indiquent une augmentation[9] de température comprise entre 0,65°C et 1,45°C et une baisse des précipitations comprise entre 5% et 13%. D'une façon générale, les analyses de longues séries sur le Nord de l'Algérie confirment le réchauffement global au cours du 20ème siècle ainsi qu'une réduction sensible du régime pluviométrique à partir des années 70, ce qui correspond au signal du changement climatique global[10].		2011-2040 Hiver : -10% à -20% Ouest et Centre et 0 à -10% à l'Est de l'Algérie Eté : -10% à -20% Ouest et Est 0 à -10% Centre de l'Algérie		2041-2070 (Hiver : -10% à -20% ; Eté : -20% à -30%) Une analyse plus fine[11], prévoit une baisse de 25% à 75% d'ici la période 2071-2100 pour le scénario[12] A2. • Déplacement des isohyètes vers le Nord[13], impliquant une baisse de 13% des précipitions (2 milliards de m³ d'eau) • Augmentation des T de 1°C, soit un déplacement agro-climatique de 100 km. • Augmentation des phénomènes climatiques extrêmes.	
Coûts d'exploitation des établissements touristiques	Les coûts sont encore maîtrisables car les effets des CC restent encore localisés et de petite ampleur en plus du soutien du prix de l'énergie et de l'eau.		Augmentation des coûts d'entretien des établissements touristiques et des coûts des ouvrages de protection en mer dans le cas du tourisme balnéaire pour lutter contre l'érosion côtière et les submersion marine.		Accentuation des coûts. Augmentation des coûts de l'énergie. Augmentation du coût de l'eau. Dégradation des zones côtières et littorales et écosystèmes • Modification des conditions climatiques • Augmentation des risques et coûts d'assurance en raison des évènements extrêmes	
Visites/demande (transport aérien, allongement de la saison touristique, etc.)	Le Train connaît un fort essor passant de train à diesel vers des trains électriques. Le parc ferroviaire roule sur un réseau évalué en 2012 à 3919 km. Ce réseau ferroviaire transporte actuellement près de 32 millions de passagers. Et de 5 millions de Tonnes de marchandises en 2012.		• Pour promouvoir l'efficacité énergétique dans le secteur des transports, il est envisagé, à l'horizon 2030, une substitution des carburants usuels par le Gaz Propane Liquide Carburant à hauteur de 20% du parc véhicule national et une introduction d'opérations pilotes pour des bus roulant au Gaz Naturel Carburant avant de le généraliser. • Le Métro, passera à 57 km en service en 2020 pour transporter environ 60 millions de voyageurs/an. • Les Tramways dans les principaux axes des plus grandes villes du pays sont déjà en service et qui représenteront à l'horizon 2020, transportant 12 millions de voyageurs urbains par an. • Le réseau passera en 2020 à 12500 km transportera, en 2019, environ 87 millions de passagers et de 15,5 millions de Tonnes en 2020.		
	De Juin à Août, les T°C maximales enregistrées ont engendré des épisodes de chaleur (nombre de journées consécutives chaudes ou		- Les mois chauds s'allongent d'avantage dans les régions ouest du pays qui sont les plus exposées avec celles du sud aux sécheresses récurrentes.			

[8] i. Un climat méditerranéen sur la côte et l'Atlas Tellien, avec de rares gelées en hiver et des étés chauds. La partie orientale est plus arrosée que l'Ouest avec 2000 mm de pluie/an. ii. Un climat aride au Sud de l'Atlas Tellien, de nature sèche et tropicale, marqué par une grande amplitude thermique hivernale (36°C le jour et 5°C la nuit). Ces pluies sont plus abondantes à l'Ouest qu'à l'Est. L'influence du désert se fait sentir jusque sur la côte par l'action du sirocco, vent sec et chaud, soufflant du Sud au Nord. iii. Un climat continental sur les Hautes Plaines et l'Atlas Saharien. La température peut descendre au-dessous de 0°C en hiver et excéder 40°C en été. Les pluies sont rares, notamment sur les Hautes Plaines de l'Oranie et celles du Constantinois. iv. 4. Un climat désertique avec des pluies rares et très irrégulières, se produisant parfois sous forme orageuse. Le Sahara est une des régions les plus chaudes du monde où les températures de jour peuvent atteindre, voire dépasser 50°C. En revanche les nuits sont très froides, surtout en hiver, où il gèle souvent.
[9] (Tabet, 2008)
[10] (Meddi, 2009)
[11] Basée sur un modèle de résolution 20 km.
[12] (Giorgi et à, 2007)
[13] (SCN, 2010 ; M. Kara, 2010)

	bien des T_{max} quotidiennes > T_{max} moyenne mensuelle) les plus longs.		• Allongement des mois et des semaines de soleil. Risques de canicules qui réduiraientt la fréquentation touristique estivale.			
Pénuries d'eau	Afin de sécuriser l'alimentation de la population en eau potable un programme ambitieux de dessalement d'eau de mer de 13 stations, d'une capacité de 2,4 millions m^3/j (80 % achevé). Des transferts et adductions importants sont réalisés.		Diminution des disponibilités des ressources en eau destinées à l'alimentation humaine compte tenu de trois facteurs ; i) diminution des précipitation, ii) accroissement de la taille de la population, notamment dans les zones urbaines et iii) développement important et rapide des activités industrielles et agricoles consommatrices d'eau.			
Ressources en eaux douces	Cinquante-neuf aquifères ont été recensés sur le littoral (Figure 3), permettant une ressource exploitable globale de 914,5 hm^3/an en année moyenne (référence 2009). Dans beaucoup de plaines, le niveau des nappes a déjà chuté dans des proportions alarmantes, à l'image de la plaine de la Mitidja où les rabattements ont atteint des valeurs supérieures à 20m		Les déficits importants observés sur la zone côtière vont se creuser davantage à en 2020 pour atteindre des déficits de 886 hm^3/an. L'aquifère de la plaine de Oued Nador à Tipaza: tous les forages captant cet aquifère (16) sont abandonnés en raison de l'intrusion d'eau de mer affectant l'aquifère sur une distance de plus de 1,5 km par rapport à la côte.		Aux risques d'épuisement de la ressource, se superpose le risque d'intrusion marine. (cas des plus importantes nappes côtières de la Mitidja, d'Oran, de Terga et d'Annaba).	
Patrimoine culturel et archéologique	Aucune analyse prospective n'a été menée afin d'évaluer les effets des changements climatiques, en particulier de l'élévation du niveau de la mer sur les vestiges archéologiques et culturels côtiers. Quelques séismes suivis de mini-tsunami ont été observés à Alger (1365, 1716) à Tipasa (1989), Aïn Témouchent (1999). Le séisme de Zemmouri (2003), a eu un effet de retrait de la mer sur plusieurs dizaines de mètres a été observé avec un retour à la situation normale par la suite.		Les risques d'une élévation du niveau de la mer concerneraient les parcs culturels et archéologiques côtiers, en particulier le plus grand Parc archéologique côtiers du pays à Tipasa, dont une partie des vestiges se trouve à quelques centimètres au dessus du niveau de la mer.			
Perte de la biodiversité	Migrations, dégradation du biotope, menaces de disparition. Apparition de plus de 70 espèces marines non indigènes (NIS) le long des côtes algériennes (manque de recul scientifique pour mesurer les effets de ces espèces sur les écosystèmes des côtes algériennes).		Les espèces non indigènes recensées le long des côtes algériennes sont considérées comme thermosensibles, suggérant ainsi le réchauffement des eaux du bassin algérien (comme le reste de la Méditerranée). Ces espèces interagiront avec la biodiversité marine indigènes et pourront affecter sensiblement les deux écosystèmes marins clés de la côte algérienne (l'écosystème à Posidonie et le coralligène).			
Infrastructures	617 552 entités économiques [14] sont concentrées dans la région nord du pays, soit 2/3 de l'ensemble des entités économiques. Avec 309 830 entités économiques, au Nord Centre (33,2%).		Risques sur les plages de sables basses et les installations touristiques dans ces zones ainsi que sur certaines installations industrielles au niveau des zones à forte érosion côtière.		Risque aggravé.	
Erosion côtière	Les analyses réalisées à ce jour révèlent quelques secteurs à forte érosion côtières (Est d'Alger, Est de Béjaia, Est de Jijel, plages d'El Tarf à la frontière algéro-tunisienne ainsi que le secteur ouest de Tipasa.		Aggrave dans les secteurs en phase de forte érosion. Cette situation n'est pas liée exclusivement aux CC mais c'est une combinaison des effets des CC, l'urbanisation anarchique de certaines zones et de l'extraction du sable de plage. La sécheresse amplifie cette situation en aggravant le déficit sédimentaire (manque des apports par les oueds).		Si le scénario actuel continue avec la même intensité des secteurs comme celui d'Alger risquent de perdre à l'horizon 2100 entre 80 et 90 m des plages de sables actuellement soumises à l'érosion. Dans un tel scénario on perdrait quasiment les plages entre oued Agrioun et le port de Bejaia.	
Maladies	Au cours des deux dernières décennies, les zoonoses ont connu un bouleversement épidémiologique avec l'apparition de nouveaux foyers d'infections de leishmaniose et sa progression vers le nord du pays, marquée par		Avec les sécheresses récurrentes et l'élévation de la température le tout combiné à la raréfaction de l'eau, notamment dans les zones arides et semi arides, le risque d'augmentation de la fréquence des maladies à transmissions hydriques et certaines épidémies liées à l'élévation de la température de l'air va être multiplié par 4. Cette situation est également à souligner pour les maladies animales.			

[14] Collections Statistiques N° 172/2012. Série E : Statistiques Economiques N° 69 : 188 p.

	une urbanisation de la maladie lié probablement[15] à l'effet combiné sur l'environnement des activités humaines-CC.			

Comment les mesures identifiées ont-elles l'intention d'aborder chaque impact spécifique? Quels résultats (documents) et résultats (actions) sont prévus et quand?

Document stratégique	Année & Porteur	Objectifs et consistance	Comment les mesures approuvées vont traiter les différentes impacts
PNC - Plan National Climat « Provisoire »	2012 Ministère chargé de l'environnement Appui de la GIZ	Le PNC vise à mettre en synergie/organiser les efforts nationaux par la mise en œuvre de la stratégie d'adaptation de l'économie nationale aux CC et d'atténuation des émissions des GES. • Diagnostic des connaissances sur les CC en Algérie et inventaire des impacts des CC sur l'économie nationale et la société. • Identifier les vulnérabilités aux CC. • Identifier les plans, programmes et politiques se référant aux CC et examiner leur cohérence et proposer une stratégie de lutte contre les CC, déclinée en un ensemble de mesures et des priorités. • Proposer des mesures d'atténuation des E- GES et promotion des EnR, • Amélioration de l'efficience énergétique et la participation aux mécanismes internationaux y afférents.	• Renforcer les capacités de lutte contre les CC. • Intégrer les CC dans les politiques sectorielles. • Mettre en place une gouvernance adaptée à la lutte contre les CC. • Favoriser l'implication des différents acteurs dans la mise en œuvre du PNC. • Créer les conditions et les modalités de la mise en oeuvre du PNC, de son suivi et de son évaluation. • Améliorer l'accès aux financements/technologies internationaux et favoriser le partenariat. Le PNC est déclinée en 15 axes : 6 axes économiques (agriculture, pêche, énergie, transport, industrie, tourisme et 4 axes environnementaux et sociaux (eau, santé, forêts, écosystèmes, villes et habitat). Le PNC réserve une place particulière à la sécurité alimentaire dans un contexte de stress hydrique, à la transition énergétique et aux actions transversales (recherche scientifique, alerte, renforcement des capacités, financement, sensibilisation/information).
INDC Contribution Prévue Déterminée au niveau National	2015 Ministère chargé de l'environnement	Les objectifs d'atténuation sont : • Réduction des émissions de gaz à effet de serre de 7 à 22%, à l'horizon 2030, par rapport à un scénario de référence (Business As Usual - BAU), subordonnée aux soutiens en matière de financements extérieurs, de développement et de transfert technologique et de renforcement des capacités. • Les 7 % de réduction des GES seront réalisés avec les moyens nationaux. Objectifs spécifiques de l'adaptation sont : • Renforcer la résilience des écosystèmes (inondations et sécheresse) afin de minimiser les risques de catastrophes naturelles liées- CC; • Lutter contre l'érosion et réhabiliter les terres dégradées ; • Intégrer les effets des CC dans les stratégies sectorielles, en particulier, l'agriculture, l'hydraulique, la santé humaine et les transports ; • Intégrer les effets des CC sur la stabilité politique et la sécurité nationale.	Mesures d'atténuation • Atteindre 27% de la production nationale d'électricité à partir des EnR, généralisation de l'éclairage performant et isolation thermique de logements à l'horizon 2030 ; • Augmentation des parts du gaz de pétrole liquéfié et du gaz naturel dans la consommation de carburants; • Réduire à moins de 1% le volume des gaz torchés à l'horizon 2030 ; • Valorisation des déchets, dont la récupération et valorisation énergétique du méthane issu des CET et des STEP. • Boisement, et reboisement et prévention des incendies de forêts ; • Sensibilisation, information et éducation sur les risques liées aux CC. Mesures d'adaptation: • Adaptation et renforcement du cadre institutionnel et réglementaire aux CC ; • Mise en place d'un dispositif de veille et d'alerte précoce et renforcement des capacités pour la gestion des évènements climatiques extrêmes ; • Elaboration de plans régionaux et locaux d'adaptation aux CC.
SDAT 2025	2008 Ministère chargé du tourisme	Le SDAT 2025 constitue le cadre stratégique de référence pour la politique touristique de l'Algérie. • Affiche sa vision du développement touristique national à l'horizon 2025	• Le SDAT est orienté développement durable avec une forte résonnance économique et sociale. La dimension changements climatiques n'a pas été vraiment prise en charge directement en 2008 lors de l'élaboration de ce schéma directeur (stratégie nationale). Toutefois, de

[15] Mliki (2015).

		dans le cadre du développement durable, afin de faire de l'Algérie un pays récepteur • Définit les instruments de sa mise en oeuvre. Le SDAT 2025 est une composante du SNAT 2030 qui décline une vision basée sur l'équilibre de l'équité sociale, de l'efficacité économique et de la soutenabilité écologique.	nombreuses dispositions tenant compte des CC sont prises en charges par d'autres instruments sectoriels lors de la réalisation des infrastructures et des installations touristiques ou lors de l'élaboration des études d'aménagement touristiques comme par exemple, la réglementation ou l'interdiction de l'aménagement dans les sites vulnérables (instruments de planification du territoire), la considération des aires protégées et la biodiversité remarquable par les instruments de l'environnement, etc…

Quelles sont les principales étapes suivies et quelle est l'étape du processus?

Documents stratégiques	Pilotage & Année	Processus	Acteurs associés
Plan National Climat (PNC) « Provisoire » 2012	Ministère chargé de l'environnement Appui de GIZ	• Conférences régionales (Ouest, Centre et Est)	Acteurs institutionnels t non institutionnels: • Ministères • Etablissements techniques sous tutelle. • Wilayas (collectivités locales) • Scientifiques et experts nationaux • Medias • Représentants de la société civile (Associations de protection de l'environnement)
Contra Contribution Prévue Déterminée au niveau National 2015	Ministère chargé de l'environnement	• Comité intersectoriel • Comité National Climat • Conférence nationale[16] • Adoption par un Conseil Interministériel	• Ministères • Etablissements techniques sous tutelle. • Wilayas (collectivités locales) • Représentation populaires (APN, Senat) • Associations socio-professionnelles (FCE, UGTA) • Scientifiques et experts nationaux • Medias • Représentants de la société civile (Associations de protection de l'environnement)
SCN (Seconde communication Nationale) 2010	Ministère chargé de l'environnement Appui du PNUD et du GEF	• Large consultation nationale • Processus participatif	Large processus consultatif avec: • Ministères • Etablissements techniques sous tutelle. • Wilayas (collectivités locales) • Scientifiques et experts nationaux • Medias • Représentants de la société civile (Associations de protection de l'environnement)
Schéma Directeur	Ministère chargé du	• Processus sectoriel impliquant le comité intersectoriel.	• Acteurs et opérateurs centraux

[16] La CPDN de l'Algérie a été élaborée dans un cadre intersectoriel et a largement bénéficié du processus de consultation engagé avec les différentes parties prenantes au niveau national. Aussi, la Conférence Nationale de Concertation sur le Climat organisée le 28 juillet 2015 a constitué un cadre de dialogue et d'échanges sur les ambitions climatiques de l'Algérie entre les acteurs institutionnels et socio-économiques, les collectivités locales et les organisations patronales, les associations socio-professionnelles, les associations de protection de l'environnement, ainsi que les experts et les universitaires et de manière générale avec les représentants de la société civile. Six ministres, dont quatre représentés au Comité National Climat ont pris part aux travaux de cette conférence, ainsi que le Président du Conseil National Economique et Social.
Cette rencontre qui a regroupé plus de 500 participants et qui est la première du genre en Algérie, a également vu la participation des représentants des medias dans le cadre du volet éducation et sensibilisation du public. Sur la base de cette large consultation, une mouture révisée de la CPDN de l'Algérie a été soumise pour adoption au Conseil Interministériel, présidé par Monsieur le Premier Ministre, lors de sa réunion du 03 septembre 2015.

d'Aménagement Touristique (SDAT) 2025	tourisme	• Long processus de recherches, d'enquêtes, d'études, d'expertises et de consultations; il est le résultat d'un « brainstorming » et d'une large concertation menée avec les acteurs nationaux et locaux publics et privés durant les assisses régionales du tourisme. L'enjeu est l'appropriation du SDAT 2025 à tous les stades de son évolution (élaboration, mise en oeuvre, suivi) par l'ensemble des acteurs.	et locaux du tourisme aux différents échelons (cadres hôteliers, restaurateurs, voyagistes, guides, opérateurs, associations) • Les autres départements dans le cadre du comité intersectoriel

2. Options politiques pour traiter de tels impacts

Elaboration des politiques et mesures et état d'avancement

Quelles sont les principales étapes suivies et quelle est l'étape du processus?

Le processus engagé par l'Algérie pour préparer, mettre en place et adapter son cadre général de lutte contre les changements climatiques et leurs effets adverses peut être structurée en trois phases :

Phase 1. 1992-2000

- Cette phase qui peut être considérée comme la phase initiale où il a été procédé à la signature, ensuite à la ratification de la convention UNFFCC. Cette phase a été essentiellement une étape d'apprentissage de ce nouvel instrument juridique international et de son cadre de discussion et de négociation.

Phase 2. 2000-2010

- Cette phase a été intense, avec la ratification du PK (2004), l'élaboration du premier Plan National d'Action pour l'Environnement et le Développement Durable - PNAE DD de l'Algérie (2002), la création de l'Agence Nationale des Changements Climatiques (ANCC) en 2005, suivi en 2006 de la Désignation de l'Autorité Nationale MDP. C'est durant cette seconde phase que les deux communications Nationales sur les Changements climatiques (initiale et seconde) ont été préparées, adoptées puis soumises au secrétariat UNFCC en 2001 et en 2010.
- Une séries d'actions, de programmes et de stratégies sectorielles considérant de manière directe les changements climatiques ont été adoptées et/ou mises en œuvre, notamment le Plan National de l'Eau (2007), le Programme National de la Recherche Scientifique (PNR), Plans Nationaux de Reboisement et d'Adaptation aux Changements Climatiques de la Politique Forestière (2010). Cette phase a été ponctuée par l'Adoption par le Gouvernement algérien du Schéma National d'Aménagement du Territoire (SNAT 2030) qui consacre un volet entier aux changements climatiques.
- Durant cette phase, a été adopté le Schéma Directeur d'Aménagement Touristique "SDAT 2025", toutefois ce schéma a plutôt une orientation économique et sociale et ne considère pas de manière directe le changement climatique.

Phase 3. 2010-2018

Durant cette dernière phase des décisions et des mesures importantes ont été prises :

- La préparation en 2012 du Plan Climat de l'Algérie, intitulé « Diagnostic, stratégie, plan d'action et gouvernance » qui vise, notamment: i. établir un diagnostic sur la question des CC en Algérie et identifier les vulnérabilités du développement national au regard des CC. ii. Examiner la cohérence des stratégies et politiques sectorielle sur le dossier du CC. iii. Proposer une stratégie de lutte contre les CC, la décliner en mesures en ciblant les mesures d'adaptation et d'atténuation prioritaires en vue d'anticiper et d'affronter les risques et de réduire les vulnérabilités liés aux CC et d'identifier les conditions et les modalités de la mise en oeuvre des mesures ainsi que de leur suivi et évaluation.
- Préparation, adoption et transmission de l'INDC de l'Algérie au secrétariat de l'UNFCC
- Adoption du Programme National de Promotion et de Développement des Energies Nouvelles et

Renouvelables et de l'Efficacité Energétique.
- Adoption du programme national Aquapêche 2025 et de la stratégie nationale de Gestion Intégrée des Zones Côtières – 2030).
- La mise en place du Comité National Climat en 2015.
- La ratification de l'accord de Paris sur le Climat e 2016.

Durant les deux dernières phases 2000-2010 et 2010-2018, un programme de formation et de renforcement des capacités a été mené par des différentes acteurs institutionnels ainsi que des projets démonstratifs ont été menés dans cette perspectives, notamment avec le soutien de nombreux partenaires étrangers (exemples : PNUD, PNUE, UE, UPM, coopération allemande (GIZ), coopération belge (CTB), Banque Mondiale, etc.).

Quels acteurs ont été impliqués, comment et à quel stade?

- Il existe trois catégories d'acteurs de la politique de lutte contre les CC en Algérie, les acteurs de l'atténuation (e.g. Energie, habitats et urbanisme, transports) et les acteurs), les acteurs de l'adaptation (e.g. ressources en eau, agriculture, santé, pêche et aquaculture, tourisme) et une troisième catégorie d'acteurs qui ont un rôle transversal, en particulier, l'environnement, les collectivités locales, la recherche scientifique et la formation professionnel ainsi que les acteurs économiques.
- Durant l'ensemble du processus qui a conduit à la ratification de l'Accord de Paris sur le climat, les principaux acteurs du CC ont intervenus dans la préparation, la validation/Adoption des documents stratégiques et plans d'action climatiques de l'Algérie.
- Le comité intersectoriel mis en place lors des processus d'élaboration des deux communication nationales sur les CC en 2001 et en 2010 a joué un rôle fondamental dans ce processus, car il contribué d'une manière directe à l'amélioration de la prise de conscience au niveau des différents secteurs sur la vulnérabilité de l'Algérie face aux CC. Ila également contribué grâce aux différentes conférences régionales à renforcer les capacités des acteurs locaux, maillons clés de lutte contre les CC.
- La création de l'Agence Nationale des Changements Climatiques (ANCC) a permis de clarifier les missions intentionnelles dans le cadre de la politique nationale en matière de CC. L'ANC apparaît dans ce processus comme un acteur essentiel avec des missions très importantes sur ce dossier, notamment:
    - *i. la promotion de l'intégration de la problématique des CC dans les Plans de Développement,*
    - *ii. l'information, la sensibilisation aux études et contribution aux inventaires des émissions et à la séquestration des GES, à l'adaptation aux CC, à l'atténuation de leurs effets et de leurs impacts socio-économiques,*
    - *iii. Contribution au renforcement des capacités nationales des différents secteurs dans le domaine des CC,*
    - *iv. La production d'une banque de données relative aux CC, v. L'élaboration d'un rapport périodique sur les CC et des notes de conjoncture. vi. La réalisation d'un répertoire des activités des secteurs pour lutter contre les CC,*
    - *vii. Coordination des actions sectorielles dans le domaine des CC. La volonté politique, notamment en matière de maîtrise de l'Energie qui constitue également un volet important de l'action climatique a été exprimée lors du Conseil Intersectoriel de la Maîtrise de l'Energie qui s'est tenu en 2005.*
- Lors du processus de la préparation de l'INDC de l'Algérie et de sa participation à la COP 21 à Paris, la création du Comité National Climat (CNC) a été déterminant dans le succès de ce processus. Le CNC est présidé par le Ministre chargé de l'environnement et se compose, outre du ministère chargé de l'environnement de Sept autres départements ministériels (Affaires Etrangères et Coopération Internationale, Intérieur et des Collectivité Locales, Industrie et des Mines, Energie, Agriculture et du Développement Rural, Education Nationale, Enseignement Supérieur et de la Recherche Scientifique ainsi que du Conseil National Economique et Social (CNES). Le Comité est chargé de : i. Assurer la coordination, le suivi et l'évaluation des politiques, des stratégies, des programmes et plans d'actions nationaux des CC. ii. Appuyer l'élaboration des programmes sectoriels que requièrent les actions nécessaires pour faire face aux effets des CC. iii. Coordonner les programmes de travail, arrêtés par les départements ministériels concernés, en matière de CC. iv. Elaborer la contribution prévue et déterminée au niveau national "INDC" de l'Algérie à la Conférence de Paris sur les CC COP21. Le CNC a été officiellement désigné lors du Conseil Interministériel du 07 Juillet 2015.
- Durant le processus de préparation du PNC, une très large consultation nationale a été réalisée, lors de conférences régionales, avec la participation de tous les acteurs concernés par la lutte contre les CC (ministères, établissements techniques, scientifiques et universitaires, société civile, médias, acteurs du territoire, acteurs économiques).
- D'autres acteurs non moins importants pour l'action contre les CC en Algérie contribuent de manière directe ou indirecte dans cette action, notamment, le Centre National des Technologies de Production plus Propres

(CNTPP)[17], l'Agence Nationale pour la Promotion et la Rationalisation de l'Utilisation de l'Energie (APRUE)[18], sous tutelle du Minist.re de l'Energie et des Mines (MEM). Ainsi que l'Office National de la Météorologie (ONM), sous tutelle du Ministère des Transports (MT). Cette dernière joue un rôle clé dans la veille climatique, en particulier par rapport aux évènements climatiques extrêmes.

- L'ensemble des documents stratégiques ou d'adaptation sectoriels par rapports aux changements climatiques ont été réalisés dans le cadre de consultations intersectorielles associant également les collectivités locales, la communauté scientifique, la société civile et les médias. Les représentants de l'Assemblés Populaire Nationale et du Sénat ont également été impliqués dans ces processus.

3. Analyse croisée: options politiques et impacts climatiques

Tableau 2. Tourisme et changement climatique "fiche d'analyse croisée"

Considère entièrement		*Considère faiblement*	
Considère les composantes clés		*Ne considère pas ou pas de connaissance précise*	

Areas of impact	**PNC**		Schéma Directeur d'Aménagement Touristique « SDAT » 2025	
Risques et assurance	• Réforme écologique de la fiscalité nationale pour le financement de mesures d'adaptation aux CC (Ad) • Promotion de labels et certifications des produits verts		Le SDAT 2025 n'intègre pas la dimension « changements climatique » en tant qu'orientation stratégique. Cependant les autres documents d'orientation sectoriels (transport, environnement, ressources en eau, énergie, agriculture,…) prennent partiellement en charge des composantes de l'adaptation du secteur du tourisme aux changements climatiques.	
Variabilité climatique	• Elaboration d'un Programme National de Recherches dédié au Climat (Recherche et Formation A/A) • Mise en place du dispositif de veille et d'alerte précoce aux EMCE • Renforcement des Capacités Gestion des évènements climatiques extrêmes (Ad)			
Transport aérien	• Adaptation des transports collectifs urbains et interurbains (Urbanisme et Habitat, Ville/At)			
Energie	• Rationalisation de la consommation en énergie et promotion des technologies de l'efficacité énergétique (Energie, Renforcement des Capacités (At) • Promotion de l'efficacité énergétique dans le bâtiment (Economie Verte, UHab, Energie /At) • Création de PME/PMI, et de TPEs dans le cadre de l'Economie Verte (Economie Verte, A/A) • Développement des métiers et emplois verts (A/A)			
Pénuries d'eau	• Economie de l'eau et optimisation des réseaux d'alimentation en eau (Eau/Ad) • Adaptation économique de la tarification de l'eau distribuée aux usagers (Eau, Agriculture/Ad) • Réutilisation des eaux usées traitées pour l'adaptation de l'agriculture aux CC (Eau, Agriculture/Ad)			
Perte de la biodiversité	• Lutte contre les incendies de forets • Adaptation écosystèmes steppiques et sahariens- CC • Protection, valorisation et adaptation aux CC de la biodiversité nationale et des services éco-systémiques • Réalisation d'études sur les d'impacts des CC sur la pêche et de l'aquaculture		S'appuyer sur les pôles d'excellence écologiques et culturels (parcs nationaux et aires protégées)	
Patrimoine culturel	• **Pas de considération spécifiques au patrimoine culturel** • Elaboration de plans d'actions locaux d'adaptation du littoral et des zones côtières aux CC (Action 45 du PNC) • Elaboration de plans locaux d'adaptation et d'atténuation aux CC (Action 46 du PNC) • Elaboration de scénarios d'impacts des CC sur les		Un des cinq objectifs du SDAT : • Valoriser les patrimoines naturel, historique et culturel. Les CC ne sont pas pris en compte au niveau stratégique. Ils sont néanmoins appréhendés comme un des enjeux environnementaux en raison des menaces qu'ils font peser sur le	

[17] i. Réduction des formes de pollution et de nuisances industrielles à la source. ii. Promotion, sensibilisation et vulgarisation du concept de développement des technologies de production plus propre. iii. Assistance et soutien des projets d'investissement dans les technologies de production plus propre. iv. Mise à disposition des industries de toutes les informations utiles, dans leurs démarches visant l'amélioration des procédés de production, par l'accès aux technologies plus propres et l'obtention des certifications afférentes, le cas échéant. v. Développement de la coopération internationale dans le domaine des technologies de production plus propre.

[18] i. Mise en oeuvre de la politique nationale de maîtrise de l'énergie, à travers la promotion de l'efficacité énergétique. ii. Coordination et animation de la politique nationale de maîtrise de l'énergie. iii. Elaboration, mise en oeuvre et suivi du programme national de maîtrise de l'énergie (PNME). iv. Sensibilisation et diffusion de l'information sur la maîtrise de l'énergie, en direction du grand public, des milieux professionnels, scolaires. v. Montage de programmes et de projets sectoriels, en partenariat avec les secteurs concernés (industrie, bâtiment, transport, etc.) et recherche de financements auprès des bailleurs de fonds. vi. Organisation de formations en direction des intervenants de la maîtrise de l'énergie, en partenariat avec les secteurs concernés (éducation nationale, universités et écoles d'ingénieurs, associations professionnelles). vii. Elaboration de propositions législatives ou réglementaires relatives à la maîtrise de l'énergie, d'ordre fiscal, financier et douanier en faveur de projets de maîtrise de l'énergie.

	Territoires (Action 55 du PNC) • Analyse détaillée des effets des CC sur le tourisme, en particulier sahélien et côtier.		développement durable du tourisme algérien. classer dans les documents d'aménagement du littoral comme aires classées et frappées des servitudes de non-aedificandi, les sites présentant un caractère écologique, paysager, culturel et touristique, **(Article 4 de relative à la protection et la valorisation du littorale)** Le plan général d'aménagement du pare est un instrument de protection qui doit être inclus dans les plans d'aménagement et d'urbanisme et se substitue au plan d'occupation des sols pour la zone concernée **(Article 40 de la loi sur la protection du patrimoine culturel).**	
Maladies à transmissio n vectorielle	• Adaptation du cadre institutionnel et réglementaire et mise en place de programme de lutte contre les maladies sensibles au climat (Ad) • Mise en place d'un système de surveillance épidémiologique et de détection précoce des maladies à transmission vectorielle liées aux CC			
Infrastructures	• Renforcement de la participation locale à la planification, la mise en œuvre et le suivi d'actions relatives à l'adaptation et l'atténuation aux CC (A/A) • Adaptation aux CC de la lutte contre la désertification et la dégradation des terres (Ad) • Elaboration de plans locaux d'adaptation et d'atténuation aux CC (A/A) • Renforcement de la protection contre les événements pluviométriques extrêmes ((Ad)		Les PAT (plan d'Aménagement Touristique) doit tenir compte de la vulnérabilité de la ZET (Zone d'Expansion Touristique)	
Offre touristique/ visites			Diversification des produits touristiques pour augmenter le nombre de touristes de 4% d'ici à 2027 (orientation récente non contenue dans le SDAT 2025.	
Agriculture	• Adaptation des calendriers agricoles aux CC (Ad) • Sélection de variétés et de semences adaptées au climat aride (Eau, Agriculture/Ad)			

EMCE : événements météorologiques et climatiques extrêmes ; **Ad** : Mesure d'Adaptation ; **A** : Mesure d'Atténuation

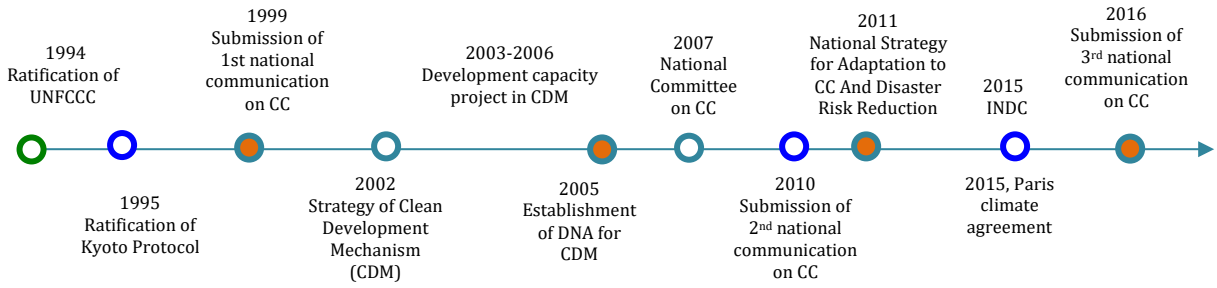
D'autres mesures transversales sont prévues par le PNC : i. Renforcement des capacités, en particulier de l'Agence Nationale des Changements Climatiques (A/A). ii. Intégration des CC dans l'élaboration des études d'impacts et de dangers et des audits environnementaux et énergétiques (A/A). iii. Elaboration de plans locaux d'adaptation du Littoral aux CC /Ad). iv. Réalisation d'études des impacts des changements climatiques sur la politique nationale de développement du Tourisme.

Egypt

1. Climate change impact areas

Egypt ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1994 and the Kyoto Protocol to the Convention in 1995. Tourism in Egypt is an important source of national income and the regional impact of climate change will be highly relevant for tourism destination and tourist alike. Since then, the country adopted a range of policy actions to respond to climate change challenges as visualised below.

Figure 1. Main steps and dates of climate change in Egypt



In 1999 the country issued, under the UNFCCC framework, the First National Communication on CC, which was followed by the Second National Communication in 2010. A number of strategies, projects and committees have been set up afterwards, as illustrated in the figure above, so to address the goals identified. By signing and ratifying the Paris Agreement in 2016 (binding to all parties), Egypt officially committed to shift to a low-carbon economy and published a national program (National Plan for Implementation of the Paris Agreement) to implement both the Paris Agreement and the national plan.

Table 1. Climate change impact "assessment fiche"

High impact (strong impact & requires major measures and immediate action)		*Negligible impact* (impact is limited but requires monitoring)	
Medium impact (impact is growing and requires minor measures, monitoring and mid-term action)		*Uncertain impact* (not enough evidence and need for further monitoring and analysis)	

Areas of impact	Currently (2017)	Near future (2020-2030)	Longer term (2030-2050-2100)
Risks and insurance	Recreational or beach[19] tourism is a dominating market[20] segment. Tourism accounted for 10 to 13% of GDP and around 20% of foreign currency. 12% Egyptian workers are employed in tourism (1.2 million employed in hotels and 1.5 million in travel and related services). Europeans make up three-fourths of the tourism market.	Threats on the existing tourism investment. The scenario[21] projected shows that tourism revenue will decrease 8.4% in 2030. Assuming there is no additional protection from SLR, losses would be between ~1 and 7 billion Egyptian pounds (EGP) per year in 2030. Annual total losses (billion EGP) in tourism due to CC in 2030: optimistic (22.2), pessimistic (19.3)	Assuming a 20% decrease in tourism, revenues in 2060 would decrease by 13 to 17 billion EGP per year. Annual total losses in tourism due to CC in 2060: optimistic (103), pessimistic (84.7)
	About 300 floating hotels of different sizes are located in Luxor – Aswan sector.	Potential decrease in Nile water level as a result of several types of CC and development projects in the upstream source countries. This directly threatens the movement of floating hotels and Nile tourism in different parts of the river, particularly[22] the Luxor – Aswan sector. Thunderstorms, high waves, and increased rainfall in coastal zones[23].	
Climate variability	Evidence of increasing mean °C and decreasing in annual precipitation. Egypt is characterized by its mild T° in winter, thus the effects of CC will mainly be in the summer months, as they are faced with loss of comfort resulting from rising temperature and with water shortages. Egypt is known for high temperature in the summer months..	Increase[24] in country averaged mean temperatures of 1°C by 2030. The annual decrease in precipitation is estimated to be 5.2% in 2030	Increase in averaged mean temperatures of 1.4°C by 2050 and 2.4°C by 2100. The annual decrease in precipitation is estimated to be 7.6% in 2050 and 13.2% in 2100.
		CC is expected to increase water temperature, shift in fish distributions northwards to live in deeper waters. In addition, increased water salinity in the coastal lakes in Egypt is expected to negatively affect fish species.	The flow in the Blue Nile in 2025 could change within the range of a 15% increase to a 9% decrease. By 2020, the flow could decrease by 10 to 50%. An average[25] of 15% reduction in flow of the Blue Nile by the end of the century, and a range of change from a 60% decrease to a 45% increase.
Visits (aviation and tourist season)[26]	Alexandria being the most important location (≈ 2 million visitors/year). The northwest coast has seen extensive urban and touristic growth[27]. The coast[28] of the Gulf of Suez is also a primary attraction for domestic tourism.	The high temperature in tourist areas may alter the attraction of some coastal areas that rely on moderate weather during the summer season. Diving tourism depends mainly on the coral reefs in the Red Sea. The high temperature of water leads to the bleaching of coral reefs, which is considered a natural wealth attracting tourists.	
	The major Egyptian tourist regions relying heavily on beach tourism are along the Red Sea coast, through hotels and vacation resorts across locations such as Sharm El Sheikh, Hurghada, Marsa Alam, and Taba.	In such a case, tourists exposed to these heat waves, which limit their activities on the beach during their holidays, may resort to spending their vacations in other regions, or visit such locations during the spring and autumn seasons only.	They will be subjected to heat waves more often, and therefore lose their attractiveness for tourism. In some cases, this will lead to a slowdown or a complete halt of tourism and travel to those affected areas.

[19] This coastal zone is the most vulnerable to SLR due to its relatively low elevation. It is als affected by salt water intrusion and extreme dust storms.
[20] Other types of tourism which are less susceptible to CC (e.g. Cairo area, with the pyramids of Giza and tours on the Nile and to the Pharaohs tombs in the Valley of Kings).
[21] Developed a high future tourism level scenario based on extrapolation of the 2004–2008 trend, and a low future tourism scenario based on extrapolation from the 2004–2010 trend.
[22] The docking of Nile boats and floating hotels is an annual phenomenon, particularly during the winter season. It is a problem that Nile tourism suffers from due to the low water level, the appearance of islands in the river stream, and the waterway between Qena, Luxor and Aswan not being cleaned.
[23] High waves and tsunamis in the Mediterranean and Red Seas. It is likely that Alexandria and the North Coast will be hit by a severe sea storm, resembling a tsunami, which will cause significant human and financial casualties, particularly with most tourist resorts, and development projects located along the beaches of Alexandria and the North Coast.
[24] General circulation models (GCMs)
[25] Used bias-corrected statistical downscaling of 17 general circulation models (GCMs)
[26] Egypt benefits from a very balanced pattern of tourist arrival all over the year (International Western tourists in winter and Arab tourists in summer).
[27] As well as the coast of Matrouh. The shores of Ras Al Barr, Port Said and Ariesh are tourist destinations of medium density
[28] The coasts of the Red Sea and the Gulf of Aqaba (South Sinai in particular) are global tourist attractions because of their natural advantages, and the availability of infrastructure.

Water shortages & Freshwater resources	Difficult balance of water uses between sectors.		Interconnection between the tourism sector and other sectors (agriculture, water resources, fishing, health), and communities, lead to tourism being directly impacted[29] by anything that befalls these sectors.		Anticipated decrease in water resources as a result of CC will affect the economics of many tourism projects that rely on water desalination, which means higher investment costs in such projects.	
Biodiversity loss	Deterioration of biodiversity[30]. For the tourism sector, coral reefs which constitute a major attraction in Red Sea resorts are highly vulnerable to CC (bleaching). In urban areas, heat islands formed by hot air arising from the increasing use of energy in buildings represent the main concern in hot arid climates.		In addition, one of the most significant potential negative impacts of climate change is the harm inflicted on national heritage as result of temperature rise, sandy winds and ground water. However, this is not just a national concern. Instead, it is a global challenge since this heritage is part of the human heritage.		20 to 35% of coral reefs in the Red Sea would be decimated by 2030 (assuming a linear increase in coral reef loss since 1990), and that 50 to 80% of coral reefs would be lost by 2060.	
Infrastructural issues	Alexandria (Mediterranean Sea) and the northwest coast have seen extensive urban and touristic growth, as well as the coast of Matrouh. The shores of Ras Al Barr, Port Said and Ariesh and the coasts of the Red Sea. The Gulf of Suez is also a primary attraction for domestic tourism.		SLR threatens the electric power plants and networks located along the coasts. Also, the negative impact of CC on rainfall rates and rain distribution across different regions negatively affects power generation from hydropower plants.		The possibility of hurricanes and tsunamis will lead to heavy loss of life in addition to the destruction of houses and infrastructure. Extreme events will also impact on infrastructure, ranging from landing and farming sites to post harvest facilities and transportation routes.	
Coastal erosion	Sea level rising, poses danger to holiday destinations in the northern Nile Delta for foreign and local tourists and leads to the losses of beaches, which reduces desirability.		Coastal zones are expected to suffer from CC impacts. These include SLR and the over flow of low-level land. Estimations indicate that SLR by 50 cm leads to serious impacts on low-level lands in Delta and adjacent highly populated cities such as Alexandria and Port Said.			
			Coastal tourism will lose most of the sandy beaches below a 1 m sea level, unless they are protected by suitable constructions. If the sandy beaches are lost[31], the coastal tourism will suffer.		Assuming there is no additional protection from SLR, losses would be between 2 and 16 billion EGP yr−1 in 2060.	
Temperature of the sea	Egypt produces[32] 93% of its fish consumption. Egypt fish food contributes an estimated 20% to animal protein intake. Egypt's limited freshwater resources are the major constraint to aquaculture development. With the absolute priority given to drinking water supply and irrigation, more than 90 % of the country's fish farms are depending on agricultural drainage run-off.		• CC is expected to increase sea T°C causing fish distribution to shift northwards and to move to deeper water. Aquaculture may suffer from water shortages due to the expected scarcity in fresh water supply, and increased T°C might also affect the production of some fish species. • Increased salinity of water in the coastal lakes may gradually reduce the existence of fresh water fish, increasing the portion of saline water fish (more sensitive to environmental changes).		• Fish farms will face stronger competition in water use, with a direct impact of T°C on the productivity of fish. • The expected SLR will have a significant impact on the rates and locations of egg hatching. The increased salinity will limit the spread of fresh water fish in the northern areas of the Delta. • Changes in production and distribution of species, including change in migratory paths, when combined with the warming coastal waters.	
Cultural heritage	Archaeological sites in Abu Keer, Qaitbey Citadel, Selsela (Eastern harbour) in Alexandria, and the Rosetta area (Some of these sites – currently above sea level -		May be affected as a result of the SLR. The monuments that are located below sea level will not be affected as they are already submerged. The SLR will further protect them from various eroding factors..			
Biodiversity damage	Severe epidemics of tomato late blight (Phytophthora infestans) emerged in the last years. Severities of current cultivars of wheat to leaf rust caused by Pucciniatriticina and stripe rust disease caused by Pucciniastriiformis increase with increasing T°C.		An epidemic onset is expected to lead to 2-4 additional sprays to be applied at the coming decades of the 2025-2100's. Furthermore, it is a challenge for potato late-blight researches in the future to find a balance between reduction use of pesticides usage and the pressure to increase pesticide utilize due to CC and challenging the pathogen populations. The expected generation numbers of the pest at 2050 and 2100 are be 12-14 and 13-15 generations per year, respectively. The similar results revealed to cotton pink bollworm Pectinophoragossypiella. The insect generation period will be shorter under CC conditions in Egypt. For			

[29] Higher water demand through higher touristic consumption will lead to conflicts with agricultural, industrial and domestic users.
[30] In Egypt, coral reef stretches along the southern coast of the Sinai Peninsula, particularly in the Cape Tantour area and the area between Ras Nasrani and Ras Mohammad. In the Red Sea region, the coral reefs extend from Hurghada to Elba Mountain on the southern border of the country. There are five areas declared as marine reserves containing coral reefs.
[31] Beach tourism still accounts for 60% of the volume of global tourism.
[32] From the River Nile and its tributaries and drains, the Mediterranean and Red Seas, the northern lakes as well as fisheries north of the Delta.

	Generation numbers of T. absoluta under CC conditions increased especially in Qena governorates (south Egypt).		example, peach fruit flies (Bactrocerazonata) and potato tubeworm, the generation number will increase during the growing seasons.	

How do the measures identified intend to address each specific impact?
What outputs (documents) and outcomes (actions) are foreseen and by when?

Strategic document	Year & Leader	Objectives et consistency	How do the measures identified intend to address each specific impact?
Egypt Third National Communication on Climate Change	2016 Egyptian Environmental Affairs Agency (EEAA)	This TNC-CC provides an overview on the CC issues and status to the key stakeholders at local, national, regional and global arena. This document contains National Circumstances, GHG, measures to mitigate CC, Vulnerability and Adaptation and the lines of research, education and systematic observation specific to the topic. Egypt's TNC-CC, funded by the GEF through the UNDP, has been able to create a solid foundation for further work on scientific and policy issues. Define the concerns relevant within the national context and has identified potential areas for further action.	Develop a Low Carbon Strategy (LCS) as part of GHGs emissions mitigation scheme, for the Egyptian tourism sector which should include: • Improve energy efficiency and load/energy management. • Increase on-site energy production from renewable sources (solar energy). • Promote for sea water desalination-based concentrated solar power and using high efficient • desalination technologies. • Set achievable specific energy, water consumption and waste generation targets. • Maximize use of natural gas when possible. • Establish energy efficiency, renewable energy and waste certification body[33] for tourism sector. Some of the proposed tourism NAMA sections are being implemented on small scale in support of Ministry of Tourism, include the following programmes (boilers tune-up, high Efficiency lighting, solar water heaters, cluster cogeneration, CSP-water desalination, PV for public lighting).
Egypt's National Strategy for Adaptation to Climate Change And Disaster Risk Reduction	2011 Egyptian Cabinet, Information and Decision Support Centre* Support[34] UNDP	The main objective of Egypt's National Strategy for Adaptation to CC and Disaster Risk Reduction is to increase the flexibility of the Egyptian community when dealing with the risks and disasters that might be caused by climate change and its impact on different sectors and activities. It also aims at strengthening the capacity to absorb and reduce the risks and disasters to be caused by such changes. The strategy adopts accommodation and protection as the two basic means of defence, taking into consideration systematic retreat based upon predefined plans, in case the coastal zones are exposed to cyclones, tsunamis or any other extreme event.	**Reducing climate change risks in touristic areas** • Developing necessary plans to address risks • Assessing the vulnerability index and the susceptibility of touristic sites and locations of archaeological value to risks • Guiding touristic growth away from environmentally sensitive areas and most vulnerable to risks • Calling upon the private sector to implement adaptation plans related to touristic projects. **Incorporating disaster risks within Egypt's sustained tourism development plans** • Reassessing the ministry of tourism plans and bodies • Preparing detailed plans for developing and activating tourism, with the merging of adaptation programs **Enhancing the capabilities of local communities in touristic areas** • Determining expected risks and the capabilities of different communities • Preparing a plan for the requirements to enhance local capabilities • Providing needs according to plan • Periodic reviewing and developing of plans.

[33] This body will mainly certify and offer incentives to the tourist facility that achieves target specific energy consumption, use renewable energy and minimize waste generation.
[34] The National Strategy for Adaptation to Climate Change and Disaster Risk Reduction expresses Egypt's vision of the problem. It benefited indirectly from the strategies of countries such as: Spain, Turkey, Germany, and the United Kingdom.

			Monitoring, planning, and follow up[35]. **Researches and studies (**studying the development of unconventional water resources (water freshening).
The Intended Nationally Determined Contributions (INDCs)[36]	2015	The INDC is submitted towards achieving the objectives of the UNFCCC. This report define the measures determined and intended to be applied by the country to face climate change in terms of adaptation (to climate change impacts) and mitigation (reducing greenhouse gas emissions).	**Mitigation Policies (i.** more efficient use of energy, especially by end users. ii. Increased use of renewable energy. iii. Reform energy subsidies[37]). **Additional Adaptation Policies and Measures (i.** Building institutional capacities of monitoring-observations. Ii. Identifying indicators and conducting full assessment of tourism sector and stakeholders. Iii. Enforcing environmental regulations. Iv. Identifying and applying protection measures of vulnerable touristic and archaeological sites and roads against extreme natural phenomena such as floods, dust storms and extreme weather conditions. V. Proactive planning and integrated coastal zone management. Vi. Risk reduction; and increasing awareness of stakeholders for energy and water utilization)
Tourism Strategy 2013-2020	2013 Egyptian National Egypt's Competitive ness Council	Develop the overall tourism economy. Distribute tourism income and benefits through employment creation and enterprise opportunity as well as employment in food production, transport, host services, retail sales, and individual crafts, thereby creating social benefits penetrating all levels of Egyptian communities. To ensure that restrictive policies in aviation do not curtail tourism growth; The intensification of the development of its marine assets for tourism and leisure, in particular the Mediterranean coast and passenger ports, i.e., in bringing on-stream cruise terminal at Alexandria, in bringing into operation the rail link from Alexandria to the Pyramids of Giza and Cairo, and in positioning Alexandria as a cruise hub for the Eastern Mediterranean.	• Green, sustainable buildings blended closely with nature are the future. Natural materials, internal gardens, creative use of water, variable lighting, and design and colour of furniture, art, all play roles in an integrated environment. • In order to attract a great deal of investment, from all sources, tourism development must be high quality while remaining environmentally outstanding. • Egypt will have to compete globally in areas of quality and value. Sustainable tourism will require luxury, the constant exceeding of customer expectations. • Introduce energy audits for hotels and tourism attractions. • Require new hotels and tourism attractions to build in solar energy solutions for water heating, lighting and cooling. • Develop eco and green projects.
Egypt's Strategy for the Development of Tourism until 2050		• Increasing demand for products of Egyptian tourism through[38]. • Facilitating access to tourist destinations through[39]. • Achieving communication in tourism development through[40]. • Developing integrated and compatible tourist destinations within tourist regions[41] • Upgrading the quality of tourist	No specific dispositions to reduce climate change impact on tourism.

[35] **C**reation of national database on CC, adaptation plans and risk reduction measures, development of indicators for the implementation of actions of the NSA-CC in touristic area, review of plans, programs and scenarios of tourism sector in coherence with NSA-CC, preparing programs for raising community awareness in the field of CC and risk reduction linked to tourism ((engage users in supporting the proposed strategy.

[36] In accordance with Decisions 1/CP.19 and 1/CP.20.

[37] This policy is implemented using 4 pillars: set different prices for petroleum products based on energy generation efficiency; increase the efficiency of energy use; provide support to certain sectors to promote switching from conventional energy sources to clean energy sources; and apply the fuel subsidy smartcard system to ensure that subsidies are received by target beneficiaries.

[38] Through expansion in the development of current international and local tourist, markets, opening new markets, increasing tourists' length of stay, developing, diversifying and integrating tourism products

[39] Through developing new means of tourist transport, developing the tourist circuits, increasing the current transport and transportation capacity serving international and domestic tourism, connecting tourist destinations and areas

[40] Through measures and setting up the required mechanisms to prevent all forms of environmental pollution in tourist areas, developing an environmental management system for tourist areas

[41] Through coordination between the various competing usages of land in tourist regions, creating functional integration between tourist destinations within the same region, as well as with tourist destinations in neighboring regions, establishing functional and dynamic ties between the different tourism activities in tourist destinations and all types of moving tourism, e.g., yachting tourism, floating Nile hotels, safaris, train tourism, etc.)

		services[42].	

ECIDSC is the Technical Secretariat of the National Committee for Crisis/ Disaster Management and Disaster Risk Reduction, and responsible for implementing climate change adaptation programs from the monitoring, planning and follow up aspects.

[42] Through human resources development and training for those working in the tourist sector and its auxiliary activities, developing the tourist sector's administrative systems and structures.

2. Policy options to address such impacts

Elaboration of the policies and measures and advancements

What main steps have been followed and what is the stage of the process?

Strategies/policies	Leader	Process	Main actors associated in the process
Egypt Third National Communication on Climate Change	2016, Egyptian Environmental Affairs Agency (EEAA)	Preparatory process with large stakeholders consultations	• Institutional bodies • Scientists and experts • International experts • Public & Private sectors • NGO's • Medias
Egypt's National Strategy for Adaptation to Climate Change And Disaster Risk Reduction	2011, Egyptian Cabinet, Information and Decision Support Centre. Support[43] UNDP		
The Intended Nationally Determined Contributions (INDCs)[44]	2015		
Tourism Strategy 2013-2020	2013, Egyptian National Egypt's Competitiveness Council	Non available information on the process	Non available information on the process
Adaptation to CC in the Nile Delta through ICZM in Egypt (enhanced resilience to CC impacts by integrating sea level rise risks within an adaptive capacity approach for human/natural systems)	2010-2017 UNDP[45] (the GEF Implementing Agency in this project)	The Project Management Unit (PMU) is located within CoRI[46] in Alexandria.	Multi stakeholders involved : Ministry of Water Resources and Irrigation (MWRI), through its components: CoRI[47] and SPA[48]. The third major national stakeholder is the Egyptian Environmental Affairs Agency (EEAA)[49]. It houses the Secretariat of the National Committee for Integrated Coastal Zone Management (NCICZM).
CC adaptation and preparedness for natural disasters in the coastal cities of North Africa (Egypy case: Alexandria).	Environmental Affairs Agency 2008-2011	Technical process with multi-stakeholders consultations and participations.	Multi-stakeholders process in order to identify the main challenges associated with the protection of 60 million people living in Mediterranean cities & enhance decision-making capacity.
Monitoring the risks of CC and SLR above that of groundwater and agriculture in the Nile Delta	2009-2012		Multi-stakeholders process in order to enhanced decision-making capacity for predicting and mitigating CC impacts on agriculture and the environment along the Nile Delta coast Identification of migration and human.
National Sustainable Tourism Strategy 2013 – 2020	2013, Supported by USAID[50]	Sectoral process	
CC Risk Management Program (CCRMP) (Adaptation project).	Supported by Spanish Development Fund		Include many ministries and sectors (Ministry of Irrigation and Water Resources, Agriculture, Environment, International Cooperation and Foreign Affairs)

Other projects and programs:

- Assessment and Strategy to Respond to the impact of SLR on Human Mobility in Egypt. Project aims to understand effects and potential consequences of SLR on the issue of migration and human security in the Nil Delta and some coastal cities in Egypt (Adaptation project). Project implanted by (IMO)[51]. In cooperation with the Ministry of Man power and Immigration, The Ministry of Environment, The Coastal Researches Institute and number of Non-Governmental Partners.

[43] The National Strategy for Adaptation to Climate Change and Disaster Risk Reduction expresses Egypt's vision of the problem. It benefited indirectly from the strategies of countries such as: Spain, Turkey, Germany, and the United Kingdom.
[44] In accordance with Decisions 1/CP.19 and 1/CP.20.
[45] UNDP-CO supports the implementation of the project by contracting project personnel, experts and subcontractors, undertaking procurement, and providing other assistance upon request of the National Executing Agency
[46] Coastal Research Institute
[47] the Coastal Research Institute (CoRI) is responsible for investigating the coastal processes along the Nile Delta as well as along the entire Egyptian coast. It monitors the evolution of the Egyptian coast, studies the dynamics of its shores in order to find out efficient and cost-effective control methods to protect valuable coastal infrastructure from erosion
[48] The Shore Protection Authority (SPA) is responsible for physically managing the shoreline in coastal areas that have socioeconomic value or natural resource value, and that are threatened by erosion. It develops shore protection plans, designs projects for shore protection and prepares all studies for shore protection. It also issues license for projects located in the coastal zone area
[49] which is the national organisation responsible for development, promotion and implementation of ICZM. Housed in Egypt's Ministry of State for Environmental Affairs, it should be the "champion" for ICZM, as the coordinating organization for ICZM planning and activities
[50] Agency for International Development or the United States Government.
[51] International Organization of Migration

- Climate change Adaptation and Natural Disaster Preparedness in the Coastal City of Alexandria. Expected impacts of CC and ND (Adaptation project). Collaboration with World Bank & AASTMT[52].
- CC & Human Mobility Project (Various dimensions of internal and external migration and impact of CC on migration (Adaptation project). Supported by (AFD[53], Partnership with IEHS[54]-UN, University and WB.

What actors have been involved, how and at what stage?

- Egypt realize very early the threat of CC to its development. After signing the UNFCCC in 1992 and with the support of international donors, the Egyptian scientific community started to assess the vulnerability of different economic sectors to the potential adverse impacts of CC.

- The climate change department within the organizational structure of Egyptian Environmental Affairs Agency (EEAA), and the vital role played by the sustainable development department of the Ministry of Foreign Affairs (MOFA).

- National Committee on Climate Change has been established in 2007 (Prime Minister Decree #272). The committee includes representatives from the Ministries of Foreign Affairs, Water Resources & Irrigation, Agriculture & Land Reclamation, Electricity & Energy, Petroleum, Trade & Industry, Economic Development and Defence, besides experts from national and relevant agencies. The National Committee is concerned with developing mitigation and adaptation strategies to address phenomenon of climate change. Reviewing and activating the National Strategy for Climate Change with the preparation of plans and programs required in the near term and long term and integrated into national action plans for development in Egypt.

- Climate change department is (i) reporting for UNFCCC: INC 1999, SNC 2010 and TNC, (ii) reviewing IPCC reports, particularly SPMs, (iii) negotiating UNFCCC, (iv) designing National Policy related to Mitigation and Adaptation, (v) mainstreaming policies within national Planning, Top Down and Top Down approaches, (vi) piloting projects.

- Egyptian Cabinet's Information and Decision Support Center (IDSC) Crisis Management and Disaster Risk Reduction Sector is the Cabinet's Think Tank. Its main task is to support decision makers with regard to economic, social and political issues.

- Crisis Management and DRR Sector is the technical secretariat for the National Committee for Crisis Management and Disaster Risk Reduction (DRR) which is the National Platform for DRR according to Hyogo Framework for Action.

- IDSC coordinates among all ministries and bodies concerned with the implementation of requirements of the strategy for adaptation to climate change to ensure their incorporation into development plans. IDSC Follow up on the development of mechanisms for monitoring and early warning in the areas of climate change and disaster impact reduction.

- Alexandria Research Center for Adaptation to CC (ARCA) aims to establish a multidisciplinary and rigorous hub for climate change adaptation research to support cross-cutting decision and policy making.

- Water Institute of the Nile (WIN) is a think tank based in Cairo that began in 2011 by a group of professionals working in various sectors looking for an alternative space to deal with water issues surrounding the Nile Basin. WIN provides a platform for youth engagement in Nile basin issues, including climate change issue. WIN is doing research on HIMA for CBA under Climate Change.

What data has been considered and from what sources?

- Scientific research: Academic research (The multi-criteria approach 'Adaptation Simulation Evaluator' (ASE).
- Scientific/ technical modelling: Climate model predictions, Global Climate Model (GCM)

[52] the Arab Academy for Science, Technology and Maritime Transport.
[53] French Agency of Development
[54] the Institute for Environment and Human Security of UN

projections).

- CAPMAS (information centers and information banks), as well as governmental institutions issuing licenses to targeted entities relevant to the GHG inventory.
- Egyptian General Petroleum Corporation (EGPC), Egyptian Natural Gas Holding Company (EGAS), Egyptian Electricity Holding Company (EEHC), New and Renewable Energy Authority (NREA), Ministry of Planning, Ministry of Transport, Egyptian Electricity Holding Company (EEHC), National Electricity Dispatch Center (NDC).
- Ministry of Interior (MOI), the Egyptian National Railways (ENR) and the Ministry of Transport (MOT). Ministry of petroleum (MOP) and the Organization of Energy Planning (OEP).
- CAPMAS and the State Information Service (SIS).

3. Policy options to address such impacts

Table 2. Tourism and climate change "cross-analysis fiche"

Completely considered		Weakly considered	
Main components considered		Not considered or Non known	

Areas of impact	Climate cc policy		Tourism Policy (National Sustainable Tourism Strategy 2013 – 2020)	
Risks and insurance	• Implementation of integrated environmental management systems in touristic sites (e.g. IEMS for the coasts of the Red Sea – funded by the GEF (adaption). • Developing plans to address risks. • Assessing the vulnerability and the susceptibility of touristic sites to risks.		• Improve the effectiveness of tourism organization, the institutional framework and the legal and regulatory environment. • To adopt an approach to development that will ensure environmental sustainability	
Climate variability	• Assessing the degree of fragility and vulnerability to risk of touristic sites and sites of Archaeological value.		• No specific measures/actions required	
Aviation routes change	• Adapt tourism seasonality to heat waves (might make the climate less attractive for tourists).		• No specific measures/actions required	
Infrastructures			• Introduce energy audits for hotels and tourism attractions • Require new hotels and tourism attractions to build in solar energy solutions • Remove all remaining incandescent bulbs and replace with long life energy efficient CFL and LED bulbs. • Use condensing boilers where appropriate • Use of light systems at night which are controlled by PIR's or sensors which switch on as required • Lagging of hot water pipes and storage– heat loss is higher than 35% in unlagged systems and use high efficiency absorption heat pumps where appropriate	
Water shortages	• Implementing an awareness campaign on the impact of CC. • Slowing down and limited time storing for water[55] and managing competition in water demand among sectors[56].		• Use boilers with high AFEU ratings to heat water and fit with automatic sensors to manage hot water use load • Develop highest environmental criteria and utilize Best Practice in water use.	
Biodiversity loss	• Proclamation of MPA's (adaptation measures for environmentally vulnerable areas within tourist sites).		• Conserve and present the full range of the rich natural heritage of Egypt • To identify areas of special environmental interest and habitat and areas of natural and scientific interest, and to protect them under the law and manage public access for the benefit of residents and visitors • Adopt strict measures to protect and conserve environment, heritage etc.	
Cultural heritage	• No specific actions or assessment for tourism • Lower relevance if compared to water and agriculture, but includes some tourism concerns.		Cultural benefits include improved preservation and presentation of the nation's heritage and culture to be enjoyed by citizens, visitors, and future generations. The need to leverage Egypt's great legacy of heritage in new ways, avoiding sameness in new development. Lastly, development depends on optimizing, in a sustainable way, the extremely valuable coastal lands.	

[55] Through surgical perpendicular canal/canals at the bottom of the flood route. Minor multiple and repetitive dams could be built to periodically store water and consequently lessen the amount of resultant water at the crossing

[56] Higher water demand through higher touristic consumption will lead to conflicts with agricultural, industrial and domestic users

			The Supreme Council for Tourism is a sound structural component for Egypt's tourism industry. Up to 11 ministries could be involved in the council, but major players will likely be Civil Aviation, Heritage, Culture and the Arts,	
Decline of landscape	• Expected tourism growth away from environmentally sensitive areas and the areas that are most vulnerable to climate change.		• Green, sustainable buildings blended closely with. Natural materials, internal gardens, creative use of water (sight/sound), variable lighting.	
Vector-borne diseases	• Better accessibility and analysis[57] of existing historical data and more detailed data for all regions in relation to different CC scenarios. • The best economic strategy for farmers is to use integrated pest management practices to closely monitor insect and disease occurrence. • Develop a map for the observation of plant diseases and their causes, their prevalence.		• No specific measures/actions required	
Infrastructural issues	• Developing a monitoring system for the expected impacts of CC in touristic sites. • Enforcing and constructing fortifications against floods in the areas vulnerable to flood risks of coastal zones. • Rehabilitation and support of natural protection • Undertaking engineering and preventive works to prevent or control sea water intrusion.		• Development planning in new tourism areas like the Red Sea, Mediterranean Coast, Siwa, and the Western Desert can be of the highest environmental quality and Best Practice. • New buildings for tourism have to be environmentally friendly and demonstrate a "green".	
Tourist offer/ Visits	• Preparing plans for developing and activating tourism, with merging of adaptation programs. • Guiding touristic growth away from environmentally sensitive areas and most vulnerable to risks.		• Develop a range of Eco-tourism products that respond to the requirements of modern and future visitors	

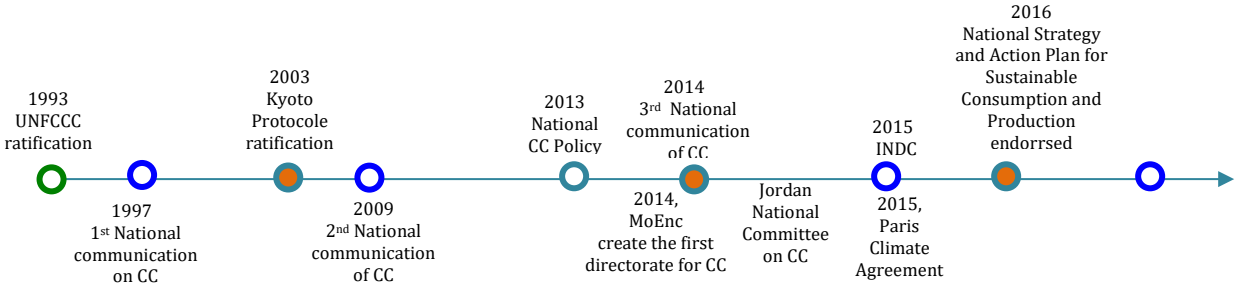
[57] Additional information and research is required on the distribution of plant pests and diseases, and on their epidemiology.

Hashemite Kingdom of Jordan

1. Climate change impact areas

Tourism is a very important economic sector in Jordan. Also, tourism can support the preservation of the natural and bio-diversity resources (through eco-tourism), and the preservation of Jordan's cultural heritage. Tourism could be impacted by climate change in different ways. Jordan has taken large steps during the last decade to insure a relevant and operational framework to tackle climate change issues and its various impacts. Under the UNFCC, the initial climate change communication was prepared and submitted in January 2001 and updated in November 2001. Since then, several strategies and adaptation action plans of vulnerable sectors to climate change have been developed and part of them implemented (health, agriculture, water). The Third National (2014) and Jordan INDC (2015) have also improved the strategic national climate in line with international climate framework and orientations of UNFCC and its COP's.

Figure 1. Main steps and dates of climate change in Jordan.



Since its ratification of the United Nations Framework Convention on Climate Change (UNFCCC) in 1993 and the Kyoto Protocol, Jordan has embarked on a momentum to organize its national framework to combat the adverse effects of climate change and climate change, improve the resilience of the most strategic sectors to these changes in order to maintain and consolidate its development gains and to sustainably preserve its natural resources. During this process, special attention was paid to the economic activities and ecosystems most vulnerable to climate change.

Under the UNFCC, the initial communication was prepared in 1997 and the second one in 2009. Since then, several strategies to adapt sectors to climate change have been developed. In 2013, The National Climate Change Policy of the Hashemite Kingdom of Jordan 2013-2020 was developed and evaluated the current conditions of several sectors that will be affected by climate change and suggested practices and adaptation measures. The sectors included energy, transportation, solid waste and wastewater, land use and forestry, agriculture, water, biodiversity, health, coastal areas and tourism. As a result a special directorate for Climate Change has been established in the Ministry of Environment. After this milestone the third national communication to UNFCC on Climate Change was prepared (2014), Paris Agreement was ratified in 2015 and in 2017 prepared the 1st Biennial Updated Report to UNFCC on Climate Change.

In accordance with the new Paris Agreement, the Government of Jordan declared in its Intended Nationally Determined Contribution (INDC), issued in 2015, its intention to reduce its greenhouse gas emissions by a bulk of 14 % until 2030. This contribution of GHGs reduction will be unconditionally fulfilled at, maximally, 1.5 % by the Country's own means compared to a business as usual scenario level. However, Jordan, conditionally and subject to availability of international financial aid and support to means of implementation, commits to reduce its GHGs emissions by additional, at least, 12.5 % by 2030.

Table 1. Climate change impact "assessment fiche"

High impact (strong impact & requires major measures and immediate action)		*Negligible impact* (impact is limited but requires monitoring)	
Medium impact (impact is growing and requires minor measures, monitoring and mid-term action)		*Uncertain impact* (not enough evidence and need for further monitoring and analysis)	

Areas of impact	Currently (2017)	Near future (2020-2030)	Longer term (2030-2050-2100)
Risks and insurance	54.47% of the community income based on agriculture which was considered the most sensitive sector to CC.	Loss of income due to the high dependence on resources sensitive to climate change	
Climate variability	The annual average rainfall ranges between 600 mm in the northern uplands and less than 50 mm in the southern and eastern desert areas. About 90 % of the country receives less than 150 mm/season. Most of the precipitation[58] falls in the form of rain or drizzle, snow may fall on highlands, and hail is frequent during thunderstorms.	The result shows that there is a significant decline in the quantities of rainfall all over the region in some area the decrease can reach -50 mm in the North Jordan and +3mm in the South while the variance will be up to 30 mm. Increase [59] in temperature < 2°C, by 2050. Warming was found to be stronger during the warm months of the year while less warming is projected to occur in the cold months of the year.	New scenarios[60] reveal an obvious increase in temperature ranges from 1 – 4°C and a decrease in precipitation ranges from 15 to 60%. All of the models showed an increase in temperature of less than 2°C by the year 2050.
Visits (aviation, tourism season, etc.)	The Amman and Aqaba airports[61] are the primary entry points for many visitors and as such must offer a positive and welcoming experience. Much work has been done to date on improving facilities and streamlining processes.	May be impacted by international dispositions on reduction of CO2 emissions.	Expected strong regulation by international legislations and agreements.
	The average number of monthly heat waves during the 1981-2010 period are 55 for mountainous region[62], 41 for the desert regions[63] and 27 for Jordan Valley[64]. The highest absolute maximum air temperatures for the period (1981-2010) recorded are 48.8°C at Wadi El-Rayyan in August, 48.6°C at Ghor Safi in July and 47.7°C at Baqura in July.		In 2050 simulation shows that warming was found to be stronger during the warm months of the year while less warming is projected to occur in the cold months of the year.
Water shortages	Jordan is country with limited water resources. As a result of population increase, the gap is always widening between demand and supply, and is putting pressure on hotel and resorts in case of limited adaptation of the sector to reduce needs and consume of fresh water.	Results for the incremental data showed that the precipitation is the major factor that affects the availability of surface runoff water. In dry years, it's expected that these amounts may decreased up to 35%, while in normal year it will decrease only by 2% even if the temperature increase 4°C. In the wet years these values my increase up to 40%.	The amount of stream flow values are expected to decrease by year 2096. Prediction that the amounts of surface runoff are going to be decreased within the next 90 years With continuing increases in temperatures, water flow may decrease in Jordan River by 80%.

[58] Precipitation falls during rainy season (October-May), but about 75% of precipitation falls during winter season, which extends from December to March. During summer, the Jordan valley is very hot, and the mean daily maximum is 39°C. During winter, the mean minimum temperature is about 9°C. In the mountainous region, it is rather cold during winter with mean daily minimum temperature of about 4°C, while in the summer, it is about 26°C-30°C.

[59] Climate change future scenarios for Jordan developed as part of 2nd NC by interpolating the coarse resolution of the GCM (Global Circulation Models) to the Jordanian part of the Yarmouk River Basin show small discrepancies in the results from different models especially regarding future precipitation levels (GCM climate change scenarios for precipitation are not fully consistent)

[60] In a recent study a statistical downscaling model was employed to generate site-scale future climate scenarios at several locations in Jordan from the coarse GCM products for the period 2011 – 2099

[61] Royal Jordanian Airlines has its own comprehensive programs for minimizing its impact on the environment which are widely recognized as being among the most responsible and progressive in the industry. As part of its policy, emission reduction is a key pillar. Aviation is different from other energy-using activities. Currently it accounts for about 2% of the global CO2 emission from the emission produced by aircrafts due to fuel consumption, but it is rising fast. Aviation emissions of CO2 have the same effect on climate as terrestrial emissions, from power stations, industry or transport sources.

[62] Ras Muneef, Irbid, Amman, Er Rabbah, Shoubak, Tafileh

[63] Mafraq, Wadi Dhulail, Ruwaished, Ma'an, Al Jafer, Safawi

[64] Baqura, Aqaba, Deir Alla, Wadi El-rayyan, Ghor Safi

Freshwater resources	Jordan is among the poorest countries in the world on the basis of /capita water availability (147 m^3/person/ year in 2010). Renewable water resources are less than 130 m^3/person/year. Total water deficit in 2010 = -329. Jordan is a resource-starved, middle-income country with insufficient supplies of water. The country is classified as being a semi-arid to arid region with annual rainfall of less than 200 mm over 92% of the land. Major project for water desalination in Aqaba under development.		Water deficits will continue to grow and the gap between demand and supply will lead to an increase in bulk water supply costs for priority domestic use from average current levels of 0.JD 35/cubic meters to JD 0.95-1.10/cubic meters or more. Total water deficit in 2020 = - 451 Impact of Aqaba and how climate change could affect that?		Total water in 2040 = -687		
	Cutaneous Leishmaniasis is an endemic disease in Jordan. The disease is focal in nature and hyper-endemic in the Southern part of Jordan Valley, Subeihi and some areas in Karak and Tafileh, recently the trend of CL shows a remarkable increase. Food borne diseases due to Salmonella and Shigella In the last decade the number of food poisoning outbreaks significantly increased, it was difficult to attribute the increase[65] to CC to this as there are many confounders but it is well known that the increase in the temperature increases the microorganism multiplication.		Climate change is one of the multiple potential risks of emergence and spread in new foci. Almost 70% of Jordan's territory constitutes a potential biotope for Leishmaniasis Major transmission and the disease is expected to spread in areas undergoing major population movements and/or environmental changes. Expected moderate impacts: • Chronic respiratory diseases, including bronchial asthma • Ischemic heart diseases, • Patients admission • New focuses Cutaneous Leishmaniasis		Expected major impacts: • Waterborne diseases like Typhoid Fever • Dysentery, hepatitis A and E, giardiasis, bilharzia (Food poisoning outbreaks) • Increasing diarrhea from • bacterial source Expected Catastrophic impacts: • Epidemics due to water and food-borne diseases • Remerging malaria • Spread of schistosomiasis • Emerging Hemorrhagic fevers (dengue fever or rift valley • Remerging cholera		
Infrastructural issues	Current stage of infrastructural impacts?		Data existing on future projections?		Data existing on future projections?		
Coastal erosion			• Beach migration & flood (from upstream watershed) • Changes in run-off due to upstream extreme rainfall events or droughts & Inundation (storms and SLR) (Exposure level: high (AS[66]=4); Sensitivity: high (AS= 4); Impact level: high (AS = 3.5)) Are these correct? Are there updated values for the future?				
Sea surface Temperature & CO_2 concentration			• Increased probability for the invasion of MAS[67] • Coral bleaching in the Gulf of Aqaba & increase extinction rate of species • Decrease fisheries production & trophic structure & food web • Increased probability of losing protected areas • Sea level rise • Loss of income resources from fisheries & tourism (Exposure level: very high (AS=5); Sensitivity: very high (AS=4.25); Impact level: high (AS = 4)) Are these correct? Are there updated values for the future?				
Cultural heritage	Not considered in appropriate manner in all documents assessed. In general included in tourism considerations, as component of tourism and not separate from it.		Indirect environmental change impacts: Because environmental conditions are such a critical resource for tourism, a wide-range of climate-induced environmental changes will have profound effects on tourism including on cultural heritage at the local and regional destination level. Changes reducing landscape aesthetic, increased natural hazards, coastal erosion and inundation, damage to infrastructure and that may affect cultural and archaeological sites. .				
Biodiversity	The rate of endemism is high among (13.7%) of the total fish species recorded with 7 species of fishes recognized as endemic to the Gulf of Aqaba). > 20% of		• The primary CC threats on fishes at Aqaba are the increased sea surface temperatures, as well as CO_2 concentrations, which will lead to changes in pH and loss of habitat. Increased sea surface temperatures and pH will have an impact on foraging, growth, fecundity and migratory behaviour in aquatic species leading to its decrease. This				

[65] The severity of the disease is related to dose response relationship so climate change could indirectly change the pattern of food poisoning
[66] AS: Average score
[67] Marine alien species

	mollusks, echinodermata as well as several species of algae occurring in the Gulf may be endemic. These species are unique or rare to the area and they are vulnerable[68] to CC.		will in consequence lead to the extinction of traditional fishing practices, which is considered a primary income source for many families at the Gulf of Aqaba – but with very low levels of catches. • Intensification of biodiversity loss and interactions between endemic biodiversity with Non Indigenous Species (Thermophile species)	

[68] Since they need specific conditions and cannot tolerate environmental changes or the introduction of invasive species

2. How do the measures identified intend to address each specific impact? What outputs (documents) and outcomes (actions) are foreseen and by when?

Strategic document	Year & Leader	Objectives et consistency	How do the measures identified intend to address each specific impact?
The National Climate Change Policy (NCCP) of the Hashemite Kingdom of Jordan 2013-2020	2013 Ministry of Environment Supported by Global Environment Facility (GEF) & the United Nations Development Programme (UNDP)	**Long-term goal and objective** • To achieve a pro-active, climate risk-resilient Jordan, to remain with a low carbon but growing economy. • To build the adaptive capacity of communities and institutions. • Adaptation to CC and mitigation of GHG-E. **Main short-term objectives** • Integration of vulnerability and CC impact assessment, adaptation measures and CC mitigation objectives into key relevant sectors' policies, strategies, and legal framework, including in tourism; • Mainstream CC considerations in infrastructure planning and services as well as land use planning; • Provide a ground to secure sufficient financial support and strengthen institutional and human resources capacities to achieve the objectives of NCCP.	Advanced concrete strategic objectives, measures, and instruments to adapt the Country to climate change impacts in each involved sector (water, coastal areas, agriculture/food security, health, tourism, biodiversity, and socioeconomic situation/poverty). • To gain more insight in the vulnerability and impact of climate change on the tourism sector in Jordan, including the potential economic damages and impact on local communities and vulnerable groups; • To reduce the dependency of tourism on resources impacted by climate change, e.g. water and energy; • To promote eco-tourism in line with the adopted strategies in Jordan • To initiate study programs and projects on vulnerability of the tourist sector in Jordan and the impact of climate change; • To adopt and implement measures to save climate sensitive resources by the tourist industry, such as water; • To consider climate change in the national and regional tourism strategies in Jordan; and • To integrate adaptation in the tourism into the adaptation strategies of the water sector and other related sectors
Third National communication of CCC (UNFCCC)	2014 Ministry of Environment Supported by UNDP	• Technical gaps in National Communications • Policy Mainstreaming • Implement TNC learning and outreach plan • Education and Capacity Building • Knowledge Management • Scientific research and innovation • Financial resources	• Enhancing institutional and legal frameworks • Increasing scientific knowledge and public awareness. • Insuring technical transfer • Diversifying and optimizing financial resources
National Tourism Strategy 2011-2015	Minister of Tourism and Antiquities	• Delivering planned improvements and enhancements in the enabling environment that will empower the industry. • Raising overall tourism revenue by increasing the average length of stay of international visitors, increase arrivals in the off season, and stimulate the domestic tourism market. • Reducing the impact of seasonality further by increasing tourist volumes during the shoulder and off-peak months.	CC issue is not directly tackled by the strategy but some of the measures and orientations can be considered as part of climate change answer by tourism sector. • Develop new tourism policies and enhance the legal and regulatory environment. • Promote eco-friendly practices within the tourism. • Ensure safety and security practices in the tourism sector to meet or exceed international standards. • Increase awareness amongst key stakeholders of the socio-economic benefits of sustainable tourism development in Jordan

Strategic document	Year & Leader	Objectives et consistency	How do the measures identified intend to address each specific impact?
INDC	2015	Jordan nationally determines to reduce its greenhouse gas emissions by a bulk of 14 % until 2030. This contribution of GHGs reduction will be unconditionally fulfilled at, maximally, 1.5 % by the Country's own means compared to a business as usual scenario level. However, Jordan, conditionally and subject to availability of international financial aid and support to means of implementation, commits to reduce its GHGs emissions by additional, at least, 12.5 % by 2030.	Mitigation actions[69]: • Energy (utilizing the local conventional and renewable sources of energy and encouraging investment in renewable energy, encouraging the use of solar energy for water heating, requiring the implementation of green building codes[70], rationalizing energy consumption). • Transport (increasing use of public transport, reducing percentage of fuel consumption, implementing the railway system). • Waste Management (developing a system for sorting, re-using and recycling of solid waste). Adaptation actions: • Water (introducing water metering and water saving technologies, collection of rainwater[71], increasing the efficiency of irrigation systems). • Desalination project in Aqaba – status? • Biodiversity (enhancing the resilience of local communities impacted by climate change in areas within and surrounding PAs (including community-based pilot adaptation projects). • Agriculture (restoration of the degraded forest ecosystem, protection of forest and reforestation).
National Strategy and Action Plan for Sustainable Consumption and Production 2016 – 2025	Ministry of Environment. 2016 supported[72] by SCP RAC, UNIDO, MAP/UNEP	• Leapfrogging to socially inclusive Sustainable Consumption and Production practices preserving the environment; • Integrating the natural capital and the environment in the core business of Mediterranean companies • Creating a critical mass of citizens for SCP	Lake in consideration regional Action Plan: as most Tourism activities in the country are taking place on the coastal areas of the City of Aqaba. This SCP NAP is in-line with provisions of the ICZM Protocol in particular its Article 9, which identifies tourism, sporting and recreational activities as a key economic activity in the framework of the Protocol.

[69] National-level actions through the National Strategy and Action Plan for Transitioning towards the Green Economy in Jordan 2016-2025.
[70] by setting clear standards for construction, materials and land based on best practices; and requiring all new buildings in the public sector to comply with Leadership In Energy & Environmental Design (LEED)
[71] for gardens, toilets, and other applications
[72] SwitchMed Programme is funded by the European Union

2. Policy options to address such impacts

Elaboration of the policies and measures and advancements

What main steps have been followed and what is the stage of the process?

Strategies/policies	Leader	Process	Main actors associated in the process
The National Climate Change Policy (NCCP) of the Hashemite Kingdom of Jordan 2013-2020	2013 Ministry of Environment Supported by Global Environment Facility (GEF) and the United Nations Development Programme (UNDP)	National Committee on Climate Change has voted, in June 2012 to develop a national climate change policy (17 votes against 2). Process is based on multistakeholders consultation (large participation) Negotiator: MoEnv Focal point. Advocate: Process coordinator. Planner: national consultant Facilitator/ compromiser international consultant 10 thematic groups consultations (each with 10-15 members). 01 large kick-off meeting, 01 verification workshop and 03 drafts edited by all stakeholders.	The policy was a result of an extensive multi-stakeholder dialogue process that involved all active organizations from various sectors in Jordan. The policy was drafted to accommodate all national climate change priorities for action and to provide a highly flexible policy reference point upon which further strategies and sectoral policies can be based.
Third National communication of CC (TNC) (UNFCCC)	2014 Ministry of Environment Supported by UNDP & GEF, UICN[73].	The process of developing the TNC report has involved all national stakeholders and experts in a two-year effort supported by GEF and UNDP and using the best available guidelines. The TNC was produced through the use of national expertise, with international support in the area of climate projection downscaling. The capacity building components of the TNC have helped to increase national capacity to produce national reports in a sustainable manner and with the best scientific quality. The knowledge created and generated within the TNC process will drive further research and enhance the information base for all stakeholders for years to come.	The process of preparing the TNC report included the participation of tens of national institutions and hundreds of experts, professionals, researchers, activists and other members of the CC community in Jordan. Data availability and sources of information were the key factor for preparing the TNC, in particular the Ministry of Water and Irrigation and the Jordan Meteorology Department for providing the project with comprehensive historical data of climate indices. Special thanks are also extended to the members of the National Committee for CC which has provided the project with all needed information and documents. The cooperative feedback from national institutions involved in the project as sources of GHG emission data. The project has benefited from the highly skilled technical support provided by the national consultant organizations working in the Mitigation and Adaptation sectors, in particular the Royal Scientific Society and the IUCN Regional office for West Asia.
National Tourism Strategy 2011-2015	Minister of Tourism and Antiquities	No indication in the document	Consultation with sectors and industry representatives.
INDC	2015	Large consultation process among technical interested parties	Energy, transport, waste, environment

What actors have been involved, how and at what stage?

[73] IUCN Regional office for West Asia

- Jordan has early, in 1997, prepared and submitted its first (initial) national communication on climate change under the UNFCCC.
- Since the launch of the SNC in 2009, Jordan has vastly improved its policy framework in relation to Climate Change. Before 2010, Climate Change was weakly mentioned in Jordan's main developmental plans. Currently the Jordan has established a relevant and useful policy framework that should be utilized for improving national capacities for addressing the challenge of Climate change in all sectors, in particular those who are vulnerable to climate change impacts.
- During 2011-2012, the Government of Jordan decided to make a contribution to the national, regional and global process of NAMA design and implementation, by evaluating and prioritizing its national list of GHG mitigation projects, greenhouse gas emissions and mitigation and design of new partnership arrangements between the public and private sectors
- One of the main policy and planning tools in Jordan is the Government Executive Programme (GEP) 2013-2016 which is based on the National Agenda of 2005 and was developed by the Ministry of Planning in 2013. In this planning document, Climate Change has been integrated as one of four pillars of the Environment sector.
- After becoming the first country in the Middle East to develop a national climate change policy in 2013, Jordan created a special directorate for Climate Change at the Ministry of Environment to act as a coordinating platform for all climate change activities in the country.
- Thanks to a national committee on Climate Change (JNCCC) [74] (headed by the Minister of Environment) for many years, Jordan is well positioned to act positively and effectively to contribute to global effort in climate protection.
- In the last few years, many sectors (ministries) have now developed their own adaptation strategy such as health ministry, agriculture ministry and water ministry.
- Jordan Meteorology Department plays a central role in GHG emission inventory as coordinator of several Ministries and technical departments (energy transport, waste, health, agriculture and tourism).
- One of the orientations of national strategy of Climate Change in Jordan (2013) is the revision by the Ministry of Environment of the institutional frameworks, in particular the Environment Protection Law no. 52 of 2006 in order to include and strengthen the climate change consideration. The MoEnv will strengthen its internal capacity for climate change to address its existing and new tasks under the Climate Change Policy.
- What role of AZESA and local authorities in this process?

What data has been considered and from what sources?

- Therefore, SWAT along with General Circulation Models (GCM) were used to assess the future impacts of climate change on water resources in the study area. Based on the analysis of different GCM GCM models, HadCM3 runs A2 and B2 were found to be the best fits the climate conditions of Jordan.
- Three General Circulation Models (GCMs) (CSIROMK3 (Australian), ECHAM5OM (German), HADGEM1 (British)) were used in the SNC to predict future changes in climate during the period of 2005-2050, on the basis of a fundamental climate data for 45 years from1960- 2005.
- Digital Elevation Model: The CGIAR Consortium for Spatial Information (CGAIR-CSI)
- Soil Data: Ministry of Agriculture
- Land use/cover: Ministry of Agriculture
- Meteorological Data: Ministry of Water and Irrigation & Department of Meteorology
- Surface run gaging data: Ministry of Water and Irrigation.
- Department of statistics.

[74] The main responsibilities of the JNCC are: i. Supervises and supports implementing the UNFCCC in Jordan in accordance with national interests. ii. Supervises and ensures the development and execution of needed legal, regulatory and institutional arrangements and frameworks. iii. Acts as a national advisory body by providing overall institutional and technical guidance. iv. Leads climate change adaptation and mitigation efforts and ensures the integration of adaptation within other national development strategies and plans and enhances the integration of gender dimension in these strategies. v. Overviews and provides opinion and feedback on climate change programmes and projects in terms of institutional and technical aspects.

3. Policy options to address such impacts

Table 2. Tourism and climate change "cross-analysis fiche"

Completely considered		Weakly considered	
Main components considered		Not considered or Non known	

Areas of impact	Climate Change Policy (2013-2020)		Tourism Policy	
Risks and insurance	• Achieve a pro-active, climate risk-resilient Jordan, to remain with a low carbon but growing economy, with healthy, sustainable, resilient communities, sustainable water and agricultural resources, and productive ecosystems.		• Raising overall tourism revenue by increasing the average length of stay of international visitors, increase arrivals in the off season, and stimulate the domestic tourism market.	
Climate variability	• Build the adaptive capacity of communities and institutions, to increase the resilience of natural ecosystems and water as well as agricultural resources to CC, and to optimize mitigation opportunities. • Coordination of GHG inventory process and creating a National GHG inventory System. • Enhance capacity of the Meteorology Department in expanding the scope of climate indices recorded. • Use of existing meteorological data through the production of maps, datasets and comparative tables that process raw data into policy-oriented knowledge products. • Education and Capacity Building (integrate CC in national curricula and develop informal education programmes/plans in CC issues).		• No specific measures	
Aviation routes change	• Promote mass transit options: establishing mechanisms to promote investments in high-capacity public transport systems.		• No specific measures	
Energy	• Coordination between the Energy and forest authorities to clear tree branches that are affecting electricity lines that can cause hazards during storms. • Introduce climate responsive building techniques and elements to reduce the effect of heat and reduce demand on energy for cooling. • Promote the use of energy saving devices and raise awareness on the long-term benefits of energy efficiency and saving devices. • Amendments to sector policies and regulations, such as building codes, to reflect CC risks. • Introduce renewable sources of energy to help in heating and reduce the dependence on the electricity network		• Promote eco-friendly practices within the tourism. • Rationalize energy use.	
Water shortages	• Water sector (Residential water supply, irrigation, water quality, socio-economic issues)		• Increasing the efficiency of irrigation systems	
Biodiversity loss	• Biodiversity, eco-systems, and protected areas adaptation actions – what about land vs. marine?		• Proclamation of protected areas – what about land vs. marine?	
Decline of landscape	• Ensure that land using planning in urban areas • Consider a combination of ecosystem-based and traditional engineering approaches to reduce vulnerability. • Government to co-ordinate and integrate transport, energy, land use, economic development, environment & other policies. • Guarantee the access of the most vulnerable groups to resources contributing to strengthening their capacity to respond to the impacts of climate change.		• Considers the impacts of climate change and the need to sustain ecosystem services when considering development of tourism.	
Vector-borne diseases	• Health sector adaptation actions (health impacts of temperature related events, water and food-borne diseases, vector-borne diseases, occupational health).			
Infrastructural issues	• Integrated analysis of the vulnerability to CC.			
Tourist offer/ Visits			• Reducing the impact of seasonality further by increasing tourist volumes during the shoulder and off-peak months.	
Cultural heritage	Cultural heritage as one of the main components and assets of tourism is considered through: • Review the current plan of DRR and modifying it using participatory mechanisms and provide practical link		• Improve management of cultural resources key heritage sites • Ensure the sustainability and well-being of cultural assets by putting in place robust	

	with CCA in a realistic and practical technical based methodology. • Attract funds to support applied researches related to CCA and DRR. This should be done in close collaboration with different ministries, in various sectors and establishing active cooperation with international donors. • Design and implement pilot projects at community/governorate level to strengthen the harmonization and integration between DRR and CCA.		and clear guidelines for site use, management and conservation.	

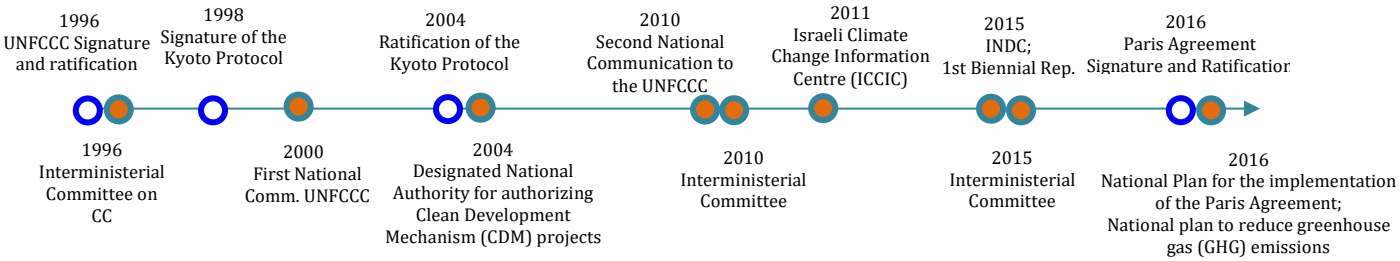
ISRAEL

1. Climate change impact areas

Israel ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1996 and the Kyoto Protocol to the Convention in 2004. Despite the fact that Israel is not included in Annex I of the UNFCCC, it is today a state committed to contribute to the global efforts to reduce greenhouse gas (GHG) emissions. Indeed, despite Israel is a relatively small contributor to CC, it is highly sensitive to the related potential impacts, as are many other Mediterranean riparian countries. Effects are anticipated in many areas, namely: water resources, food security, public health, biodiversity, forests, economy, national infrastructures and geopolitics.

In order to build (and improve, over the years) a consistent national strategy to combat CC, over the last two decades the government has established many Interministerial Committees (1996 to 2015) to address matters related to CC mitigation and adaptation. It has also established specific organisms to gather and assess knowledge on CC in order to contribute to a national adaptation program (i.e. the Israeli Climate Change Information Center - ICCIC).

Figure 1. Main steps and dates of climate change in Israel



In 2000 the country issued, under the UNFCCC framework, the First National Communication on CC, which was followed by the Second National Communication in 2010. Besides identifying national sources and amounts of GHG emissions and the national risks deriving from CC at the mid-long term, both reports outlined the (evolution of its) national plan established to provide the country and its society with the necessary tools (strategies, action lines and plans, measures, etc.) to address CC challenges. Such plans involved the definition of both mitigation and adaptation strategies at the national level.

In 2015, the national government submitted its official GHG reduction targets to the UNFCCC and subsequently published a National Plan for Implementation of the Greenhouse Gas Emissions Reduction Targets and for Energy Efficiency (2016). By signing and ratifying the Paris Agreement in 2016 (binding to all parties), Israel officially committed to shift to a low-carbon economy and published a national program (National Plan for Implementation of the Paris Agreement) to implement both the Paris Agreement and the national plan.

Table 1. Climate change impact "assessment fiche"

High impact (impact is strong and requires major measures and immediate action)		*Negligible impact* (impact is limited but requires monitoring)	
Medium impact (impact is growing and requires minor measures, monitoring and mid-term action)		*Uncertain impact* (not enough evidence and need for further monitoring and analysis)	

Areas of impact	Currently (2017)	Near future (2020-2030)	Longer term (2030-2050-2100)
Risks and insurance	Any data/evidence available?	• Higher burden on the insurance industry	Higher burden on the insurance industry
Climate variability	• The past four decades have demonstrated an average increase of 0.5°C in temperature per decade in the Mediterranean Sea area.	• Average warming of 0.3°C-0.5°C per decade • Reduction in rainfall: natural water supplies declining by approximately 15% of the long-term average between 2015-2035 • Increase in the frequency and strength of extreme weather events (heat waves and floods in the Mediterranean region) over the next 50 years.	<u>Intensification</u> • Average warming of 0.3°C-0.5°C per decade • Reduction in rainfall • Increase in the frequency and strength of extreme weather events (heat waves and floods in the Mediterranean region) over the next 50 years.
Exploitation costs of tourisms facilities	• In 2009 the government introduced a 40% increase in water tariffs in the domestic and tourism sectors, based on a two-tiered tariff system penalising heavy water consumers.	• Increased costs for goods and services • Increased energy demand due to harsher heat stress, particularly during peak heat waves • The two-tiered tariff system may be adjusted in future drought years to include a third tier of exceptionally high tariffs for extremely heavy consumers, including hotels with particularly high per capita consumption rates.	• Worsening, under a BAU scenario, although energy and water efficiency programmes in place/ ongoing
Aviation routes change	• The main mode of transport used by incoming tourists is air; in 2017, arrivals by air represented 85%	• (General) <u>Potential air travel disruptions</u>: hotter air is thinner air, impeding the generation of enough lift for planes to flight. As the global climate changes, air disruptions are likely to become more frequent, potentially making air travel costlier and less predictable.	
Visits/ demand	• No impacts perceived/ assessed today	• Loss of tourist and economic assets of great value will be lost if archaeological and natural sites are damaged/ destroyed. • Jellyfish invasive species damage tourism. Local authorities report a decrease in the number of tourists on the beaches due to the risk of jellyfish stings. • Outbreak of eradicated diseases will mostly damage tourism	• Impacts on air travel might involve a significant decrease on tourist arrivals to the country • Loss of tourist and economic assets of great value will be lost if archaeological and natural assets are damaged/ destroyed. • Diseases' outbreaks and extreme weather events affecting tourism
Season duration	Any data/evidence available?	Any data/evidence available?	Any data/evidence available?
Water shortages	• Exceeding renewable water resources (122% in 2011), although tourism accounts for	• Increasing sea-level trends associated to increasing flooding along the coastal plain and increased intrusion of seawater	• No scenario assessed, but under BAU environmental risks related to water resources will

	<1% of total water consumption (0.53% in 2011) • Excessive use of ground water resources for domestic supply • Seawater intrusion into aquifers and coastal areas • Reduction in water availability in aquifers and surface water bodies • Deterioration of water quality		to the coastal aquifer leading to salinization. • Total loss of groundwater due to a possible increase of 50 cm in sea level could reach 16.3 MCM per km of coast.		tend to worsen, as well as associated economic costs		
Biodiversity loss	• Spatial movement northward in the distribution of Mediterranean species; replacement by desert ecosystems, migrating from the Negev. • Appearance of blue-green algae in the Sea of Galilee, producing toxins and adversely impacting the quality of drinking water and reducing biodiversity in the lake. • Moderate-low vulnerability of some species of plants and butterflies to the forecasted reduced precipitation. • Prolonged intra-seasonal periods of dryness adversely impacting plants. • Increased risks of forest fires.		• Higher damages on Mediterranean coasts by comparison to the Gulf of Aqaba (Eilat) due to the different nature of the coast in terms of the profile slope and coastal structure • Severe damage to coral colonies in the Red Sea coast • Changes in the geographical distribution of species and in the ecological services provided by natural ecosystems. • Increased water temperature in the Medit. leading to increased penetration and establishment of alien species originating in the Red Sea/Indian Ocean • Damage to coastal species and ecosystems • Damage to fishery, as most of the alien species are of lower nutritional value than the local species.		• No scenario assessed, but under BAU risks will tend to worsen and economic costs will increase (e.g. damages to economic activities such as tourism, restoration costs).		
Infrastructural issues	• Episodic coastal flooding and inundation events.		• Expansion of the risk zone of the infrastructure constructed on the coastal cliff by 40-50 m eastward. • Invasive species (in particular, jellyfishes) impacting coastal infrastructures. Jellyfish block water pipes in cooling systems of ships and coastal power plants. • Damage to coastal structures (e.g., marinas, intake points of cooling seawater for coastal power plants) and to archaeological sites.		• Damage to existing properties and infrastructure in the proximity of the cliff. • Loss of valuable real estate (due to proximity to the sea). • Damage to construction plans. • Damage to high-value lands (beaches, natural reserves). • Destruction of archaeological sites and heritage building.		
Sea Level Rise and Coastal erosion	• Recorded trend of rising seawater levels totalling >10 cm in the Med Sea over the past 2 decades. • Wave storms with wave heights exceeding 3.5 m have increased along with exceptional storms with a wave height above 6 m. • The retreat rate of the top of the cliff eastward, as measured by comparing aerial photographs from 1945 and 2004, is approx. 20 to 30 cm/year). • Monitoring activities have long revealed major damage to coastal sites, including the collapse of sea-wall structures and installations.		• Rising seawater levels ranging 1-10 cm per decade according to scenarios. • Increased wave storms pose major risks and collapse coastal cliff (retreat and damage). • Sand removal. • Sea water intrusion of the coastal aquifer (salination). • Economic losses estimated at NIS 180 million due to coastal recession of some 10m in 20 yrs. • Protecting the coast: cost estimates per meter of cliff length ranges NIS 12,500 to 35,000, depending on protection means and areas to protect (high coastal urbanisation).		• Migration of the water line by some 10-30 meters eastward, expected by the year 2100. • Loss of coastal areas due to sea flooding, and consequently, an eastward retreat of the territorial water of Israel.		
Cultural heritage	• Cultural heritage is strongly affected: coastal and		• Direct impacts of sea level rise: submersion and sea water abrasion on cultural and archaeological sites.				

	underwater archaeological heritage is rapidly eroded by the sea, e.g. ancient coastal cities of Ashkelon, Yavne-Yam, Appollonia, Caesarea, Dor, Atlit, Acre (World Heritage Site) and Achzib. • Submerged prehistoric settlements in the shallow water are exposed due to changes in sedimentation patterns and are being rapidly abraded by the sea.		• Loss of the balance reached with the hydrological, chemical and biological processes of the soil: short and long cycles of change to these parameters may result in a poorer level of survival of some sensitive classes of material. • The valuable cultural maritime heritage will vanish within a few decades without intensive rescue and protection activities.			
Vector borne-diseases	• Thermal stress: heat stress already harms the elderly, the ill and workers exposed to heat.		• Increased incidence of parasitic/ infectious diseases (Malaria, West Nile Fever): rise in extreme weather events + higher temperatures increasing mosquito populations and altering their distribution. <u>However</u>: low probability risk of renewed outbreak of malaria. • Increased thermal stress: increased heat stress harming the elderly, the ill and workers exposed to heat. • Increased risk of damages from extreme weather events.		Same if trends persist.	

<u>Main references</u>: 2nd National Communications to UNFCCC (2010); Climate Change and Tourism Policy in OECD Countries (OECD-UNEP, 2011); Tourist arrivals and day visits (2017) in http://www.cbs.gov.il/publications18/yarhon1217/pdf/e7.pdf; Case Study: Israel - UNESCO World Heritage Centre (2007) Israel Antiquities Authority's "Answers to the Questionnaire on Climate Change and World Heritage- Endangered Ancient Coastal sites in Israel", see https://whc.unesco.org/document/8702.

2. Policy options to address such impacts

How do the measures identified intend to address each specific impact? What outputs (documents) and outcomes (actions) are foreseen and by when?

Strategic document	Year/ Carrier	Objectives	How measures envisage addressing each impact
Israel National Plan for Implementation of the Paris Agreement	MoEP 2016	• Outlining the plan for implementing the Agreement regarding the following central subjects: ○ Reduction of GHG emissions according to the National Plan for GHG reduction targets ○ Monitoring reporting and control system ○ International financing ○ Accompanying the international negotiations ○ Training program	• Same as National CC Mitigation Plan
National Plan for Implementation of the GHG Emissions Reduction Targets (National Mitigation Plan) (Gov. Decision 1403)	Government 2016	• Meet the national target for reducing electricity consumption and improving energy efficiency • Meet the national target for reducing private car mileage	• Develop APs and measures for reducing electricity consumption, improving energy efficiency (incl. buildings) and increasing energy production from renewable energies. • Develop APs and measures fostering the use of public transport, reducing private car mileage and increase fuel efficiency in transport • Establish economic tools (incentives, investment programs, tax policies e.g. green taxation, tax benefits, etc.)

			• Setting up a steering and monitoring committee on reducing GHG emissions.
Israel's Intended Nationally Determined Contribution (INDC)	MoEP 2015	• Communicating Israel's national commitment towards reducing GHG emissions for the 2016-2030 period, including mitigation and adaptation targets and actions. • Updating GHG emissions forecast until 2030 under BAU and set GHG reduction scenarios. • Identifying main emission sources.	• Setting targets on specific sectors, believed as major emitters of GHG, i.e.: the Energy sector and Transport. • Measures seeking mechanisms to leverage large scale funding set up • The establishment of a national system for managing and monitoring GHG emissions envisaged
Israel's Second National Communication to the UNFCCC	MoEP 2010	• Updating the First Comm. Report, providing detail on achievements and highlighting challenges • Conducting updated GHG emission inventories and assessments: • Building GHG scenarios while focusing on the necessary steps to reduce these emissions; o Diagnosis, critical sectors, GHG inventory/sector, description of CC impacts on sub-sectors; o Trend analysis	• Provide updating of the National Action Plan regarding CC. • Outline adaptation and mitigation strategies and action plans. Detailing guidelines of activities. • Highlight mitigation and adaptation measures proposed for "major contributors": Energy, Industry, Residential and Commercial Sector, Transport, Agriculture, Land use and Forestry, Waste and Wastewater
Israel's First National Communication to the UNFCCC	MoE (At the time, Ministry of Environment) 2000	• Provide the first assessment in terms of GHG emissions' inventory • Provide the outline of the National Action Plan regarding CC in terms of: o Mitigation options, o Vulnerability and adaptation o Forecasts, economic analysis and proposed policy	• Providing guidelines of activities to increase economic efficiency, improve the environment and reduce GHG emissions, based on technological, economic and legislative mechanisms.
		ONGOING	
Decision Nº 474 on the Creation of a Strategic Plan for CC adaptation	Gov. decision, 2009 Not submitted	Preparation of a CC policy for Israel and to formulate a national action plan, which will include a program of adaptation measures.	• Foresees preparedness action plans for each Ministry

Elaboration of the policies and measures and advancements

The Israel Ministry of Environment Protection (MoEP) is in charge of adopting the necessary steps to respond to the UNFCCC requests, and has funded and leaded work regarding the completion of the national communication reports (until now, 2000 and 2010) and the INDCs. The MoEP has also established multi-stakeholder structures and bodies (e.g. Interministerial Committees on CC and the ICCIC) to involve pertinent stakeholders into the national CC strategy and thereby gather knowledge, criteria and inputs from them.

What main steps have been followed and what is the stage of the process?

Strategic Document	Leadership	Process	Associated actors
National Plan for Implementation of the Paris Agreement 2016	MoEP	• Same as National Mitigation Plan, since the document presents the national plan for implementing the GHG reduction targets to present plans for addressing the Paris Agreement's requests over the period 2016-2017. • Work conducted under the 2015 Interministerial Committee	• Same as National Mitigation Plan
National Plan for Implementation of the GHG Emissions Reduction Targets (Gov. Decision 1403) 2016	Government	• The State of Israel established an Interministerial Committee in 2015 for the formulation of the national target (INDC)	• Most government ministries, relevant statutory authorities, major government companies, representatives of industry

		• Based on its work (in clusters/working groups), conclusions of the Interministerial. Committee were adopted in Decisions 542 and 1403 issued in 2015 and 2016 (official mitigation targets for Israel and National Mitigation Plan, respectively) including committee recommendations. • The plan focuses on activities for the 2016-2017 period and foresees updating, whenever necessary	and commerce, local authorities and NGOs + national and international experts
Israel's INDC 2015	MoEP	• Establishment of an Interministerial. Committee, headed by MoEP. In charge of examining the national potential for reducing GHG emissions by 2030 and formulating official targets. • Specific working groups in place for: o Scenario (BAU and abatement) assessment o A cost-benefit analysis carried out on <100 different abatement measures and technologies in various economic sectors including energy, transport, buildings, industry, agriculture, waste. o Mitigation potential was assessed in those sectors and combined for the whole economy. • Removal of obstacles to implementation examined. • Scenario assessments considered GHG emissions of domestic aviation.	• Document submitted jointly to the government by 3 Ministers: **Environmental Protection** and **Finance and National Infrastructures**, **Energy and Water Resources** • The interministerial Committee included representatives from all relevant government ministries, public utility companies, industry and commerce, local government, environmental and NGOs, academia and other national and international experts from various disciplines.
Israel' Second National Communication to the UNFCCC 2010	MoEP	• Establishment of a Min. Committee on Env.Protection and CC coordinated by the MoEP • Gathering experts together to address the anticipated impacts of CC and present recommendations on adaptation measures for water, agriculture, seas & coasts, public health, biodiversity, energy, infrastructure and the economy. • Emission forecasts and mitigation options were identified based on two independent studies commissioned by the MoEP. Major mitigation measures included energy and buildings, transport and waste.	• Interministerial Committee: central and local gov., the industrial and the electricity sectors, academic and research institutions, and NGOs.
Israel's First National Communication	Ministry of Environment	• The first inventory of emissions and proposed removals of GHG was prepared on the basis of the 1996 IPCC guidelines. • An Interministerial Committee on Climate Change was established and charged with overseeing the national inventory of GHG emissions as well as the initial reports on mitigation options, action plans and recommendations to reduce GHG.	• The Interministerial Committee includes representatives of govern. ministries, industries and NGOs. • Ministries of Finance, Infrastructures & Energy, Transport, Industry & Trade, Agriculture and Science particularly engaged in the process. • Academic centres providing significant inputs, part. on the GHG inventory, forecasts & economic analysis, and mitigation & adaptation options.
		ONGOING	

Decision Nº 474 (2009) on the Creation of a Strategic Plan for CC adaptation	Interministerial Committee (2009) leaded by the MoEP	• Professional working groups on different fields of adaptation set up. • Working groups focus on areas such as biodiversity, public health, water resources and droughts. • In charged of closing the gaps in existing knowledge on the impacts of CC in Israel based on different scenarios, surveying available means for minimizing damage and vulnerability and identifying Israeli technology for dealing with climate change that may assist other countries. • Setting up of the ICCIC (2011) to help developing knowledge and integrate it into national policy • To date, it has not been delivered.	As in other cases, multi-stakeholder. • Representatives of government organisms and national agencies, public sector, academia and NGOs.

What actors have been involved, how and at what stage?

- The Israel Ministry of Environment Protection
  Coordination and conduction of work regarding climate change is (and has been over the last two decades) under the lead of the Israel Ministry of Environment Protection (MoEP), which concerns the implementation of the UNFCCC guidelines and requests, i.e. completion of the national communication reports (until now, 2000 and 2010) and the INDCs.
- Other government agencies in close relationship to CC national works:
  Ministry of Economy; Ministry of Finance; Ministry of National Infrastructures, Energy and Water; Ministry of Transport and Road Safety; Ministry of Industry, Trade and Labor; Ministry of Agriculture and Rural Development; Ministry of Foreign Affairs; Central Bureau of Statistics (CBS).
- The Interministerial Committee on Climate Change
  - Established to contribute to the national work conducted under UNFCCC (e.g. GHG emission inventories, reports on mitigation and adaptation, action plans for GHG emission reduction, formulation of recommendations and strategies for reducing GHG and for adapting to CC).
  - Interministerial Committee on CC is headed by the MoEP and includes representatives of government ministries, industries and non-governmental organisations.
- The Israeli Climate Change Information Centre (ICCIC)
  Set up by the MoEP in 2011 in the wake of Government decision in 2009 on the preparation of a national CC adaptation program. It is established at Haifa University, in cooperation with Tel Aviv University, the Technion-Israel Institute of Technology and the Samuel Neaman Institute.
  Dedicated to compiling the scientific knowledge base and the policy documents which will be integrated in the national plan.
  The ICCIC brings together ca 100 representatives from public administration, academia, industry, and NGOs to gather and analyse information, identify existing knowledge gaps, identify risks and CC implications, and to submit recommendations on prioritized research requirements, proposed national adaptation policy, and ways of marketing the scientific and technological knowledge collated for application in Israel and around the world.
  Main focuses:
  - Anticipated changes in climate in Israel from 1990 to 2010, 2020, 2030, 2040, and 2050
  - Implications of CC on public health
  - Implications of CC on the water sector
  - Implications of CC on biodiversity
  - Implications of CC on urban planning and building
  - Implications of CC on Israel's economy
  - Implications of CC on geostrategic issues associated with Israel's neighbours

- Academic centres (both private and public)
  Active and key stakeholders in the definition of the national strategy and works to address CC (both mitigation and adaptation): besides the ones specifically involved in the ICCIC, some of these are namely: the Soreq Nuclear Research Center; the Arava Institute for Environmental Studies; the Israel Environmental Policy Research; the Blaustein Institute for Desert Research (Ben Gurion

University of the Negev); the Hebrew University of Jerusalem; Israel Meteorological Service; Israel Oceanographic and Limnological Research; Taub Center for Social Policy Studies in Israel; etc.

- International/ regional organisations and partnerships and cooperation programs:
  - Barcelona Convention-UNEP-MAP
  - World Bank
  - OECD
  - ISERD - Israel-Europe. Directorate for Research & Innovation. Cooperation between Israel and Europe in thematic and/or Bi-National Programs.
  - GLOWA Jordan River: German-Israeli-Jordanian-Palestinian cooperation project addressing the vulnerability of regional water resources as a case study of Eastern Mediterranean ecosystems under climate change
  - Mashav: Israel's Agency for International Development Cooperation

  Private sector

  Also present in all stages of the national process against CC, either in the form of environmental and/or engineering consultancy firms or as public and government-owned companies (e.g. Israel Electric Corporation, the Manufacturers Association of Israel)
- Non-governmental organisations:

  KKL JNF - Keren Kayemet LeYisrael – Jewish National Fund, Israel's largest green NGO; Greenpeace.

What data has been considered and from what sources?

Document	Source
National Plan Paris Agreement (2016) and National "Mitigation" Plan (2016)	- 2015 Interministerial Committee and related work on INDC/ formulation of Israel's targets for GHG reduction
INDC (2015)	- Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories and the Global Warming Potential (GWP) values from the IPCC Second Assessment Report (1995) - Scenarios (BAU and abatement) developed using the Long range Energy Alternatives Planning System (LEAP model).
Israel's Second National Communication to the UNFCCC (2010)	- 1996 Interministerial Committee including national and local authorities, local government, the industrial sector, the electricity sector, academic and research institutions, and non-governmental organizations providing information and data inputs: - **National**: data from MoEP and most ministries; CBS; National Insurance Institute; Israel Public Utilities Authority - **Private sector**: contributions from the Israel Electric Corporation, environmental/ engineering consultancy firms - **Academic:** Diverse literature published in scientific journals by national & international researchers & academic centres/ universities - **International cooperation organisms**: IEA, Centre for International Agricultural Development, International Arid Land Consortium, International Renewable Energy Agency; World Bank; OECD; UNEP; - **ONG**: KKL-NJF among other environmental organisations
Israel National Report on CC. First National Communication to the UNFCCC (2000)	- **National**: Data/information/reports available in national ministries (MoEP, Central Bureau of Statistics, etc.) - **Academic**: Diverse literature published in scientific journals by national & international researchers & academic centres/ universities - **International cooperation organisms**: UNEP/MAP reports - IPPC reports and guidelines - **ONG** Greenpeace reports

3. Cross-analysis of gaps, good practices and opportunities

Table 2. Tourism and climate change "cross-analysis fiche"

Entirely considered		*Weakly considered (or indirectly considered)*	
Considers key/main components		*Not considered or no precise knowledge*	

Areas of impact	NATIONAL STRATEGY ON CC		
	CC MITIGATION **Gov. Decision Nº1403 (2016) unoff. Translation** **National Plan Implementation Paris Agreement** **2nd National Communication to the UNFCCC**		**ADAPTATION TO CC** **2nd National Communication to the UNFCCC**
Risks and insurance			Proposed adaptation options (not tourism specific) • Cost-benefit analysis of adaptation action vs. inaction in selected fields • Economic incentives that promote adaptation to anticipated climatic changes • Risk analysis for the insurance industry 3 possibilities for adaptation of insurance companies foreseen: ○ Adaptation to adverse CC effects on their profitability and on their redemption capacity: an extensive analysis of the potential impacts of CC assists individuals, governments and private companies to moderate economic losses. ○ Insurance companies could work toward improving the scientific research on the impacts of the anticipated changes and the means to cope with them, and assist in the funding and development of projects to promote clean technologies and energy-efficient construction ○ Insurance companies could grant economic incentives, such as discounted premiums for those insured who will prepare in due time for the expected changes and hence reduce the losses expected
Climate variability			
Exploitation costs	• Indirect: Development of a national plan and program of measures to reduce GHG from buildings • Indirect: Development of a national plan to increase energy efficiency		Proposed adaptation options (not specific for tourism facilities) • Use of renewable energy to meet increased energy demand • Increased energy efficiency • Adaptation of building regulations to new climatic conditions
Travel prices change			
Aviation routes change			

Energy	Requests: • Development of national plan for energy efficiency and national investment programs in energy efficiency • Development of national plans to reduce GHG emissions from buildings and to reduce electricity consumption; • Development of a national plan for Ren. Energy generation • Evaluation and diversification of Israel's energy mix • Updating the national tax policy for energy-saving products and granting tax benefits for renewable. Energies facilities			
Transport	Requests: • Promotion of the use of public transport • Fostering the reduction of private car mileage • Set recommendations for the implementation of economic tools to promote GHG reduction in the transport sector			
Short/Long haul paths				
Water shortages			• Expansion of desalination capacitiy • Efficient water use and effective water economy management • Improved modelling • Increased public awareness and change of consumption patterns • Enhanced water quality and quantity monitoring and modelling • Reassessment of water quality standards • Enhanced collaboration of authorities and relevant institutions • Improved wastewater and drainage infrastructure • Enhanced management of the land-use interface in flood-sensitive areas	
Biodiversity/ loss			• Enhanced international trade control in order to prevent invasion of exotic marine species • Prevention of sea pollution in order to reduce stress on coral reefs	
Decline of landscape				
Coastal erosion			• Incorporations of CC implications into land-use planning • Enhanced monitoring of sea level and coasts • Use of sea protections and sand nourishment techniques	
Vector-borne diseases			• Enhanced control and monitoring of disease carrying vectors and risk assessment • Training of health experts • Improvement and adaptation of health systems to climate change risks • Public education • Improved urban planning to reduce heat stress and air pollution	
Cultural heritage*				

Infrastructural issues			• Enhanced monitoring of sea level and coasts • Adaptation of coastal infrastructure • Use of sea protections	
Tourist offer/ Visits				
Education	• Set training courses to target stakeholders (i.e. government employees)			

*****Although not specifically in the context of the national strategy (mitigation and adaptation) set to address CC, adopted in the UNFCCC framework, various legal mechanisms have been set in Israel to control development in the coastal strip and protect natural, cultural, historical and archaeological heritage.
These regulations include the Antiquities Law (1978, updated 2000), Planning and Building Law (1965, subsequently amended on several occasions, including 2002, 2005, 2007 and 2008), Nature and Parks Law (1997, amended 2018) and the Law for the Protection of Coastal Environments (2004, amended in 2007 and 2008).
(References: Israel Ministry of Environmental Protection (website), Israel Ministry of Foreign Affairs (website), Emek Shaveh (ONG) website (https://alt-arch.org/en/changes-to-the-nature-and-parks-law/); E. Galili, S. Arenson (2014) "Management of the underwater and coastal archaeological heritage in Israel's seas", RIPARIA 0, 151-177).

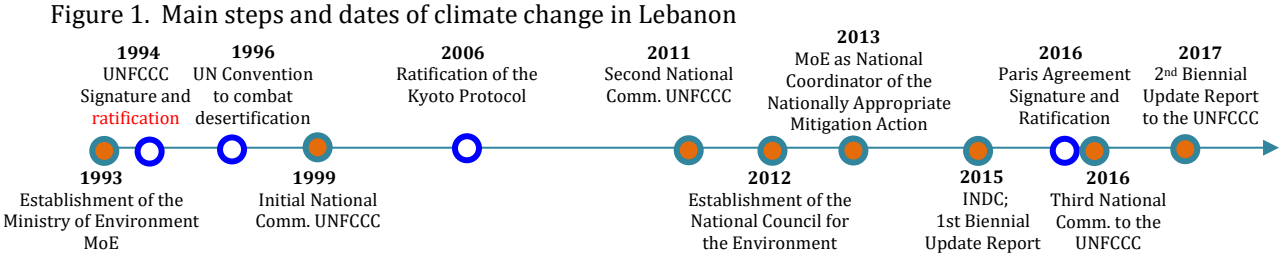
In addition, Israel participates in and contributes to various environmental international activities which directly and indirectly relate to CC, such as the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention).

LEBANON

1. Climate change impact areas

Lebanon ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1994 as a Non-Annex I Party, with Law No. 359. The Kyoto Protocol to the Convention was ratified in 2006. As many neighbouring Mediterranean countries, it is considered a relatively small contributor to CC, while it is highly sensitive to the related potential impacts expected in the Eastern basin. Through efforts carried out at the national scale, effects have anticipated in many areas, namely: water resources, agriculture and food consumption, public health, electricity consumption, tourism, ecosystems and society.

Figure 1. Main steps and dates of climate change in Lebanon



In 1999 the country submitted its Initial National Communication on CC to the UNFCCC. A Second National Communication report followed in 2011 and a Third National Communication in 2016. All three reports aimed at identifying (and progressively improving knowledge and information on) national sources and amounts of GHG emissions, as well as the national risks deriving from CC at the mid-long term. All reports highlighted the (evolution of) national mitigation and adaptation strategies and detail of related actions (adoption of (sector) strategies, action lines and plans, measures, etc.) to address CC challenges. In addition, the country has also published two Biennial Update Reports (2015 and 2017) with latest information concerning GHG inventory, mitigation actions as well as gaps and constraints. In order to meet UNFCCC requests, and by reason of financial and technical constraints, Lebanon has been supported by international funding organisms, such as GEF, UN and UNDP.

In accordance with the new Paris Agreement, the Government of Lebanon declared in its Intended Nationally Determined Contribution (INDC), issued in 2015, its intention to reduce greenhouse gas emissions by 15% by 2030 as an unconditional target and by 30% as a conditional one. The country signed the Paris Agreement in April 2016, as for ratification, agreement was approved by the Council of Ministers and subsequently forwarded to Parliament.

Table 1. Climate change impact "assessment fiche"

High impact (impact is strong and requires major measures and immediate action)		*Negligible impact* (impact is limited but requires monitoring)	
Medium impact (impact is growing and requires minor measures, monitoring and mid-term action)		*Uncertain impact* (not enough evidence and need for further monitoring and analysis)	

Areas of impact	Currently (2017)		Near future (2020-2030)		Longer term (2030-2050-2100)	
Risks and insurance	Any available evidence?		• Extreme weather events (i.e. extreme storms) may threaten tourism facilities, involving increased insurance costs due to loss of insurability and business interruption costs.		Any available evidence?	
Climate variability	• SST increasing at twice the rate of global oceans • Sea level rise in the order of 5 -10 mm/yr • Noticeable decrease of snow cover • Decrease in the residence time of dense snow cover		• By 2040, maximum temperatures predicted to increase between 1ºC around the coast up to 2ºC in the mountainous inland; • Significant reductions projected for rainfall, more severe from the coastal to the inland areas, from -10% to -20% for 2040; • Small reductions in annual average relative humidity; • Seasonal changes by 2040: temperatures will increase more in summer and precipitation will decrease more in winter; • At an altitude of 2000 m, a 2°C increase in temperature would cause a decrease of 50% in snow precipitation • The altitude of snowpack that lasts would shift upwards from 1500 m to 1700 m for a +2°C incr.		• By 2090 maximum temperatures increases range from 3 to 5ºC respectively. • Significant reductions are projected for rainfall, which will be more severe from the coastal to the inland areas, from -25% to -45% for 2090; • Annual average relative humidity: reductions up to -10% in the eastern part are projected for the 2080s • By 2090: significant extension of the summer season stress • The altitude of snowpack that lasts would also shift upwards to 1,900 m for a 4°C warming	
Exploitation costs of tourisms facilities	Any available evidence?		• Additional cooling costs to deal with heat stress and health risks due to warmer temperatures • Higher temperatures in summer will increase demand for cooling, with related consumption of electricity increasing 1.8% for a 1°C increase in temperature, and 5.8% for a 3°C increase in temperature		• Similar trend, aggravating impacts	
Visits/ demand **(aviation access, seasonality, etc)**	• The main mode of transport used by incoming tourism is air; in 2016, arrivals by air represented 93%		• (General) <u>Potential air travel disruptions</u>: hotter air is thinner air, impeding the generation of enough lift for planes to flight. As the global climate changes, air disruptions are likely to become more frequent, potentially making air travel costlier and less predictable.			
	• Reduction in GDP from fewer tourists in Lebanon's coastal area (USD millions): 22 (2020)		• Loss of ski season • Reduction in GDP from fewer tourists in Lebanon's coastal area USD (millions): 160 (2040) • Decrease in winter outdoor tourism; • Shortening of the skiing season (on high-altitude mountains): warmer Tª and precipitation reduction leading to a decrease in intensity,		• Loss of ski season • Reduction in GDP from fewer tourists in Lebanon's coastal area (millions): USD 1800 (2080)	

			residence time and thickness of the snow cover and altitude of regions covered by snow. • High adaptive capacity of residents and seasonal tourists in the mountainous summer resort areas, especially that many of the residences are second-homes. • Climate-related decreases in biodiversity reducing tourism demand by about 1.4% in 2050 • Coastal tourism: impacts in response to changes in ecosystems, loss of natural attractions, e.g. as sandy public beaches, and structural damage to the archaeological heritage			
			• The greatest benefit of a 2-3°C rise in SST would be the extension of the swimming season beyond May and October to the spring and autumn seasons (perceived as positive).		Any available evidence on seasonality impacts for coastal tourism in the longer terms?	
Water shortages	• Excessive use of ground water resources for domestic supply • Seawater intrusion into aquifers and coastal areas		• Water shortages, competition over water between tourism and other sectors, desertification, increased wildfires threatening infrastructure and affecting demand.		• A worsening of the situation is expected if no measures are taken, due to water scarcity in the eastern Mediterranean basin	
Biodiversity loss	Any available evidence?		• Marine fish stock potentially decreasing and marine biodiversity changing/ declining; • Thermophilic species might become more abundant (e.g. Sardina) • Combination of higher water temp., overfishing and sewage discharge causing predominance of jellyfish and algal blooms in coastal waters. • Loss of natural attractions and sp. from destinations, entailing losses in nature-based tourism		Similar pattern aggravating in the future? Any available evidence on seasonality impacts in the longer terms?	
Infrastructural issues	• Coastal flooding and inundation during high sea level conditions		• Increased flooding risk (plus mudslides and rockslides); damage to touristic attractions (beach resorts, marinas, public beaches (e.g. Ramlet el Bayda, Tyre etc.)) if protective structures not built. • Higher costs to protect and maintain waterfronts.		Any available evidence in the longer terms?	
Sea level rise and coastal erosion	• Current rate of rise, approximately 20 mm/year • Coastal erosion sensed, due to an increase in the frequency/intensity of episodic weather events, sea-level rise and/or alteration of coastal circulation patterns		• Sea level rise reaching 12-25 cm/yr by 2030; • Growing risk of coastal flooding, increasing coastal erosion and covering sand beaches; • Altering coastal ecosystems in natural reserves and elsewhere; • Impact on attractiveness of public beaches.		• Sea level rise will reach 22-45 cm/yr by 2050; • May rise up to 30-60 cm/yr in worst scenarios.	
Cultural heritage	• Coastal erosion and potential structural damage to the national archaeological heritage.		• Higher temperatures, saline intrusion, flooding, storm effects and sea level rise can ruin monuments already in vulnerable condition; • Coastal erosion involving structural damage to the national archaeological heritage located in the Lebanese coastline; • Reduction of the attractiveness of coastal cultural heritage sites (and related effects on tourist visits).			

Vector borne-diseases	• Economic costs of climate-related risk of death/ Malnutrition, diarrhea, floods, malaria, cardiovascular disease (in 2020): 31,100 deaths/ USD millions 41,900; • Uncontrolled sewage disposal and no monitoring of septic tanks; bacterial contamination of ground and surface water		• Economic costs of climate-related risk of death/ malnutrition, diarrhea, malaria, floods, cardiovascular disease (in 2040): 33,900 deaths/ USD millions 45,800		• Increased risk of death/ malnutrition, diarrhea, floods, malaria, cardiovascular disease (in 2080): 33,300 deaths/ million USD 45,000; • Increased morbidity and mortality from heat and other extreme weather events; • Malnutrition from droughts, floods and other water-borne, rodent-borne and vector-borne diseases	

Main references: 2nd and 3rd National Communications to UNFCCC, UNWTO Lebanon: Country-specific: Basic indicators (Compendium) 2012 - 2016 (01.2018) (https://www.e-unwto.org/doi/abs/10.5555/unwtotfb0422010020122016201801); MoE/UNDP/GEF (2015). Economic Costs to Lebanon from Climate Change: A First Look. Beirut, Lebanon (see http://climatechange.moe.gov.lb/viewfile.aspx?id=228).

2. Policy options to address such impacts

How do the measures identified intend to address each specific impact? What outputs (documents) and outcomes (actions) are foreseen and by when?

Strategic document	Year/ Carrier	Objectives	How measures envisage addressing each impact
Lebanon's Nationally Appropriate Mitigation Actions (NAMAs)	MoE and specifically the National Council for the Environment 2017	• Voluntary emission reduction proposals submitted by developing countries to the UNFCCC. • Lebanon's government-prioritized actions aim at reducing or limiting GHG emissions from various sectors, and they are expected to be the main vehicle for mitigation action the country.	• Considered a discrete set of measures feeding into the transition to a low-emission development; • Providing an opportunity to achieve long term transformational change supporting sustainable economic growth in the country
Lebanon's Third National Communication to the UNFCCC	2016 MoE (+UNDP +GEF)	• Diagnosis, identification of critical issues: gas emission inventory per sub-sectors contributing to CC, impacts of CC in economic sub-sectors; trend analysis; proposal of adaptation and mitigation strategies and action plans	• Improved adaptation and mitigation strategies and related action plans based on improved data and quality of national assessments: ○ Energy (Electricity and Transport); Agriculture; Water; Coastal Zones; Forestry; Public Health; Tourism; Human Settlements and Infrastructure; • Tourism concerns less approached/ addressed by comparison to 2nd NC (2011)
Lebanon's Intended Nationally Determined Contribution (INDC)	MoE 2015	• Highlighting Lebanon's national commitment towards reducing greenhouse emissions at the national level, including mitigation and adaptation actions, to promote resilience of the national economy, society and natural systems to CC. • Outline of envisaged implementation means	Proposal of a number of targets (rather concrete) and actions (of general scope): a) Adaptation targets: establishes **major initiatives**, focusing on the water sector (National Water Sector Strategy, 2012), and Forestry and agriculture (National Forest Programme); *(versus)* **Promotion** of CC adaptation, also focusing on vulnerable sectors such as tourism, infrastructures and public health. b) Mitigation targets: (unconditional, without international support; and conditional, with international support). Covering the sectors of energy, industrial processes and other products use, agriculture, forestry and land-use change, and waste.
The National Action Programme to Mainstream Climate Change into Lebanon's Development Agenda	MoE 2013-2015	• (Project) Supporting the Lebanese government in its efforts to move towards a low carbon/emission economy, by provide a directive for national adaptation activities leading to a national low emission climate resilient development strategy	• Engagement of public institutions in continuous planning/decision making on climate change issues; • Identify and develop Nationally Appropriate Mitigation Actions (NAMAs) and pilot demonstration adaptation projects; • National engagement in the international climate change arena and promoting new national and international financial mechanisms.
Rural Tourism Strategy for Lebanon	Ministry of Tourism 2014	• Overall goal: improve the competitiveness of rural tourism in Lebanon	• Strategic plan including key directions and practical actions at large that could be implemented in the next 5 years
Lebanon's Second National Communication to the UNFCCC	2011 MoE (+UNDP +GEF)	• GHG emission inventories and assessments: ○ Diagnosis, identification of critical sectors, gas emission inventory per sectors contributing to CC, and description of impacts of CC on economic sub-sectors; ○ Trend analysis	• Adaptation and mitigation strategies and related Action Plans on a series of "*heavy emitter sectors*": ○ Energy (Electricity and Transport); Agriculture; Water; Coastal Zones; Forestry;

		○ Proposal of adaptation & mitigation strategies and action plans	○ Other sectors also approached, yet still not object of a national strategy: Public Health; Tourism; Human Settlements and Infrastructure;
		ONGOING	
Draft National Sustainable Development Strategy (NSDS)	?? Led by the Prime Minister Economic Advisor, the Ministry of Environment and the UNDP PCM teams	• Provide the national context with an overarching sustainable development strategy; • The NSDS has laid down a Vision and 7 Strategic Objectives which are expected to be declined in a series of Initiatives and concrete projects;	• The final version of the NSDS was expected by 2015… • Draft results of the NSDS have presented 7 Strategic Objectives and 41 related Initiatives, **including one Initiative on Ecological Tourism** (i.e. Developing tourism, including rural, ecological, and medical tourism) under Strategic Objective 7 (i.e. Asserting Lebanon's position as an Arab, Mediterranean, and international hub).

Elaboration of the policies and measures and advancements

The Ministry of Environment (MoE) is the focal point to the UNFCCC, and has been participating in international climate change discussions since 2006 as a state committed to contribute to the global efforts to reduce GHG emissions. Financially supported by GEF, and assisted in management by the UNDP, the MoE has executed work regarding the completion of the national communication reports (1999, 2011 and 2017) and the INDCs, as well as Biennial Update Report (2015, 2017). The MoE has also established multi-stakeholder structures and bodies (e.g. National Council for the Environment) to involve relevant stakeholders into the national CC strategy.

What main steps have been followed and what is the stage of the process?

Strategic Document	Leadership	Process	Associated actors
Nationally Appropriate Mitigation Actions (NAMAs) 2017 and ongoing	Council of Ministers, MoE and specifically the National Council for the Environment	• Lebanon first identified 13 mitigation actions in the form of NAMA ideas, including activities related to energy efficiency, renewable energy, waste and wastewater management, transport, etc. • Final consultations resulted in selecting two sectors for the LECB project[75] aimed to develop NAMAs: ○ the NAMA in Lebanon's Private Road Transport Sector (FEVs) and ○ the NAMA in Lebanon's Municipal Solid Waste Sector. • Transport NAMA and waste NAMA project proposals have been endorsed by the Council of Ministers decision number 14/2017. The two NAMAs will be submitted to the NAMA Registry.	• Multi stakeholder process: Actors from the Transport, Energy, Waste, Forestry and Industry sectors, plus Governmental structures and a Technical support Group (check)
Lebanon's Third National Comm. to the UNFCCC 2016	Ministry of Environment (funded by GEF and implemented by UNDP Lebanon)	• Result of many stakeholder consultation meetings (including sectoral but not only), to capture expert judgement in the sectors covered and to ensure improvement of data estimations and calculations compared to previous national communications; • Builds on the work of the 2 previous reports, while presents an improved methodology of national GHG emissions for 2012 with a trend series for 1994-2012, and analysis of reduction potentials, CC vulnerability, impacts and adaptation capacity	• Academics and representatives from government institutions, private sector and non-governmental organizations

[75] Low Emissions Capacity Building (LECB) programme

Lebanon's INDC (Intended Nationally Determined Contribution) 2015	Ministry of Environment	• Cooperation exercise: planning the implementation of sectoral targets with all key national stakeholders • Approach: Bottom-up approach and extensive sectoral stakeholder involvement to include all actors' perspectives and reflect them in planning so as to ensure full support • Basis: existing national and sectoral plans and (low carbon, adaptation) long-term strategies.	• Sectoral stakeholders
Lebanon's Rural Tourism Strategy 2015	Ministry of Tourism	• The process of strategy development based on consultations with rural tourism actors on national and regional levels so that proposed actions reflect needs and perspectives: • Conduction of a series of interviews, consultations, workshops and focus group discussions (>150 stakeholders.) • Rural tourism approached from an integrated economic, social and environmental perspective (2020) • Consultation with rural tourism stakeholders in January and July 2014; • Plenary workshop March 2014 to validate priorities and actions, including ideas for a mechanism of common work; • 6 focus group discussions clustered according to Lebanese (rural) regions with 86 actors in total. Discussions identified regional specificities for intervention and for local common work recommendations. • 1 workshop with 12 stakeholders to discuss and identify a mechanism for actors to work together on implementing actions and developing the sector.	• National, regional and local authorities: Ministry of Tourism (MoT), municipalities and unions of municipalities • NGOs (nature conservation, trails, accommodations, food, local and tourism develop.) • Forest reserves, protected areas • Travel agents and transport companies, in-bound tour operators, outdoor and adventure companies • Syndicates of hotels and restaurants; wineries, food trails, and agro-tourism development programs • Owners of hotels, guesthouses, accommodations in rural areas and youth hostels • Owners of restaurants in rural areas • Local guides • Online tourism marketing companies • Event and festival organizers • Universities, training and tourism schools • Experts in tourism development and independent activists • Craftsmen • Women groups
Lebanon's Second National Comm. to the UNFCCC 2011	Ministry of Environment (funded by GEF and implemented by UNDP Lebanon)	• Extensive work undertaken by government agencies, academic institutions, the private sector and non-governmental organizations, led by the Ministry of Environment. • Most of the work was carried out during the period 2007-2010	• Government agencies, academic institutions, private sector and non-governmental organizations
		ONGOING	
National Sustainable Development Strategy (NSDS) (in preparation)	Led by the Prime Minister Economic Advisor, the Ministry of Environment and the UNDP PCM teams	• In March 2015, the Presidency of the Council of Ministers and the MoE initiated the development of the National Sustainable Development Strategy (NSDS) for Lebanon. • It will be coordinated by MoE • A participatory approach seems to have been adopted, including online participation, consultation meetings and working groups. • By 2015/16: NSDS Draft I: has laid down the foundation of an Economic Vision and a Country Policy Road Map for 2025	• Multi stakeholder process; • International actors supporting the action: UNDP • National authorities and agencies, among others: the Ministries' Focal Points, previously assigned by each Ministry to coordinate with and assist UNDP's PCM Team for the sake of the NSDS Document, in addition to the DG of Justice, Finance and Central Administration for Statistics (CAS), and the

		• By 2016/17: The next step will be to conduct, during the 3rd & 4th Quarters of 2016, one-on-one meetings with each Ministry to ensure active participation of all in the Draft II of the NSDS and the related Database.	Advisors to a number of other Ministers.

What actors have been involved, how and at what stage?

- Coordination and conduction of work regarding climate change is in charge of the Lebanese Ministry of the Environment (created in 1993). This responsibility also concerns the implementation of the UNFCCC guidelines and requests, i.e. completion of the national communication reports and biennial reports (until now, 1999, 2011, 2016) and the INDCs.

- The Ministry of Environment is the main national coordinator for climate change and the UNFCCC focal point. The Ministry chairs the National Council for the Environment (NCE) which is composed of official representatives from 7 ministries (the Ministry of Environment; and the ministries of Finance, Interior and Municipalities, Agriculture, Public Works and Transport, Energy and Water, and Industry) and 7 non-public entities (Order of Physicians, Order of Engineers and Architects, The Bar Association, Association of Banks, Association of Insurance Companies, representative of Non-Governmental Organizations (NGOs), representative of the academic sector). The NCE is mandated to approve environmental policies and strategies and integrate environmental concept, including climate change issues, into national development plans.

- Pillars of the Lebanese national « strategy » regarding CC are sectors both affected by and contributing to CC, namely: energy, water and agriculture. The Ministry of Energy and Water (MoEW), with its Policy Paper for the Electricity Sector (2010) and the National Water Strategy (2012), the Ministry of Agriculture and the Ministry of Transport are therefore major players contributing to Lebanese national efforts on CC.

What data has been considered and from what sources?

Main sources of information and data considered:

1. National data: Central Administration for Statistics (CAS), Ministry of Environment (MoE), Ministry of Energy and Water (MoEW), Lebanon Meteorological Service (LMS)
2. International / Regional databases: UNWTO, World Resources Institute,
3. Scientific research: Academic research
4. Scientific/ technical modelling: Climate model predictions (downscaling the Global Climate Model (GCM) projections); PRECIS (Providing REgional Climates for Impacts Studies) regional climate model;

Document	Source
Lebanon's Third National Communication to the UNFCCC (2016)	Contributions from national and international stakeholders: - **National authorities**: Ministry of Environment, Ministry of Agriculture, Ministry of Energy and Water, Ministry of Public Works and Transport, Directorate General of Civil Aviation, Ministry of Interior and Municipalities, Traffic, Truck and Vehicle Management Authority, the Central Administration for Statistics, the Lebanese Centre for Energy Conservation (etc.), - **Private sector**: Fuel importers, Industries' Syndicates, Waste contractors - **Academia**: Lebanese University, American University of Beirut, Center for Remote Sensing Université Saint-Esprit de Kaslik Lebanese Agricultural Research Institute International Center for Agricultural Research in the Dry Areas, National Centre for Scientific Research, Satellite Imageries, Planet Action. - **International players**: FAO, IPCC Task Force on National Greenhouse Gas Inventories, International Energy Agency, ESCWA, World Health Organization in Lebanon, Instituto Mediterraneo Di Certificazione - **ONG and civil organisations**: e.g. Moawad foundation, Bekaa Grower Association, MORES, LACECO, BATCO, Association for Forests, Development and Conservation, and the Lebanese Reforestation Initiative
Strategy for Rural Tourism in Lebanon (2015)	Mostly based on a stakeholder consultation process: - Consultation with rural tourism stakeholders Jan-July 2014 - Plenary workshop March 2014 to validate priorities Other data sources and reports: - Ministry of Tourism and sectoral data and reports

	- WTTC, UNWTO, UNDP
INDC (2015)	National as well as sectoral planning has addressed these challenges through the development of a number of low-carbon and adaptation strategies
Lebanon's Second National Communication to the UNFCCC (2011)	National: - Ministries and related sectors' data: Ministry of Environment (2000-2005-2008) Ministry of Energy and Water (MoEW); Ministry of Agriculture; Ministry of Finance; Ministry of Public Works and Transport; - CAS 2000-2008 - INSEE - Electricité du Liban (2000-2009) - Lebanese Agriculture Research Institute. - Lebanon Meteorological Service (LMS) - American university of Beirut International databases and reports: - UNWTO 2000-2009; WRI 1995-2008; FAO; IMF; IFAD; IEA; - IPCC; UNFCCC; UNDP, UNEP/MAP Academic research, from a variety of disciplines and of regional national (Lebanon), sub-regional (Med Levantine Basin and related countries), regional (Mediterranean) and international scope. International support: Modelling: - Regional Climate Model (RCM) - PRECIS (Providing Regional Climates for Impacts Studies) regional climate model (UK)
	ONGOING
Draft NSDS (in preparation)	Based on a prepared Database that serves as a stock-taking Tool of all relevant Policies/Strategies/Legal Texts found at ministries and official administrations, as well as a mapping Tool for NSDS' Chapters and Strategic Goals with UN SDGs.

3. Cross-analysis of gaps, good practices and opportunities

Table 2. Tourism and climate change "cross-analysis fiche"

Entirely considered		*Weakly considered (or indirectly considered)*	
Considers key/main components		*Not considered or no precise knowledge*	

Areas of impact	Lebanon Rural Tourism Strategy		3rd National Communication to the UNFCCC / Proposed Strategies and Action Plans on Tourism		2nd National Communication to the UNFCCC/ Proposed Strategies and Action Plans on Tourism	
Risks and insurance	Not addressed		• Develop other short-run tools for **managing risks** to tourism (risks related to e.g. disruptions from coastal storms or lack of snowfall at mountain resorts): ○ developing appropriate **long-run plans** for managing risks, such as moving coastal tourism facilities away from potential storm surges and winter facilities to higher altitudes • **reducing the stress on climate-sensitive natural resources** important to tourism from e.g., erosion and urban sprawl, providing the tourism industry with better, **timely information** about pending **extreme weather events**		• **Improve insurance coverage** in the face of extreme events, natural disasters and unprofitable seasons due to climatic changes;	
Climate variability	Not addressed				• Establish a plan to organize and assist ski resorts to move ski slopes to higher altitudes or to colder north mountains or to invest in snow production. It is essential to involve the MoPWT in the excavation of roads leading to new ski slopes and the restoration of already existing ones;	
Travel prices change	Not addressed		Not addressed		Not addressed	
Aviation routes change	Not addressed		Not addressed		Not addressed	
Infrastructures	• Invest in and where available conduct basic infrastructure related to: ○ Roads and signage to improve access to tourism sites, and villages and towns in general ○ Public transportation and inter-towns connectivity • Develop public transportation hubs among destinations and village towns; ○ scheduled departures from "entrance towns" leading to other towns in a destination (i.e. from Byblos to surrounding rural areas, etc.); ○ design flyers, online information and signs at departure posts in different languages to communicate schedules to public.		Not addressed		Not addressed	
Short/Long haul paths	Not addressed		Not addressed		Not addressed	
Water shortages	• Invest in and where available conduct basic infrastructure related to: ○ connectivity ○ Waste water management		• General, not focussed on the tourism sector.		• Adoption of water conservation measures at the resort level;	
Biodiversity loss	• Enhance protection of local assets and enforce applicable laws • Develop local protection APs with stakeholders (i.e. authorities and decision makers) to promote EIA culture and the development of conservation including:					

	○ Identifying assets to protect (forests, landscapes, mountains, natural sites, old buildings, historic and archaeological sites, old religious buildings etc. ○ Where applicable develop himas (protected areas), regional parks and reserves ○ Develop cleaning campaigns and applicable plans and best practices for proper waste and litter collection and management ○ Proper waste water management					
Decline of landscape	• Same as biodiversity loss • Invest in and where available conduct basic infrastructure related to: ○ Protection of sites and natural resources sites				• Support protected area management to enhance their resilience; • Enhance and restore the forest cover to promote sustainable tourism; • Implement all adaptation measures proposed for the forestry sector and coastal zones (ICZM).	
Vector-borne diseases	Not addressed		• Include improving knowledge about and awareness of the interactions between CC and public health, • Strengthen systems for monitoring and responding to the effects of CC on public health, • Encouraging development related strategies, • Strengthen institutions responsible for preparing for and responding to the effects of CC on public health. • Consider the "Regional strategy on health and the environment and plan of action for the period 2014–2019 in the Eastern Mediterranean Region (EMR)", recently developed and endorsed by WHO (2015).		• Ensure public health concerns and health protection from CC • Implement adaptive strategies at local & national level to minimize impacts of CC on population's health • Support "healthy" development strategies in other sectors that protects and promotes health and mitigates CC • Strengthen institutional capacity of public health systems for providing guidance and leadership on health protection	
Infrastructural issues	• Invest in and where available conduct basic infrastructure related to: ○ Rehabilitation of heritage and archaeological sites, old buildings, etc. • Waste water management				• Implement 'soft' coastal protection measures to prevent erosion such as conservation of shore-stabilizing vegetation that act as natural buffers; • Enforce enhanced design and planning guidelines for tourism establishments to increase their resilience to the impacts of CC changes.	
Cultural heritage(*)	<u>(Not specifically targeting CC effects on cultural/ historical heritage)</u> • Improve and enforce conservation and protection of the (environmental,) cultural, historical (and agricultural) heritage of rural areas: ○ Hold awareness sessions for local municipalities, mohafazats, decision makers and local communities at large (CBOs, clubs and others) about the social, environmental and economic benefit of their local tangible and intangible heritage (historic, archeological, cultural, etc.) • Invest in and where available conduct basic infrastructure related to: ○ Rehabilitation of heritage and archaeological sites, old buildings, etc.		• <u>Direct/Indirect?</u> Developing and implementing a strategy for protecting capital and people unlikely to move, e.g., essential transportation structures and highly urbanized areas,		<u>(Indirect)</u> • Implement 'soft' coastal protection measures to prevent erosion such as conservation of shore stabilizing vegetation that act as natural buffers; • Integrate CC factors into regulatory frameworks for tourism development, i.e. env. impact assessment and strategic environmental assessments;	

Tourist offer/ Visits	• Develop and improve marketing and promotion to increase consumer awareness and the visibility of rural tourism destinations, products and services domestically and internationally; • Develop existing and new competitive rural tourism destinations -according to new trends – and appropriate to the local communities specificities and identities • Improve quality of tourism offers and products and develop standards and the culture of certification and labelling across the value chain (including among others "Nature conservation and where applicable eco-tourism activities" or "new thematic trails: historic, social, cultural, literary, food, etc.)".				• Create financial incentives to encourage investment in more sustainable touristic activities such as ecotourism to be sponsored by MoT; • Sponsor direct awareness of tourists, through MoT, towards cultural and sustainable tourism in order to promote diversification of tourism activities; • Integrate CC factors into regulatory frameworks for tourism development, such as environmental impact assessment and strategic environmental assessments;	

(*) Cultural heritage is part of the 5th Strategic Objective of the Draft National Sustainable Development Strategy (NSDS, today in preparation), calling at "Preserving the natural and cultural heritage", envisaging 5 different initiatives, out of which one would focus on "Preserving archaeological sites".
In Lebanon, the Ministries of Culture and of Tourism and the Directorate General of Antiquities (under the former) represent the institutions in charge of conducting the necessary actions to protect the national archaeological/ cultural/ historical heritage.

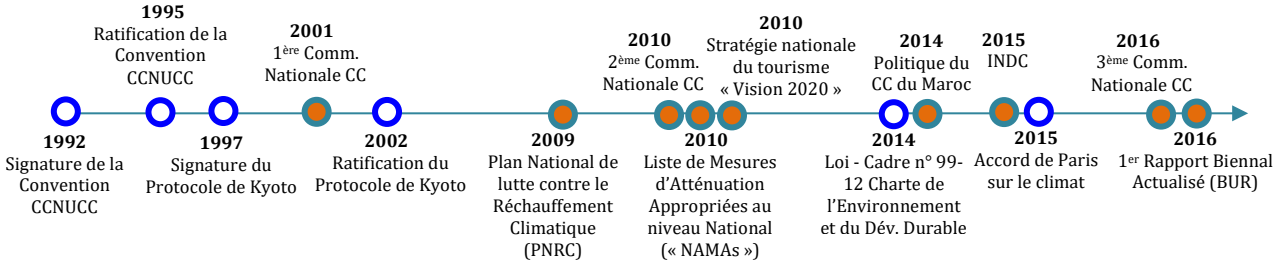
MAROC

1. Contexte de l'impact du changement climatique

Depuis sa ratification de la Convention Cadre des Nations Unies sur les Changements Climatiques (CCNUCC) en décembre 1995, le Royaume du Maroc s'est engagé activement dans le processus mondial de lutte contre le réchauffement global de la planète en tant que Partie Non-annexe I de la Convention. En abritant la COP 22 à Marrakech en 2016, après avoir déjà organisé la COP 7 en 2001, le pays a réaffirmé sa volonté de contribuer à l'effort mondial de recherche de solutions durables aux effets du CC.

Ainsi, la stratégie du Maroc en matière de lutte contre les changements climatiques (CC) est basée, d'une part, sur la mise en œuvre d'une politique d'atténuation des émissions de GES lui permettant de contribuer à son développement global, notamment grâce à l'introduction des technologies propres ; et, d'autre part, sur l'anticipation d'une politique d'adaptation visant à préparer l'ensemble de sa population et de ses acteurs économiques à affronter les risques et la vulnérabilité de leur territoire et de leur économie aux effets des CC.

Figure 1. Principales étapes et dates liées aux actions pour traiter les changements climatiques au Maroc



La Communication Nationale Initiale à la CCNUCC a été préparée en 2001, lors de la COP 7, et a été suivie par la publication de la Seconde Communication Nationale en 2010 et par la Troisième Communication Nationale (2016). Le Maroc a également soutenu l'Accord de Copenhague en communicant au Secrétariat de la CCNUCC une liste de Mesures d'Atténuation Appropriées au niveau National (« NAMAs ») en 2010 ; sa mise en œuvre permettra l'atténuation des émissions nationales des GES à l'horizon 2020. En outre, la Contribution Prévue Déterminée au Niveau National (*Intended Nationally Determined Contribution* - INDC) a été élaborée et présentée à la CCUNCC en juin 2015. En avril 2016, le Premier Rapport Biennal actualisé a également été soumis à la CCNUCC.

Parallèlement, afin d'atteindre ces objectifs, un large chantier de planification a été entrepris et le Maroc a élaboré plusieurs stratégies en matière d'atténuation et d'adaptation :

- la Stratégie Nationale en matière de lutte contre le Réchauffement Climatique (SNRC);
- le Plan national de Lutte contre le Réchauffement Climatique (PNCR), présenté en 2009 à l'occasion de la COP 15 à Copenhague, avec ses déclinaisons territoriales;
- la Politique du Changement Climatique au Maroc (PCCM, 2014), outil de coordination des différentes mesures et initiatives entamées pour la lutte contre le CC, envisagé en tant qu'instrument politique structurant, dynamique, participatif et flexible;
- le Plan d'Investissement Vert (IPV), visant à assurer un financement climatique conséquent.

L'intégration du CC a également été conduite et mise en œuvre dans les plans sectoriels notamment le programme de développement des énergies renouvelables du Maroc (où s'inscrivent le Plan Solaire Maroc et le Plan Eolien) ; le Programme pour l'efficacité énergétique ; ou encore le Programme de l'Intégration du Changement Climatique dans le Plan Maroc Vert (PICCPMV).

Le Maroc a fait preuve de son engagement en faveur du développement durable par l'adoption en avril 2014 de la loi cadre 99-12 portant Charte Nationale de l'Environnement et du Développement Durable, qui est devenue une véritable référence pour les politiques publiques du Maroc en la matière.

Tableau 1. "Fiche d'évaluation" de l'impact du changement climatique

Impact élevé (impact important, nécessitant des mesures majeures et une action immédiate)		*Impact négligeable (l'impact est limité mais nécessite un suivi)*	
Impact moyen (impact croissant, nécessitant des mesures mineures, suivi et action à moyen terme)		*Incidence incertaine (pas assez de preuves et nécessité d'un suivi et d'une analyse plus poussés)*	

Domaines d'impact	Actuellement (2017)		Moyen terme (2020-2030)		Long terme (2030-2050)	
Risques et assurances	(Situation potentiellement semblable aux pays voisins) • Les risques contre les aléas climatiques, en particulier les inondations mais également les intrusions marines et l'érosion sont encore faibles. Les risques à court terme ne sont pas très importants.		(Situation potentiellement semblable aux pays voisins) • Scénario tendanciel à 2030 : les assurances lies aux aléas climatiques augmenteront. Pertes de potentiel productif du tourisme et de l'artisanat, et fluctuations de productivité des principaux actifs naturels (eau, sol, plages).		(Situation potentiellement semblable aux pays voisins) • Risque aggravé en 2050. Perte de capital économique et le tourisme en résulterait très impacté.	
Variabilité climatique	• Réchauffement sur tout le Maroc: les températures moyennes annuelles ont augmenté de 1,0 à > 1,8°C • Les précipitations ont subi un déclin qui varie entre 3 et 30% avec une baisse de 26% dans la région Nord-Ouest du pays (la zone la plus humide du Maroc)		• Tendance à la baisse des cumuls annuels des précipitations qui varie entre 10 et 20 à l'horizon **2020 - 2050** • Tendance à la hausse des températures moyennes annuelles de 0,5 à 1°C est à l'horizon **2020** et de 1 à 1,5 °C aux horizons **2050** et 2080, sur l'ensemble du pays		• Tendance à la baisse des cumuls annuels des précipitations qui atteint 30% sur les provinces sahariennes à l'horizon **2100** • Tendance à la hausse des températures moyennes annuelles de 0,5 à 1°C est à l'horizon 2020 et de 1 à 1,5 °C aux horizons 2050 et **2080**, sur l'ensemble du pays	
Coûts d'exploitation des établisse-ments touristiques	(Situation potentiellement semblable aux pays voisins) • Hausse légère des coûts d'exploitation des établissements touristiques.		(Situation potentiellement semblable aux pays voisins) • Maîtrise des coûts d'exploitation (mobilité touristique, relative proximité des marchés européens) permettrait de maintenir l'attractivité.		(Situation potentiellement semblable aux pays voisins) • Difficile à évaluer. Une politique de sobriété et d'efficacité énergétique permettrait de maîtriser ces coûts pour maintenir la rentabilité.	
Visites[76] (transport aérien, saison touristique, etc.)	• En 2015, la grande partie des touristes (67% du total des non-résidents) a opté pour le transport aérien (20% par voie maritime et 13% par voie terrestre. Ces taux n'ont pas connu de changement significatif depuis 2010.		L'atteinte de l'objectifs de réduire les émissions de GES (limiter la hausse des T°C à 2°C) nécessite des ajustements pour les pays développés émetteurs de flux touristiques. • Conditions climatiques (augmentation des périodes chaleureuses/ vagues de chaleur) pouvant entraîner des impacts sur la fréquentation touristique		• Conditions climatiques (augmentation des périodes chaleureuses/ vagues de chaleur) pouvant entraîner des impacts sur la fréquentation touristique	
Ressources en eau	Données disponibles ?		• Baisses significatives par rapport à la période de référence 1950-2002 attendues. • Les estimations indiquent que le capital eau (m3/hab/an) subirait une baisse importante à l'horizon 2050 et 2080, engendrant ainsi une situation de pénurie d'eau		• Baisses significatives par rapport à la période de référence 1950-2002 attendues. • Les estimations indiquent que le capital eau (m3/hab/an) subirait une baisse importante à l'horizon 2050 et 2080, engendrant ainsi une situation de pénurie d'eau	

[76] Le tourisme contribue à 7,5% du PIB et assure près de 400 000 emplois. La Tunisie capte entre 0,5% et 0,7% des flux touristiques mondiaux et près de 0,2% des recettes drainées par l'industrie touristique mondiale. Sérieusement affectée par la crise internationale qui a touché le tourisme après les événements du 11 septembre 2001, la Tunisie a dû faire face en 2011 à un effondrement des arrivées de touristes (-2,1 millions de touristes/2010). L'objectif est de gagner 1 million de touristes/an pour atteindre 6.8 millions en 2013 et 10 millions en 2016, et de doubler les dépenses moyennes par touriste et par jour à horizon 2020.

			dès l'horizon 2020, quel que soit le scénario considéré.		dès l'horizon 2020, quelque soit le scénario considéré.	
Erosion côtière	• Inondation, érosion des côtes sableuses et submersion marine déjà observées et accentuées par le phénomène de littoralisation, d'urbanisation côtière, et autres activités humaines		• Submersion marine et érosion de la ligne de rivage (notamment pour le littoral meuble ou pourvu de côtes sableuses de faible altitude) ;		• Submersion marine et érosion de la ligne de rivage (notamment pour le littoral meuble ou pourvu de côtes sableuses de faible altitude) ;	
Infrastructure	Données disponibles ?		• Détérioration des ressources naturelles et des infrastructures (équipements portuaires, réduction de la surface des plages, réduction de la biodiversité, des zones humides en arrière plage et des écosystèmes des estuaires fluviaux, salinisation,…).		• Détérioration des ressources naturelles et des infrastructures (équipements portuaires, réduction de la surface des plages, réduction de la biodiversité, des zones humides en arrière plage et des écosystèmes des estuaires fluviaux, salinisation, etc.).	
Patrimoine culturel*	Données disponibles ?		Données disponibles ?		Données disponibles ?	
Perte de la biodiversité			• Accélération de la désertification et de ses effets néfastes sur les systèmes écologiques.		• Accélération de la désertification et de ses effets néfastes sur les systèmes écologiques.	

***Un manque de données générales ainsi que d'analyse des risques du CC vis-à-vis du patrimoine culturel national est constaté. Les risques concernant le patrimoine historique et culturel sont (légèrement) soulevés dans le cadre de l'analyse du volet tourisme et changement climatique (inclus dans les rapports nationaux en matière de lutte contre le CC), mais leur caractérisation n'est pas détaillée.

Comment les mesures identifiées ont-elles l'intention d'aborder chaque impact spécifique? Quels résultats (documents) et résultats (actions) sont prévus et quand?

Document stratégique	Année & Porteur	Objectifs et consistance	Comment les mesures approuvées vont traiter les différents impacts
Stratégie nationale du secteur du Tourisme (vision 2020)	2010 Ministère du Tourisme	• La stratégie du tourisme « Vision 2020 » vise à élaborer une offre touristique compétitive, diversifiée et équilibrée, capable de satisfaire la demande de la clientèle, dans différents domaines tel que le balnéaire, le culturel, la nature ou encore le sport et le bien-être tout en considérant le principe de durabilité. • <u>Objectifs</u> : Stimuler le tourisme international et national (doubler la taille du secteur et la capacité d'hébergement) et s'imposer comme une référence en matière de développement durable dans la région Méditerranéenne : ○ Maximiser le développement territorial et répartir et diffuser les richesses issues du tourisme sur les différentes régions du pays (création de 8 destinations touristiques compétitives) : ○ Tirer avantage des atouts naturels des régions tout en prenant en considération les pressions maximales que celles-ci sont en mesure de soutenir ;	- 6 grands plans de développement, dont une démarche intégrée en faveur du tourisme durable pour valoriser et préserver les ressources naturelles et durables. - Mesures en matière de durabilité : • <u>Monitoring et de suivi de la durabilité</u> ○ Dispositif de suivi de la durabilité touristique) ; ○ Dispositif d'affichage environnemental pour les établissements d'hébergement touristique (EHT); ○ Evaluation du bilan des émissions GES du secteur du tourisme + élaboration d'une Mesure d'Atténuation Appropriée au Niveau National (NAMA) ; • <u>Intégration des considérations environnementales dans les référentiels touristiques :</u> ○ Refonte du système de classement des EHT ; ○ Protection & valorisation par le tourisme des zones fragiles & fragilisées – Site pilote : Merzouga ; ○ • <u>Sensibilisation, promotion, valorisation des initiatives et la communication :</u> ○ Charte Marocaine du Tourisme Durable ; ○ Trophées Maroc du Tourisme Durable ; ○ Journée marocaine du tourisme durable ;

			○ Autres : le Guide du voyageur responsable, l'introduction des Labels « Clef Verte» » pour les hôtels et « Pavillon Bleu » pour les plages en partenariat avec la Fondation Mohammed VI pour la Protection de l'Environnement. • Promotion du tourisme durable à l'international
3ème Comm. Nationale CC CCNUCC/ 1er Rapport Biennal Actualisé	Ancien Ministère délégué à l'Environnement 2016	• Présenter l'analyse réalisée en matière de l'inventaire des émissions GES par les différents secteurs d'activité, ainsi que leurs tendances d'évolution; • Présenter les résultats de l'analyse de vulnérabilité des différents secteurs d'activité du Maroc, y compris le tourisme. • Présenter le détail des programmes et des mesures d'atténuation des émissions de GES ; • 3ème Comm : Détailler les plans et mesures d'adaptation aux impacts du CC (ressources en eau, agriculture, forêt, pêche maritime, littoral, biodiversité) à l'échelle nationale et régionale (infranationale).	• Programmes comportant des mesures visant à faciliter une adaptation appropriée au CC dans le domaine des ressources en eau, l'agriculture, les forêts, le littoral. P.e. : ○ Amélioration de la planification et de la gestion intégrée des ressources en eau: renforcement des synergies entre les différentes stratégies et plans en rapport avec l'eau : Stratégie Nationale de l'Eau, Plan Maroc Vert, Energie, Industrie, Tourisme…. ;
Contribution Déterminée au Niveau National (CPDN/NDC) CCNUCC	Ancien Ministère délégué à l'Environnement 2015	• Présentation de l'engagement du Maroc en matière de la réduction des émissions GES à l'horizon 2030 (conditionnelle et inconditionnelle) ; • Présentation de l'évolution des émissions GES selon les différents scénarios considérés (CNA/BAU, conditionnel et inconditionnel d'atténuation) pour les secteurs énergie, industrie, agriculture, déchets, forêts; • Présentation du détail des programmes, plans et stratégies sectoriels et mesures en matière d'atténuation (y compris planification) ; • Présentation du détail des programmes, plans et stratégies sectoriels, des mesures et des besoins en matière d'adaptation ; • Présentation des coûts financiers (estimés à USD 45 milliards) et des besoins en matière d'investissement.	• Concentration des efforts prioritairement dans le secteur de **l'énergie**, mais mesures et programmes dans tous les secteurs de l'économie : **agriculture**, **eau**, **déchets**, **forêts**, **industrie** et **habitat**. • Plan national de lutte contre les polluants de courte durée envisagé, afin d'inventorier les émissions de ces polluants et les bénéfices de leur réduction (pour le climat, santé, production agricole) ; • Mise en œuvre du Centre de Compétences Changement Climatique du Maroc (4C Maroc) : renforcement de compétences des différents acteurs et échange d'informations ; • Evaluation du budget national d'investissement réalisée, ainsi que des mécanismes d'appui financier existants (e.g. Fonds Vert pour le Climat-FVC) ; évaluation de l'utilisation potentielle des mécanismes de marché internationaux ; • Stratégies et Plans d'actions / atténuation: ○ Stratégie Nationale Energétique ; ○ Programme National de Valorisation des Déchets ○ Programme National d'Assainissement Liquide et d'Epuration des Eaux Usées ○ Plan Maroc Vert ○ Stratégie de Préservation et de Gestion Durable de la Forêt • Adaptation : approche sectorielle adaptée : ○ Gestion des risques climatiques actuels et à venir (montagne, littoral, oasis, zones agricoles, zones urbaines) ○ Protection des systèmes productifs sensibles/ vulnérables au CC, e.g. l'agriculture, le tourisme et les infrastructures ; ○ Stratégie nationale de l'Eau : ○ Protection patrimoine naturel et des écosystèmes (biodiversité, forêts, ressources halieutiques) ○ Actions d'éducation et de sensibilisation concernant la conservation par les bonnes pratiques ancestrales, notamment en matière d'agriculture et d'eau.
ONGOING			

Stratégie Nationale de Développement Durable/ Sobre en Carbonne (SNDD)	Attendue en 2016 ?	
Plan National d'Adaptation au Changement Climatique.	Attendue en 2016 ?	

2. Options politiques pour traiter de tels impacts

Elaboration des politiques et mesures et état d'avancement

La mise en œuvre des différents projets et des mesures planifiés au niveau national dans le cadre de la lutte contre le réchauffement climatique (atténuation et adaptation) est confrontée à l'insuffisance des ressources financières. Le soutien de la coopération internationale (par exemple, du Programme des Nations Unies pour l'Environnement (PNUE) et/ou du Programme des Nations Unies pour le Développement (PNUD)) et la mobilisation des ressources additionnelles sont cruciales pour la mise en œuvre de la Politique du CC au Maroc.

Quelles sont les principales étapes suivies et quelle est l'étape du processus?

Documents stratégiques	Pilotage	Processus	Acteurs associés
Stratégie du secteur du Tourisme (vision 2020)	Ministère du Tourisme/ Fédération Nationale du Tourisme	• Le Ministère du Tourisme est chargé de travailler avec les administrations concernées à la rédaction, la mise en œuvre et l'évaluation de la stratégie pour le tourisme ; • Contacts réguliers avec les différentes parties prenantes.	• Acteurs nationaux : ○ Ministère du Tourisme, Comités publique-privés, SMIT, ONMT, Observatoire du Tourisme, Confédération nationale du tourisme, Fédération Nationale de l'Industrie Hôtelière ; ○ Fondation Mohammed VI pour la Protection de l'Environnement (partenariats); • Acteurs internationaux (partenariats) : ○ PNUE, PNUD, International Climate Initiative (financée par le gouvernement allemand).
Stratégie Nationale en matière de lutte contre le Réchauffement Climatique (SNRC)	MdE	• La mise en œuvre de la SNRC repose sur: ○ Le Plan National de lutte contre le Réchauffement Climatique (PNRC), élaboré pour consigner les actions menées dans les divers Ministères, tant en atténuation qu'en adaptation ; ○ Les Plans Territoriaux de lutte contre le Réchauffement Climatique (PTRC), en cours, pour compléter le PNRC selon les spécificités locales	Implication de tous les acteurs concernés à travers leurs domaines respectifs : • Groupe des administrations et organismes institutionnels • Groupe des élus et des Collectivités locales ; • Groupe d'opérateurs économiques; • Groupe des chercheurs; • Groupe d'opérateurs de la société civile
3ème Comm. Nationale CC CCNUCC/ 1er Rapport Biennal Actualisé	MdE	• Mise en place d'un Comité Interministériel de Suivi (CIS) chargé des orientations, du suivi, de l'approbation des plans de travail annuels et de la validation des travaux portant sur les différentes phases d'élaboration des deux rapports. • Mise en place d'une Unité de Gestion du Projet (UGP) chargée du suivi régulier des activités concernant les deux rapports. • Réunions CIS + UGP à différentes phases d'élaboration et de validation des deux rapports techniques • L'UGP a organisé également des sessions de renforcement des capacités au profit des responsables	• Le CIS est composé de représentants des principaux partenaires (départements ministériels, PNUD, agences, offices, …) concernés par la problématique de l'atténuation et de l'adaptation au Maroc. • L'unité UGP est composée du Coordonnateur National, d'un assistant technique, du représentant du MdE, du représentant du PNUD et tout autre partenaire selon le besoin.

		des services ministériels et des collectivités territoriales au niveau régional (Tanger, Marrakech, Agadir, Casablanca, Fès et Oujda).	
NDC/ CCNUCC 2015		• Large processus de concertation avec les parties prenantes afin de passer en revue les politiques et les programmes mis en place au niveau national pour lutter contre le CC ; • Conférence nationale finale de présentation du projet de NDC Marocain aux parties prenantes afin d'assurer leur engagement dans la démarche.	• Parties prenantes nationales en matière d'atténuation et d'adaptation ; • Désignation de la plateforme 4C Maroc en tant que responsable *inter alia* du développement d'un système national d'inventaire des émissions de GES ; • Collaboration avec la Coalition pour le Climat et l'Air Pur (PNUE).

Quels acteurs ont été impliqués, comment et à quel stade?

Le Maroc dispose d'un dispositif institutionnel de gouvernance climatique nationale favorable à la concertation et à l'action, comprenant un ensemble d'entités chargées des différents aspects de la politique climatique ; le pays dispose également de plusieurs organismes chargés de la recherche en matière de l'observation et de l'analyse des effets liés au réchauffement climatique.

- **Secrétariat d'Etat auprès du Ministre de l'énergie, des mines et du développement durable, chargé du développement durable (avant, Ministère de l'Energie, des Mines, de l'Eau et de l'Environnement (MdE)) :**
  Point Focal National de la CCNUCC, le Secrétariat d'Etat est chargé de la coordination de la mise en œuvre nationale de la Convention.
  Le cadre national s'ouvre à la société civile et aux opérateurs économiques par des Comités Interministériels :
  - **Un Comité National sur le Changement Climatique (CNCC)**
    Regroupant les représentants des principaux acteurs publics impliqués dans la problématique du CC au Maroc, en sus de représentants du secteur privé et de la société civile.
  - **Comité National Scientifique et Technique– Changement Climatique (CNST-CC)**
    Composé d'experts nationaux (établissements publics, universités, bureaux d'études) et couvrant les principales thématiques du changement climatique.
  - **Comité Interministériel de Suivi (CIS)**
    Chargé du suivi et de validation des études techniques réalisées par le Maroc dans le cadre du respect de ses engagements vis-à-vis de la CCNUCC (Communications Nationales, INDCs, NAMAs, etc.).
- **Centre de Compétences Changement Climatique du Maroc (4C Maroc) :**
  Plateforme visant la mobilisation des acteurs de la société marocaine et des partenaires financiers internationaux, via le renforcement des compétences des différents acteurs et l'échange d'informations en matière de CC. Le 4C Maroc sera également responsable du développement d'un système national d'inventaire des émissions de GES ;
- **Autorité Nationale Désignée MDP**
  Chargé d'examiner et d'approuver les projets nationaux du Mécanisme pour un Développement Propre dans le cadre du protocole de Kyoto.
- **Comité National de suivi et de surveillance de la qualité de l'Air**
  Comités Régionaux de suivi et de surveillance de la qualité de l'Air.
- **Autorité Nationale Désignée chargée du Fonds Vert Climat**
  Dont l'objectif est d'examiner les projets soumis au financement du FVC.
- **Direction de la Météorologie Nationale (DMN)**
  Fournit un appui technique et représente le Point Focal du Groupe Intergouvernemental des Experts sur l'Evolution du Climat (GIEC).
- **Centre Royal de Télédétection Spatiale (CRTS)**
  Chargé de la collecte, la production et l'analyse des données de l'observation de la Terre et développe des applications et des méthodologies dans le domaine des techniques spatiales et des disciplines connexes. Il réalise également le programme national dans le domaine de la télédétection spatiale en partenariat avec les différents départements ministériels concernés, les opérateurs privés et les universités.

Le CRTS mène différents projets/études qui ont un rapport direct ou indirect avec les CC, basés essentiellement sur l'utilisation de l'observation spatiale dans différents secteurs économiques : évolution des forêts, désertification, océanographie et gestion des ressources halieutiques, occupation des sols, etc.

- **Le Ministère du Tourisme**
- **La Confédération Nationale du Tourisme (CNT)**
  Créée en 1995, s'engage ainsi à œuvrer pour regrouper l'ensemble des professions touristiques et à œuvrer pour le renforcement des structures des différentes professions pour plus d'efficience et de participation, au niveau régional (Fédérations Régionales du Tourisme-FRT) et national (Fédérations Nationales des Métiers du Tourisme).
- **Société marocaine d'ingénierie touristique (SMIT)**
  Créé par le Ministère du Tourisme, pour promouvoir l'investissement par la mise en œuvre de la stratégie de développement pour le tourisme, en concevant et suivant les principaux projets touristiques ;
- **Office national marocain du tourisme (ONMT)**
  Responsable de la promotion (marketing) du tourisme marocain, de la commercialisation et du développement de la destination et du transport aérien. En charge de l'étude approfondie des principaux marchés émetteurs, l'analyse du comportement et des attentes des touristes européens, le dynamisme de ses délégations à l'étranger, la qualité des actions de communication ou de relations publiques orchestrées sur les marchés émetteurs ou au Maroc.
- **Observatoire du Tourisme**
  Initiative publique-privée créée en 2005 pour soutenir le développement du secteur touristique. L'observatoire a trois rôles : fourniture d'informations, la communication et le suivi.
- **Comités publiques-privés**
  Co-présidés par le Ministère du Tourisme et la Confédération nationale du tourisme, les comités axent leurs efforts sur l'engagement du secteur privé en faveur de la Stratégie Vision 2020, la définition des grandes questions à traiter et la mobilisation des parties prenantes pour la résolution des conflits. Les comités traitent les thèmes suivants : gouvernance, compétitivité, transport aérien, production et investissement, capital humain et durabilité.

Autres acteurs pouvant être potentiellement impliqués et/ou ayant un lien potentiel avec le tourisme/ le développement durable/ le CC) :

- **Observatoire National de l'Environnement du Maroc (ONEM) et déclinaison régionale (Observatoires Régionaux de l'Environnement et du Développement Durable (OREDD))**
  L'Observatoire National de l'Environnement du Maroc a pour missions de :
  - Evaluer l'état de l'environnement tant au niveau National que régional ;
  - Définir et assurer la mise à jour des indicateurs de développement durable (IDD) ;
  - Mettre en place des outils et des systèmes de la gestion de l'information environnementale ;
  - Evaluer les performances des politiques publiques en matière de la gestion de l'environnement ;
  - Diffuser les données environnementales et les partager dans le cadre du réseau national ou des réseaux régionaux de l'environnement.

Quelles sources et quelles données ont été considérées?

La réalisation des principaux documents produits au Maroc en rapport avec les exigences de la CCNUCC en matière des impacts du CC a été conduite sur la base des données, informations et ressources issues des sources suivantes :

- Les données des agences et des organismes gouvernementaux / publics nationaux :
  Ministères (particulièrement, le Ministère Délégué chargé de l'Environnement du Maroc), le Haut-Commissariat au Plan (HCP, institution marocaine de prospective, d'analyse et de prévision économique, en charge du système national de production statistique) ; la Direction des Statistiques ; le Haut-Commissariat aux Eaux et Forêts et à la Lutte contre la Désertification (HCEFLCD) ; le Secrétariat d'Etat Chargé de l'Eau ; l'Agence Nationale pour le Développement des Zones Oasiennes et de l'Arganier (ANDZOA) ; l'Office National de l'Electricité et de l'Eau Potable (ONEE) ; Agence pour le Développement Agricole (ADA); Agence Marocaine pour l'Efficacité Energétique (AMEE) ; Agence de Développement des Energies Renouvelables et de l'Efficacité Energétique (ADEREE); Maroc Energies (MEMEE); Portail national des collectivités territoriales (PNCT) ; Direction de la Météorologie Nationale (DMN) ;

- Les données produites au sein des projets menés dans le cadre du Mécanisme pour un Développement Propre au Maroc (MDP) ;
- Les données produites par le secteur académique et la recherche scientifique, nationale et internationale ;
- Les données produites par le secteur privé (e.g. bureaux d'études et/ou cabinets d'assistance technique) ;
- Les ressources issues d'organismes de coopération internationaux (CCUNCC, PNUD, PNUE, FAO, Banque Mondiale, GIZ, AFD, OCDE, CIHEAM, Plan Bleu, etc.) et des projets menés dans le cadre des accords internationaux (e.g. projets/ actions nationales ou NAMAs visant l'atténuation des émissions GES) ;
- Les données des simulations et modèles, en particulier pour les scénarios d'évolution du climat et d'estimations des atténuations des émissions GES dans des scénarios différents ;
- Les données et ressources issues d'organismes non gouvernementaux (ONGs) notamment Enda Maghreb Maroc.

Document	- Source
3ème Comm. Nationale CC CCNUCC/ 1er Rapport Biennal Actualisé	Données : - Secteur public : Ministères, Secrétariats d'Etat et des organismes publics concernant les secteurs clés (environnement, agriculture, eau et énergie, eau et forêts, météorologie….) ; ainsi que les différentes Collectivités Territoriales - Secteur privé : bureaux d'études environnement et ingénieurie - Organismes internationaux (PNUD, FAO, Banque Mondiale, etc.) - Etudes et publications scientifiques internationales et nationales, portant sur les effets du CC au Maroc - ONGs
Stratégie Nationale du Secteur du Tourisme	- Ensemble des stratégies sectorielles menés au niveau national, en partenariat avec le secteur privé; - Données du secteur du tourisme (confédération nationale du Tourisme, données statistiques nationales, etc.)
NDC/ CCNUCC	- Inventaire des émissions de GES selon les lignes directrices révisées du GIEC (1996). - Scenarios CNA (BAU) et d'atténuation (conditionnel, inconditionnel) basés sur le logiciel LEAP pour tous les secteurs. - Données des secteurs : Energie: Industries de production d'énergie, Demande d'énergie (ménages, transport, industrie, tertiaire, agriculture et pêches) ; Industrie et procédés industriels: Industrie du ciment, industrie de l'acier et métaux, autres industries) ; Agriculture: Fermentation entérique et gestion du fumier, systèmes de culture, utilisation des terres agricoles ; Déchets : Déchets solides, Eaux usées; Utilisation des terres et leur changement, forêts : Forêts naturelles, boisement et reboisement, arboriculture, bois de feu des forêts, bois de feu des vergers, incendies de forêts

Eléments principaux

Le cadre général du secteur du tourisme durable au Maroc

Le Maroc dispose d'un patrimoine touristique et culturel riche et diversifié. Le secteur du tourisme est prometteur et est devenu une priorité économique nationale. En effet, le secteur de tourisme contribue largement à la création de richesses et à la diminution du chômage et de la pauvreté avec une contribution d'environ 12% du PIB national. Le secteur est également un excellent pourvoyeur en emplois avec 505 000 emplois directs qui correspondent à près de 5% de l'emploi dans l'ensemble de l'économie. Le tourisme domestique, qui continue de consolider son poids et de confirmer son rôle de levier pour une croissance équilibrée et résilente de l'activité touristique au Maroc, a une importance significative pour le pays : ce segment représente un tiers des arrivées et un quart des nuitées enregistrées, d'où la nécessité de multiplier les efforts pour accélérer son développement.

Stratégie Nationale du Secteur du Tourisme « Vision 2020 » du Maroc :

Le Maroc mise sur le tourisme comme secteur prioritaire de sa stratégie de développement. Ainsi, la Stratégie du Nationale « Vision 2020 » a pour but de doubler la taille de l'industrie touristique marocaine pour la hisser au rang des 20 premières destinations touristiques mondiales et faire du pays une référence en matière de développement durable dans le bassin méditerranéen.

Plusieurs grands projets structurants, impulsés et soutenus par l'Etat, les régions et le secteur privé sont

envisagés :
- Programme Azur 2020 (en continuité avec le plan Azur de la Vision 2010) ;
- Programme Patrimoine et Héritage (faire rayonner l'identité culturelle du Maroc) ;
- Programme Eco & Green (valoriser des espaces naturels préservés d'exception) ;
- Programme Animation et Loisirs (enrichir l'offre touristique hôtelière et la rendre plus compétitive) ;
- Programme Niches à forte Valeur Ajoutée (positionner le Maroc comme destination de rang international sur le Bien être) ;
- Programme Biladi (consolidation et achèvement des initiatives lancées dans le cadre du plan Biladi, visant à la création de 8 stations touristiques localisées dans des régions fortement prisées par les touristes nationaux et assorties de produits et de prix répondant à leurs attentes).

La Stratégie touristique « Vision 2020 » suit les principes du développement durable en visant l'amélioration des compétences nécessaires au moyen d'une plate-forme de formations en ligne, de mesures de sensibilisation et de guides de bonnes pratiques. Le ministère envisage le suivi de la durabilité du secteur au moyen d'indicateurs de tourisme durable en cours de déploiement dans tout le pays.

Ainsi, le Maroc a choisi de placer le tourisme durable et responsable au cœur de sa stratégie touristique et a joué un rôle déterminant dans la promotion du développement durable du tourisme à l'échelle internationale. En 2014, il a été élu co-responsable du Programme tourisme durable, qui fait partie du Cadre décennal de programmation concernant les modes de consommation et de production durables (10YFP) des Nations Unies.

Le secteur de l'aviation au Maroc et l'absence de l'évaluation de ses liens avec le CC et/ou le développement durable

Le Maroc a mis en place le Schéma directeur de développement des aéroports à l'horizon 2035, un programme d'extensions des aéroports et de développement du transport aérien qui vise à accompagner la stratégie du secteur du Tourisme (vision 2020) et de renforcer la position de l'aéroport Mohammed V comme pôle aérien international leader de et vers l'Afrique centrale et l'Afrique de l'Ouest.

Le Schéma directeur est ainsi axé sur :
- Positionnement de Casablanca comme l'aéroport de référence de l'Afrique du Nord ;
- Définition d'un schéma directeur de développement des aéroports à l'horizon 2035 ;
- Consolidation les dessertes aériennes du marché européen afin d'assurer les objectifs de Vision 2020 ;
- Promotion du transport aérien domestique ;
- Développement du Fret aérien au Maroc et étude d'opportunité pour le développement d'un hub fret.

Comme pour la plupart des pays, les effets du CC sur le secteur de l'aviation et, par extension, les risques dérivés pour le secteur du tourisme au niveau national demeurent inexplorés/ non considérés au Maroc ; désormais aucun plan d'action et/ou mesure d'adaptation du secteur n'a été envisagé.

3. Analyse croisée: options politiques et impacts climatiques

En raison de la variété de plans, stratégies et programmes conformant le cadre d'action national en matière de lutte contre le CC au Maroc, l'analyse des dispositions et/ou considérations qui concernent directement/ indirectement le CC et/ou le développement durable est menée à partir de la considération de trois documents : la Stratégie Nationale (SNRC) et le Plan National de lutte contre le Réchauffement Climatique (PNRC, 2009), la Politique du CC au Maroc (PCCM, 2014)) et la Stratégie Nationale du secteur du Tourisme « Vision 2020 »).

Tableau 2. Tourisme et changement climatique "fiche d'analyse croisée"

Considère entièrement		*Considère faiblement (ou indirectement)*	
Considère les composantes clés		*Ne considère pas ou pas de connaissance précise*	

Domaines d'impact	**Cadre d'action national en matière de lutte contre le Réchauffement Climatique (capitalisant l'ensemble des efforts nationaux) : Stratégie Nationale en matière de lutte contre le Réchauffement Climatique (SNRC) ; Plan National de lutte contre le Réchauffement Climatique (PNRC, 2009) ; Politique du CC au Maroc (PCCM, 2014))**	**Stratégie Nationale du secteur du Tourisme « Vision 2020 » (2010)**
Risques et assurance	• Elaborer un Plan National de Prévention et de Réponse aux Risques Climatiques. • Actualiser et mettre en œuvre le Plan National de Protection contre les Inondations. • Perfectionner le dispositif d'alerte aux événements météorologiques extrêmes et mettre en place un système d'information dédié à la vigilance climatique et à l'alerte aux événements extrêmes ayant un accès facile et gratuit pour tous les acteurs sectoriels • Elaborer et mettre en œuvre des Plans Territoriaux de lutte contre le Réchauffement Climatique (PTRC), mettant la priorité sur l'identification des zones les plus vulnérables, des risques climatiques et la réduction des inégalités sociales faces aux impacts négatifs du CC. • Intégrer les considérations liées au CC dans les Plans Communaux de Développement (PCD). (A priori, pas de mesures concernant directement les assurances ni leurs liens avec le CC)	• Création d'une commission « Tourisme durable », instance transversale public-privé capable d'impulser, de suivre et d'évaluer la mise en œuvre de la stratégie intégrée de tourisme durable ; • Mis en œuvre d'un dispositif de veille, consistant en « observatoires de la durabilité touristique », déployé au niveau régional afin d'assurer le suivi d'une problématique essentiellement locale. (Pas de mesures concernant les assurances ni leurs liens avec le CC)
Variabilité climatique	• Elaborer un Plan National de Prévention et de Réponse aux Risques Climatiques.	• Pas de considérations sur la variabilité climatique dérivée du CC
Transport aérien	• (Indirect, référence au) Développement du Schéma Directeur aéroportuaire national à l'horizon 2035, dans le cadre de l'accompagnement de la vision touristique 2020 : o Extensions des installations aéroportuaires, maintenance de ces installations : développement de 15 aéroports selon le trafic aérien attendu à court, moyen et long termes ; o Multi-modalité : liaison des aéroports au reste du réseau (moyens de transport terrestres), afin de dimensionner les accès de façon optimale. (Pas de considération sur les liens secteur aérien – CC)	
Energie	• Mise en œuvre de la Stratégie Energétique Nationale, établie à l'horizon 2030 (atténuation) : o promotion des énergies renouvelables (ER) o promotion de l'économie d'énergie à travers des mesures d'efficacité énergétique (EE) dans le bâtiment	• Les observatoires de la durabilité touristique auront pour mission de suivre un ensemble d'indicateurs de performance environnementale, y compris : o Le niveau de consommation d'eau et d'énergie et les efforts faits par le secteur pour sa maîtrise • Développement d'un ensemble d'éco-territoires et de nouveaux produits touristiques « best-in-class » en matière de préservation de l'environnement et d'efficacité énergétique,

			définis via des cahiers des charges élaborés en concertation avec des experts	
Ressources en eau	• Mise en œuvre de la Stratégie Nationale de l'Eau, établie à l'horizon 2030 (adaptation), dont volets : ○ La gestion de la demande et la valorisation de l'eau par : ▪ le programme d'économie d'eau en irrigation ; ▪ l'économie d'eau potable, industrielle et touristique (utilisation de pratiques économes) ○ La gestion et le développement de l'offre : ▪ Infrastructures hydrauliques (barrages) ; ▪ le transfert des ressources en eaux brutes des bassins du Nord vers le Sud ; ▪ la mobilisation des ressources non conventionnelles (dessalement, réutilisation, captage des eaux de pluie) ; ○ La préservation et la protection des ressources en eau, du milieu naturel et des zones fragiles ; ○ La réduction de la vulnérabilité liée aux inondations et aux sécheresses: ▪ Travaux de protection contre inondations (PNI) ; ▪ Plan de gestion des sécheresses par bassin ; ▪ Prévisions hydrométéorologiques		• « Le tourisme doit tenir compte des contraintes hydriques (…) que connaît le Maroc en mettant en place toutes les mesures permettant de préserver ses ressources naturelles » • Les observatoires de la durabilité touristique mis en œuvre auront pour mission de relever un ensemble précis d'indicateurs de performance environnementale, y compris : ○ Le niveau de consommation d'eau et d'énergie et les efforts faits par le secteur pour sa maîtrise	
Forêt / Agriculture	• Différentes stratégies reflètent les efforts nationaux pour les ressources forestières (atténuation): ○ Plan Directeur de Gestion Conservatoire des Terres en Zones Pluviales (1994) ; ○ Plan Directeur des aires Protégées (1995) ; ○ Plan Directeur de Reboisement (1996) ; ○ Programme Forestier National (1998) ; ○ Plan Directeur de Lutte contre les Incendies de Forêts (2001) ; ○ Stratégie Nationale de Surveillance et de Suivi de la Santé des Forêts (2008) ; ○ Stratégie Nationale de Développement des Forêts Urbaines et Périurbaines (2009). ○ Plan d'Action Nationale de Lutte contre la Désertification actualisé (PANLCD, 2012) • 1 stratégie visant la restructuration du secteur agricole (atténuation): ○ Plan Maroc Vert, lancé en 2008, dont Projet d'Intégration du Changement Climatique (2011)		• Seuil ajusté pour chaque destination, par un audit environnemental qui a permis d'évaluer le niveau de fragilité des écosystèmes et la disponibilité en ressources et en infrastructures environnementales • Les observatoires de la durabilité touristique mis en œuvre auront pour mission de relever un ensemble précis d'indicateurs de performance environnementale, y compris : ○ L'état des sites touristiques naturels et culturels ○ L'impact du secteur sur l'environnement (à l'échelle nationale ou au niveau des sites les plus vulnérables) • Développement d'un ensemble d'éco-territoires et de nouveaux produits touristiques « best-in-class » en matière de préservation de l'environnement et d'efficacité énergétique, définis via des cahiers des charges élaborés en concertation avec des experts	
Biodiversité	• Stratégie Nationale de la Conservation et de l'Utilisation Durable de la Diversité Biologique (2004) ○ Conservation et l'utilisation durable de la biodiversité ○ Amélioration de la connaissance et la promotion de la recherche scientifique ; ○ Sensibilisation/ éducation via l'élaboration de programmes spécifiques pour des populations-cibles			
Maladies à transmission vectorielle	• Stratégie d'adaptation du Secteur de la Santé au changement climatique (2010) axée : ○ Protection de la santé de la population face au CC et réduction des inégalités devant les risques sanitaires; ○ Amélioration du système de surveillance épidémiologique ;		Pas de considérations ni d'actions.	

	○ Renforcement de la résilience des infrastructures sanitaires face aux évènements extrêmes ; ○ Préparation des plans d'urgence et de riposte ; ○ Renforcement des capacités des professionnels en matière de CC ; ○ Promotion de la recherche sur les impacts du CC sur la santé ; ○ Information et sensibilisation des différentes tranches de populations : décideurs, personnes vulnérables…		
Infrastructures	• « Le Maroc s'est fermement engagé dans des actions d'adaptation, pour de nombreux secteurs et domaines d'activités (…). De telles initiatives sont à consolider, certains aspects sont à approfondir ou à améliorer (vulnérabilité des infrastructures et des écosystèmes,…) » • Plan de protection contre les inondations ○ mesures physiques (réalisation d'ouvrages de protection tels que les barrages, les endiguements, le calibrage et l'entretien des lits des cours d'eau ou les systèmes de lutte contre l'érosion, etc.) mais aussi préventives, réglementaires, organisationnelles ou encore de sensibilisation.		(Actions prévues dans le cadre du développement du seul site écotouristique Atlas et Vallées) • Mise en valeur du patrimoine matériel avec la réhabilitation du patrimoine bâti (Ksours, Kasbahs, greniers, moulins hydrauliques) permettront de préserver l'identité culturelle du territoire ; • Préservation des espaces naturels fragiles avec la maîtrise du développement touristique et la pratique des activités sportives ; • Désenclavement du site d'Ouarzazate avec le développement de l'interconnexion entre les sites (Ouarzazate, Haut Atlas et vallées). Pas de considération du CC
Patrimoine culturel	• Charte Nationale de l'Environnement et du Développement Durable : ○ Sauvegarde de la biodiversité et de la qualité du patrimoine naturel et historique		• Programme Structurant n°3 « Patrimoine & Héritage » (parmi les 6 Programmes Structurants dans la Stratégie Tourisme) sur le soutien au patrimoine culturel mais avec pas de références au changement climatique : ○ Réhabilitation et reconversion des monuments historiques tout en préservant leur identité architecturale ; ○ Création d'une société de revalorisation touristique du patrimoine pour mettre à profit l'héritage architectural national (kasbahs, ksours, ryads, fondouks, palais d'hôte, greniers...) par sa transformation en hébergement haut de gamme authentique ; ○ Création de grands musées de classe internationale permettant d'offrir aux touristes une découverte et une interprétation du patrimoine historique et culturel.
Offre touristique/ visites	Référence à la Stratégie du secteur touristique « Vision 2020 »		• Développement d'une offre écotouristique : parmi les 8 territoires touristiques à développer, un sera spécialisé écotourisme et développement durable (territoire Atlas & Vallée) ; • Création d'une offre « Nature » complémentaire, à travers des produits innovants de faible intensité touristique et de qualité élevée (éco-lodges, resorts du désert, ksours & kasbah reconvertis...). • Les niveaux de densité touristique ont été analysés pour chacune des destinations de la « Vision 2020 » et un seuil à ne pas dépasser a été fixé et ajusté à chaque destination pour éviter la dégradation des écosystèmes et un impact négatif sur les communautés locales. • Les observatoires de la durabilité touristique auront pour mission de relever un ensemble précis d'indicateurs de performance environnementale, y compris : ○ Le respect des seuils de densité touristique fixés dans le cadre de la stratégie

			○ L'état des sites touristiques naturels et culturels • Mise en œuvre d'une démarche de labellisation « étoile verte » au sein du classement hôtelier	

Références :

- OCDE, 2016, Tendances et politiques du tourisme de l'OCDE 2016 https://books.google.es/books?id=AgSxDAAAQBAJ&pg=PA405&lpg=PA405&dq=tourisme+durable+vision+2020+maroc&source=bl&ots=coAW1hsTWQ&sig=9_GG89eLHeIA7DunoYUQTYbRNvg&hl=es&sa=X&ved=0ahUKEwiz_IbYpsTZAhXKiCwKHW11BLsQ6AEIMDAB#v=onepage&q=tourisme%20durable%20vision%202020%20maroc&f=false
- https://www.portailsudmaroc.com/actualite/vision-2020-maroc
- Ministère du Tourisme, du Transport aérien, de l'Artisanat et de l'Economie sociale : http://www.tourisme.gov.ma/fr/vision-2020/tourisme-durable
- BUR: http://unfccc.int/resource/docs/natc/marbur1.pdf
- Schéma Directeur aéroportuaire national à l'horizon 2035 : http://www.equipement.gov.ma/aerien/Grands-Projets/Pages/Schema-Directeur-aeroportuaire.aspx
- PCCM, 2014 : http://www.environnement.gov.ma/PDFs/politique_du_changement_climatique_au_maroc.pdf
- Secrétariat d'Etat auprès du Ministère de l'Energie, des Mines et du Développement durable, Chargé du Développement durable : http://www.environnement.gov.ma/fr/climat?showall=1
- Plan National de Lutte contre le RC : http://climatique.itccanarias.org/files/Seminario/Hicham_EL_YOUSFI_Plan_Nacional_Marruecos_5.pdf

PALESTINE

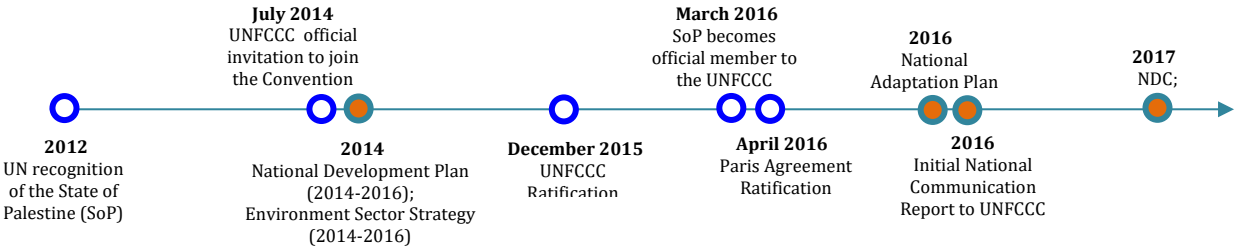
1. Climate change impact areas

Since the Rio Conference in 1992, Palestine has been a dedicated partner in the international negotiations on CC, in the form of "Observer State". Indeed, as many other countries in the Mediterranean and elsewhere, Palestine also faces rising temperatures, water scarcity, drought and rising sea levels. Committed to joining the international fight against CC, Palestine undertook CC work prior to becoming a Party to the Convention: in 2010, the Palestinian Authority developed a Climate Change Adaptation Strategy aimed to set out a national action plan to address several of the biggest threats posed by CC; it also developed the "Palestinian Climate Change Adaptation Strategy" (2010), and the "National Strategy, Action Programme and Integrated Financing Strategy to Combat Desertification" (2012).

Over the last years, the Palestine has been endeavouring to strengthen institutions and boost its national economy and social welfare from a holistic perspective. To that purpose, a National Development Plan (2014-2016) was issued, along with corresponding policies and strategies. In this sense, a variety of sectoral strategies have been developed for 21 sectors, including water, agriculture, energy and waste, as well as three cross-sectoral strategies targeting environment, gender and youth. Indeed, the country has deployed efforts to reinforce environment-related policies, issuing the "Environment Sector Strategy (2014-2016)" (led by the Palestinian Environmental Quality Authority (EQA) or the "National Strategy for Environmental Awareness and Education", among others.

After the UN recognition of the Palestinian statehood in 2012, followed by the UNFCCC invitation to join the Convention in July 2014, Palestine submitted in December 2015 the instrument of accession at COP 21 in Paris. Subsequently, in March 2016, Palestine officially became a Party to the UNFCCC. One month later, the country signed and ratified the Paris Agreement.

Palestine and its national fight against Climate Change



The country submitted its Initial National Communication Report (INCR) in 2016. The report highlighted the outcomes of the national work on GHG inventories, provided the first analysis of mitigation and adaptation potentials and announced the program of measures aimed to tackle CC. The INCR also reflected the technical and institutional national challenges faced. Having established *adaptation* as the main priority in the national fight against CC, the Palestine also published in 2016 its National Adaptation Plan (NAP), which, such as the INCR, had been reviewed and approved by stakeholders involved in the developing process. Following UNFCCC requests, and in consistence with its INCR and NAP, the country recently submitted its first NDC (2017). The actions highlighted in the INDC have been discussed with stakeholders and agreed at the ministerial and sectoral level. In the national works carried out in responding to the UNFCCC requests, Palestine has been supported by international technical and/or funding organisations, either within bilateral cooperation agreements between states, or within multilateral frameworks (e.g. UN, and in particular the UNDP Programme of Assistance to the Palestinian People (UNDP/PAPP) and the Environment).

Table 1. Climate change impact "assessment fiche"

High impact (impact is strong and requires major measures and immediate action)		*Negligible impact* (impact is limited but requires monitoring)	
Medium impact (impact is growing and requires minor measures, monitoring and mid-term action)		*Uncertain impact* (not enough evidence and need for further monitoring and analysis)	

Areas of impact	Currently (2017)	Near future (2020-2030)	Longer term (2030-2050-2100)
Risks and insurance		• Higher burden on the insurance industry	Higher burden on the insurance industry
Climate variability	• Very high confidence that temperatures have risen over the past 100 years • No reliable data on quantitative rates of change • High confidence that warm days/nights have increased and cold days/nights have decreased in frequency • Very low confidence that annual and seasonal rainfall totals have changed in either direction over the past 50 years or so but also very low confidence that there has been no change in annual and seasonal rainfall totals	• Temperature increases from 1.5 - 2.5°C by 2055 • Reduced cold periods and warmer periods • Reduction in rainfall: natural water supplies oscillating between no change up to 15% -20% decrease • Increased possibilities of flooding risks and droughts	Intensification • Temperature increases from 2 -4.5°C by 2090 • Reduced cold periods and warmer periods • Reduction in rainfall: natural water supplies declining up to 20% -30% • Reduction in rainfall • Increase in the frequency and strength of extreme weather events (heat waves and floods in the Mediterranean region) over the next 50 years.
Exploitation costs of tourisms facilities	This is our assumption… are there available data?	• Increased costs for goods and services • Increased energy demand due to harsher heat stress, particularly during peak heat waves	• Worsening, under a BAU scenario
Change in tourist season and access (aviation routes change, visits/ demand, season elongation)	• Tourists mainly arrive from Israel; the main mode of transport used by incoming tourists to Israel is air; in 2017, arrivals by air represented 85%	• (General) Potential air travel disruptions: hotter air is thinner air, impeding the generation of enough lift for planes to flight. As the global climate changes, air disruptions are likely to become more frequent, potentially making air travel costlier and less predictable.	
	• No impacts perceived/ assessed today for change in visits due to climate conditions	• Damage to coastal tourism and recreation, by reason of e.g. adverse impacts on natural reserves • Outbreak of eradicated diseases will mostly damage tourism	• Impacts on air travel might involve a significant decrease on tourist arrivals to the country • Diseases' outbreaks and extreme weather events affecting tourism
	No change foreseen in summer/winter season change due to climate change	Change in summer/winter season due to climate change foreseen?	Change in summer/winter season due to climate change foreseen?
Water shortages	• Between the years 1961-1990 most of the droughts are classified as moderate drought.	• Increase of droughts, due to rainfall decreases and reduced infiltration and recharges rates • Duration of droughts in the northern (subhumid) and middle (semi-arid) zones is expected to slightly increase. Increase is expected to be higher in the southern (arid) precipitation area • The frequency of moderate droughts is expected to decrease vs number of extreme droughts will increase • Increased salinity and pumping costs leading to water deficit	• Increase of droughts, due to rainfall decreases and reduced infiltration and recharges rates • Duration of droughts in the northern (subhumid) and middle (semi-arid) zones is expected to slightly increase. Increase is expected to be higher in the southern (arid) precipitation area

					• The frequency of moderate droughts is expected to decrease vs number of extreme droughts will increase. • Increased salinity and pumping costs leading to water deficit	
Biodiversity loss	• Spatial movement northward in the distribution of Med species; replacement by desert ecosystems/sp. • Moderate-low vulnerability of some species of plants and butterflies to the forecasted reduced precipitation. • Prolonged intra-seasonal periods of dryness adversely impacting plants/animals. • Increased risks of forest fires.		• Changes in the geographical distribution of species and in the ecological services provided by natural ecosystems. • Increased water temperature in the Medit. leading to increased penetration and establishment of alien species originating in the Red Sea/Indian Ocean • Damage to coastal species and ecosystems • Damage to fishery (in the Gaza Strip), as most of the alien species are of lower nutritional value than the local species.		• No scenario assessed, but under BAU risks will tend to worsen and economic costs will increase	
Infrastructural issues	• Extreme events (episodic flooding and frost) causing damage to structures		• Frost and increased floods, particularly in the downstream area of the watershed, causing damage to infrastructures		• Frost and increased floods, particularly in the downstream area of the watershed, causing damage to infrastructures	
Sea level rise and coastal erosion (Gaza Strip)	• Recorded trend of rising seawater levels totalling >10 cm in the Med Sea over the past 2 decades • Wave storms with wave heights exceeding 3.5 m have increased along with exceptional storms with a wave height above 6 m. • The retreat rate of the top of the cliff eastward, as measured by comparing aerial photographs from 1945 and 2004, is approx. 20 to 30 cm/year).		• Rising seawater levels ranging 1-10 cm per decade according to scenarios. • Increased wave storms pose major risks and collapse coastal cliff (retreat and damage) • Sand removal • Seawater intrusion in coastal aquifers • Economic losses and costs of coastal protection		• Migration of the water line by some 10-30 meters eastward, expected by the year 2100 • Loss of coastal areas due to sea flooding	
Cultural heritage	• Condition of cultural heritage is ranked as "highly vulnerable" in the West Bank, as it is considered as highly sensitive to extreme climates.		• No specific analysis on the mid-long term for Palestinian cultural, historical and archaeological heritage; • However, according to UNESCO*, global climate change is also exposing World Heritage natural properties to increasing disaster risks (UNESCO / WHC, 2007). • Drought and flood events, and climate change-associated variations in sea-level and storm or flood events is likely to increase the probability of hazards in vulnerable areas. • Climate change may also increase impacts of disasters on World Heritage cultural properties through its effects on significant underlying risk factors, e.g. any increase in soil moisture may affect archaeological remains and historic buildings, thereby increasing their vulnerability.			

Vector borne-diseases	• Thermal stress: heat stress already harms the elderly, the ill and workers exposed to heat.		• Increased incidence of parasitic/ infectious diseases (Malaria, West Nile Fever): rise in extreme weather events + higher temperatures increasing mosquito populations and altering their distribution. However: low probability risk of renewed outbreak of malaria. • Increased thermal stress: increased heat stress harming the elderly, the ill and workers exposed to heat. • Increased risk of damages from extreme weather events		Same if trends persist	

Main references: Initial National Communication Report to UNFCCC (2016); Table 1 included in the Israeli and the Lebanese fiches, since most of the parameters are likely to be very similar; IUCN (2013) Resilience to CC in Palestine.
*UNESCO (2010) Managing Disaster Risks for World Heritage. ISBN 978-92-3-104165-5.

2. Policy options to address such impacts

How do the measures identified intend to address each specific impact? What outputs (documents) and outcomes (actions) are foreseen and by when?

Strategic document	Year/ Carrier	Objectives	How measures envisage addressing each impact
State of Palestine Nationally Determined Contributions (NDC) /UNFCCC	EQA 2017	• Communicating the Palestinian national commitment towards reducing GHG emissions for the 2016-2030 period • Communicating conditional and unconditional targets, subject to receiving or not international support, as well as to different political scenarios (BAU and independence); • Providing GHG emissions forecast until 2040 under BAU and GHG reduction scenarios; • Communicating the list of mitigation and adaptation options selected to meet the target.	• Provision of immediate/ short-term mitigation and adaptation targets and actions, including action description, provisions for feasibility (conditional/ unconditional according to international support), timescale for implementation, an estimation of related costs, and the type of support needed. • The NDC sets out quantitative mitigation outcomes which are fully conditional on the receipt of international support.
State of Palestine's National Adaptation Plan (NAP)	EQA*/ UNDP 2016	• The objectives of the NAP are to provide: o An assessment of historic trends in climate in relation to Palestine o Identification and prioritization of vulnerabilities: a total of 12 highly vulnerable sectors are identified: agriculture, coastal and marine (Gaza Strip), energy, food, gender, health, industry, terrestrial ecosystems, tourism (only in West Bank), urban and infrastructure, waste and wastewater, and water. o Future climate-scenarios o Identification and prioritization of adaptation options, including costings: immediate/ short-term adaptation actions in relation to the 12 vulnerable sectors are highlighted; o Future developments required for Palestinian institutions to be able to participate in climate-modelling research o An outline of the process for future monitoring and evaluation; o Future steps	• The adaptation actions detailed concern envisaged (future) or ongoing actions aiming at reducing climate sensitivity and increasing adaptive capacity; • The list of actions provided includes action description, provisions for feasibility (conditional/ unconditional according to international support), timescale for implementation, an estimation of related costs, and the type of support needed; • Adaptation actions also comprise operational strategies, infrastructural changes, policy adjustments and/or capacity building.

State of Palestine's Initial National Communication to the UNFCCC	EQA* and UNDP/PAPP 2016	• Highlighting key outcomes of GHG inventories, analysis of mitigation and adaptation potentials; • Give visibility of the measures taken to tackle CC; • Stress technical and institutional challenges faced.	• Provision of ten prioritised mitigation actions (both 'realistic' mitigation actions and 'all' mitigation actions, according to the international support received).

*Supported by a consultancy firm

Elaboration of the policies and measures and advancements

The Palestinian Government deploys important efforts to understand and address challenges related to CC. Relevant government institutions, namely the Environment Quality Authority (EQA), the Ministry of Agriculture (MOA), the Palestinian Water Authority (PWA), the Ministry of Transportation (MOT), the Ministry of Finance and Planning (MOFP), the Ministry of National Economy (MONE), the Palestinian Energy and Natural Resources Authority (PENRA), and the Ministry of Health (MOH) are deeply involved in the determination of the near-future actions regarding the envisaged mitigation and adaptation national strategies, although they are recognised as having limited systems, capacity and expertise to address CC challenges efficiently.

What main steps have been followed and what is the stage of the process?

Strategic Document	Leadership	Process	Associated actors
State of Palestine's NDC/ UNFCCC **2017**	EQA	• Specifically for the NDC, a strong stakeholder consultation was undertaken through a stakeholder workshop attended by stakeholders from the NCCC (24th October 2016); • Consultation was also carried out with stakeholders outside of the NCCC; • A first draft of the NDC was circulated among stakeholders, and a second draft NDC was prepared taking on board stakeholder feedback. • A final validation workshop with stakeholders to approve the NDC was conducted. • The final NDC was approved by the Palestinian Government. • Overall, the mitigation component of the NDC is consistent with both the INCR and the recently developed draft sectoral strategies. The adaptation component is consistent with the NAP.	• <u>NCCC stakeholders:</u> Environment Quality Authority (EQA); Ministry of Agriculture (MOA); Palestinian Water Authority (PWA); Palestinian Energy and Natural Resources Authority (PENRA); Ministry of Transport (MOT); Ministry of Finance and Planning (MOFP); Ministry of National Economy; Ministry of Health; Palestinian Meteorological Department; Applied Research Institute; House of Water and Environment; Birzeit University • <u>Stakeholders outside the NCCC</u> Ministry of Local Governments and Ministry of Public Works and Housing and Union of Agricultural Work Committees.
NAP **2016**	EQA	• Identification of vulnerable (to CC) themes/ sectors (a total of 12) • Potential vulnerabilities (biophysical and/or socioeconomic) associated with each of the 12 sectors were assessed by a project team of national experts guided by an international expert, in consistency with the IPCC AR5; • "Training Workshops" were held in the West Bank and the Gaza Strip with stakeholders from each of the themes/sectors to familiarise them with the definitions of terms; • Climate sensitivities and adaptive capacities were assessed in relation to each potential vulnerability; • Subsequently stakeholders met in their thematic/sectoral groups in the West Bank and the Gaza Strip with a member of the project team. Each group reviewed the relevant list of potential vulnerabilities, the	• <u>NCCC stakeholders:</u> The process used to develop the first NAP secured input from a wide cross-section of stakeholders and the commitment of all relevant ministries;

		descriptions of climate sensitivities and adaptive capacities. • A range of potential adaptation options were subsequently identified and assessed by stakeholders, and then prioritised for implementation in a "NAP Workshop"	
State of Palestine's Initial National Communication to the UNFCCC **2016**	EQA	• National process involving all national stakeholders and experts. • 2-year process supported by UNDP/PAPP and the Government of Belgium, with a strong component of national capacity building. • Basis: the recommended and applicable guidelines issued in the UNFCCC frame • Support of an international expert to develop the assessment of future-climate scenarios	• NCCC stakeholders: • Private sector and civil society; • Experts, policy-makers, academics, engineers.

What actors have been involved, how and at what stage?

- Environment Quality Authority (EQA)
  The EQA is the government body in charge of safeguarding and protecting the environment, controlling and limiting the degradation of natural resources, combating desertification, preventing further pollution, enhancing environmental awareness, and ensuring environmentally sustainable development. Coordination and conduction of work regarding CC and UNFCCC requests (i.e. completion of the INCR and the NDC) is responsibility of the EQA, which has been designed as National Focal Point (NFP) to the UNFCCC.
- Other government agencies in close relationship to CC national works (many of them, involved in the NCCC):
  Ministry of Agriculture (MOA); Ministry of Transport (MOT); Palestinian Central Bureau of Statistics (PCBS); Palestinian Energy Authority and Natural Resources Authority (PENRA); Palestinian Water Authority (PWA); Ministry of Local Governments (MOLG); Ministry of Finance and Planning (MOFP); Ministry of National Economy; Ministry of Health; Palestinian Meteorological Department; Applied Research Institute; House of Water and Environment; Birzeit University.
- National Committee on Climate Change (NCCC)
  The NCCC is an expert advisory committee, which supports the Palestinian Government in the implementation and evaluation of its climate policies. It advises on where attention is required with regard to risks and on GHG mitigation and adaptation needs. The NCCC, on behalf of the Palestinian Government, is responsible for preparing climate-related policies (e.g. it was deeply involved in the development of the INCR), and following decisions by the Cabinet, monitoring implementation of these policies.
  The NCCC is chaired by EQA, which also acts as the permanent NCCC Secretariat, and comprises appointed representatives from the different sector ministries and agencies, academia, NGOs, and the private sector.
  NCCC's particular role is to support the Palestinian Government to:
    - Enhance the establishment of a scientific/technical and technological mechanism that addresses developments, impacts and potential challenges associated with CC in the SoP
    - Enhance the organization of scientific and technical research to inform adaptation and mitigation programs and projects
    - Ensure proper execution of the GHGI and preparation of Palestine's NCs for submission to the UNFCCC through EQA, as the National Focal Point (NFP)
    - Develop and monitor the implementation of the National Strategy on CC and the related mitigation and adaptation programs of action, plans and policies
    - Enhance research and solicit and create financing mechanisms that will facilitate and allow the SoP to succeed in its endeavours in relation to climate policy
    - Implement a broad communication strategy, including an awareness-raising, information and education campaign, and develop scientific and technical research and studies on climate change in the SoP
- Academia
  Academic centres such as Palestinian universities, i.e. the Birzeit University, the Hebron University and the Islamic University of Gaza, have been actively involved in the preparation of the INCR,

specifically as part of the team in charge of the data collection and implementation of the report.

- International/ regional organisations and partnerships and cooperation programs:
  - UNDP PAPP
- Private sector
  Also present in all stages of the national process against CC, charged with leading tasks (e.g. environmental and/or engineering consultancy firms in charge of supporting the EQA in the key national processes such as the INCR)
- Non-governmental organisations

What data has been considered and from what sources?

Document	Source
State of Palestine's INDC/ UNFCCC (2017)	- **Basis**: Information and data related to mitigation and adaptation options were estimated through the INCR for the mitigation actions and the NAP for the adaptation actions.
National Adaptation Plan (2016)	- **Basis**: The UNFCCC's Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention - **Technical support**: Future-climate scenarios for Palestine have been developed by an international expert in order to aid identification and prioritization of adaptation options in relation to the 'highly vulnerable' issues. Relevant scenarios presented in the literature were reviewed to provide context for an analysis of projections from models used in the IPCC AR5 - **Stakeholder involvement and expertise** - **Academic data**: literature search of peer-reviewed journals and grey literature, national and international - **International cooperation organisms**: IPCC
State of Palestine's Initial National Communication Report to the UNFCCC (2016)	- **National**: Data available in national bodies (in particular, PCBS, Ministry of Local Governments, Ministry of Agriculture, EQA) - **Academic data**: Diverse literature published in scientific journals by national & international researchers & academic centres/ universities - **International cooperation organisms**: UNEP/MAP reports - IPPC reports and guidelines - **ONG** Greenpeace reports Data was collected from various key institutions (United Nations Development Programme/Programme of Assistance to the Palestinian People (UNDP/PAPP), and the Birzeit University) and from field surveys and administrative records. Most of the data collected was activity data (AD) but in some cases emission factors (EF) were collected. Most effort was placed on identifying the AD rather than EF primarily because, although there are adequate default EF available, AD are country-specific and needed to be sourced from within the country.

3. Cross-analysis of gaps, good practices and opportunities

Table 2. Tourism and climate change "cross-analysis fiche"

Entirely considered
Considers key/main components
Weakly considered (or indirectly considered)
Not considered or no precise knowledge

Areas of impact	NATIONAL STRATEGY ON CC			
	CC MITIGATION **Initial National Communication to the UNFCCC**		**ADAPTATION TO CC** **National Adaptation Plan (NAP)** **Initial National Communication to the UNFCCC**	
Risks and insurance	• (General) Establishment of an early warning system, including utilising mobile phone applications.		No coverage	
Climate variability	No coverage		• Climate-smart agriculture (Production of olives, grapes, stone fruits, rain-fed vegetables and field crops)	
Exploitation costs	(Linked with energy and water savings) • Implementation of the National Energy Efficiency Action Plan, which aims to achieve 5% savings in overall electricity demand by 2020 (or annual energy savings of 384 GWh). • Promote increase use of solar thermal energy including solar water heaters, solar heating, solar fruit driers.		• Promoting green buildings	
Travel prices change	No coverage		No coverage	
Aviation routes change	No coverage		No coverage	

Energy	• Implementation of the Renewable Energy Strategy, which aims to generate 5% of the total electric energy consumed by utilising renewable energy technologies by the year 2020
	• Implementation of the National Energy Efficiency Action Plan, which aims to achieve 5% savings in overall electricity demand by 2020 (or annual energy savings of 384 GWh).
	• Promote increase use of solar thermal energy including solar water heaters, solar heating, solar fruit driers.
			• Promoting green buildings
			• Increase renewable energy production and decrease energy consumption:
			  ○ Generation of solar electricity for medium-large scale commercial and industrial application
			  ○ Implement energy efficiency measures to reduce consumption, mainly for commercial and industrial application
			• Reduce energy imports through:
			  ○ Use of renewable energy such as solar
			  ○ Implement energy efficiency measures to reduce consumption
			• Improve the condition of infrastructure:
			  ○ Building fossil-fuel storage facilities
			  ○ Electricity grid upgrading
			• Additional energy supply from neighbouring countries (only in Gaza strip)
			• Enhancing the equipment and efficiency of the Gaza Power Plant (GPP) (only in Gaza strip)	

Transport	• Encourage the use of public transport, in addition to bus rapid transport. • Improve the efficiency of the road vehicles by updating the vehicle fleet, disposing of old vehicles, and promoting and encouraging the use of efficient vehicles • Reduce traffic jams. • Use multi-modal transport patterns. • Control the technical condition of vehicles and periodic maintenance (MoT) to improve fuel efficiency and reduce emissions		• Rehabilitation of resilient road infrastructure	
Short/Long haul paths	No coverage		No coverage	

Water shortages			• Agriculture-related:
			  ○ Improve water-use efficiency and using alternative water resources (Irrigation water)
			  ○ Enhance sustainable community-level irrigation schemes and infrastructure (Irrigated vegetables)
			  ○ Rain-water harvesting (coastal agriculture)
			• Develop and improve storm-water systems and drainage infrastructure
			• Groundwater supply:
			  ○ Enhance the use of additional and alternative water resources for non-domestic purposes
			  ○ Increase share of imported water (Gaza Strip)
			• Condition of the infrastructure:
			  ○ Rehabilitate water sources: wells, canals and springs
			  ○ Control of leakage from distribution systems
			• Build a large desalination plant for Gaza

Biodiversity/ loss	No coverage		• National network of protected areas, including 50 protected areas and 51 biodiversity hotspots in the West Bank, and including Wadi Gaza and 3 biodiversity hotspots
Decline of landscape	No coverage		• Land-use planning and management - greening, afforestation, and rangeland development (Grazing area and soil erosion) • National network of protected areas, including 50 protected areas and 51 biodiversity hotspots (West Bank) • National network of protected areas, including Wadi Gaza and 3 biodiversity hotspots (Gaza Strip)

Coastal erosion	No coverage		• Condition of beaches
			  ○ Provision of beach nourishment, reclamation and beach drift rehabilitation
			  ○ Construction of detached breakwaters

Vector-borne diseases	No coverage		• Development of water, food and sanitation monitoring and safety systems using high technology • Training health professionals and increasing the awareness of people, particularly women, in water-poor areas about measures they can take to help prevent major diseases related to water, sanitation, and food • Provision of laboratories and equipment for data collection and analysis (for beaches)
Infrastructural issues	• (General) Support for dangerous cliffs through retaining walls and trenches.		• Construction of detached breakwaters (Gaza Strip) • Provision of beach nourishment, reclamation and beach drift rehabilitation (Gaza Strip) • Provision of laboratories and equipment for data collection and analysis (Gaza Strip)

Cultural heritage	No coverage		• (West Bank) Maintain and improve the condition of the cultural heritage with help from international donors, i.e.:
			  ○ Stronger regulations to prevent construction of new buildings in very sensitive areas (e.g. along Wadis), which potentially increases the sensitivity of the local cultural heritage, e.g. in relation to flooding
			  ○ Better enforcement of legislation to avoid cultural heritage sites being left open to assault
			  ○ Greater maintenance of cultural heritage sites

			○ More coordination between relevant institutions ○ Stronger national registration and classification of cultural heritage sites ○ Enhanced city and regional plans and related by-laws, including conservation guidelines ○ Increased awareness of the importance of conserving and restoring cultural heritage sites • <u>Adaptation options (West Bank):</u> ○ Identify, design and implement flood management schemes for cultural heritage sites, where appropriate ○ Identify, design and implement flood management schemes for eco-tourist attractions, where appropriate.	
Tourist offer/ Visits	No coverage		• Tourism specific (West Bank): ○ Identify, design and implement flood management schemes for cultural heritage sites, where appropriate (West Bank) ○ Identify, design and implement flood management schemes for eco-tourist attractions, where appropriate (West Bank) • General: ○ More coordination between relevant institutions ○ Stronger national registration and classification of cultural heritage sites ○ Enhanced city and regional plans and related by-laws, including conservation guidelines ○ Increased awareness of the importance of conserving and restoring cultural heritage sites	

Note: Requirement for international support to implement the actions is clearly stated in official documents.

Additional References

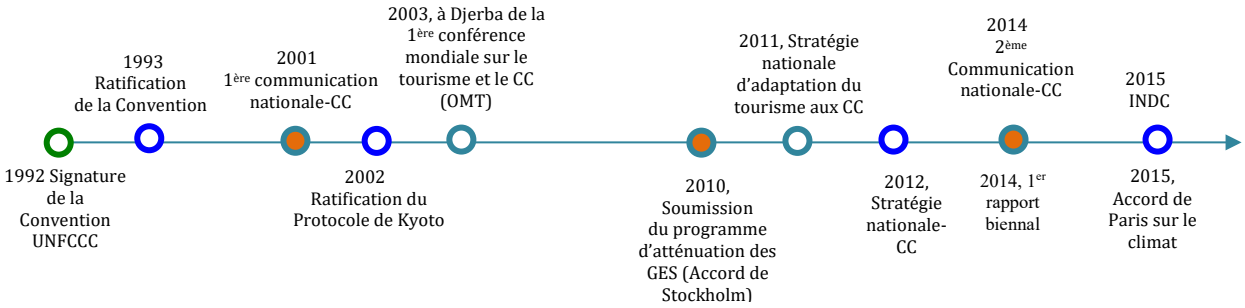
- 2017, State of Palestine, Nationally Determined Contributions/United Nations Framework Convention of Climate Change (UNFCCC)
- 2017, State of Palestine, Nationally Determined Contributions/United Nations Framework Convention of Climate Change (UNFCCC). Summary for Policy Makers

TUNISIE

1. Contexte de l'impact du changement climatique

Depuis sa ratification de la Convention Cadre des Nations Unies sur les changements climatiques (CCNUCC) en 1993 et du protocole de Kyoto, la Tunisie a entrepris une dynamique en vue d'organiser son cadre national de lutte contre les effets adverses des changements climatiques et d'améliorer la résilience des secteurs nationaux les plus stratégiques face aux changements climatiques. Ces actions visent à de maintenir et consolider les acquis en matière de développement et préserver durablement les ressources naturelles. Au cours de ce processus, une attention particulière a été accordée aux activités économiques et aux écosystèmes les plus vulnérables vis à vis des changements climatiques.

Figure 1. Principales étapes et dates liées aux actions pour traiter les changements climatiques en Tunisie



Au titre de l'UNFCC, la communication initiale a été préparée en 2001. Depuis, successivement plusieurs stratégies d'adaptation des secteurs aux changements climatiques ont été élaborées, notamment pour les activités suivantes : (i) agriculture et conservation des écosystèmes (2007), (ii) la santé (2010), (iii) le tourisme (2011). Une stratégie nationale de lutte contre les changements climatiques a été également élaborée (2012) ainsi qu'un plan de réduction de la vulnérabilité du littoral (2012). La seconde Communication Nationale de la Tunisie à l'UNFCCC a été soumise en décembre 2013, son INDC en 2015. La Tunisie a également signée l'accord Paris sur le climat (COP 21) in 2016.

Tableau 1. "Fiche d'évaluation" de l'impact du changement climatique

Impact élevé (impact important, nécessitant des mesures majeures et une action immédiate)		*Impact négligeable (l'impact est limité mais nécessite un suivi)*	
Impact moyen (impact croissant, nécessitant des mesures mineures, suivi et action à moyen terme)		*Incidence incertaine (pas assez de preuves et nécessité d'un suivi et d'une analyse plus poussés)*	

Areas of impact	Actuellement (2017)	Moyen terme (2020-2030)	Long terme (2030-2050)
Risques et assurances	Les risques contre les aléas climatiques, en particulier les inondations mais également les intrusions marines et l'érosion sont aujourd'hui faibles. Les risques à court terme ne sont pas très importants.	Scenario tendanciel à 2030 les assurances lies aux aléas climatiques vont augmenter. Pertes de potentiel productif du tourisme et de l'artisanat, et les fluctuations de productivité des principaux actifs naturels (eau, sol, plages).	Risque aggravé en 2050. Perte de capital économique (10% du PIB). Le tourisme serait très touché (capital productif dégradé dans le tourisme: 1935 Millions DT). L'ENM causerait la perte de 35000 emplois. Pertes/gains nets d'emplois dans le tourisme (2050).
Variabilité climatique		T +1.1°C à 1,5 °C, tendance à la baisse des précipitations moyennes (2 à 16%) (2030). Baisse[77] modérée en 2020. Plus de phénomènes météo-extrêmes[78]. ENM =30 cm en 2030 (de Tunis, golfe de Hammamet et de Djerba).	Augmentation significative de la T moy (+1.9°à 2.9°C) en 2050 (plus de fréquence et d'intensité des années extrêmes sèches). Baisse des précipitations de 4 à 12% avec une accentuation des tendances[79] en 2050.
Coûts d'exploitation des établisse-ments touristiques	Hausse légère des coûts d'exploitation des établissements touristiques (bien appréhendée par les professionnels).	Maîtrise des coûts d'exploitation (mobilité touristique, relative proximité des marchés européens) permettrait de maintenir l'attractivité.	Difficile à évaluer. Une politique de sobriété et d'efficacité énergétique permettra de maîtriser ces coûts pour maintenir la rentabilité.
Visites[80] (transport aérien, saison touristique, etc.)	60-65% des touristes arrivent par avion (90-95% des entrées des européens se font par avion)	L'atteinte de l'objectifs de réduire les émissions de GES (limiter la hausse des T°C à 2°C) nécessite des ajustements pour les pays développés émetteurs de flux touristiques.	
	Le tourisme balnéaire est dominant (faible durabilité, prix bas, forte saisonnalité, clientèle qui consomme peu de produits locaux et contribue faiblement au développement des régions intérieures avec une surexploitation des ressources.	En 2020, 35% du territoire aura moins de « bons mois », 35% aura des conditions climatiques assez stables et 30% verra le nombre de «bons mois » augmenter (pour 1^0C d'augmentation en 2025, le nombre de visiteurs internationaux baissera de 10% à 25% (HTM)[81].	Dans les années 2050, plus de 50% du territoire aura moins de « bons mois », environ 15% en a plus et 30% en a autant que lors de la période de référence. Amplification de la tendance.
	Situation normale	- 2% des jours défavorables en hiver et +2,6% des jours en été, une saison chaude plus longue et plus inconfortable[82]. Le CC pourrait faire progresser la saison balnéaire vers les saisons intermédiaires.	La saison balnéaire gagne une semaine pour un réchauffement annuel de 0,5°C, 2 semaines pour un réchauffement de 1°C et un mois pour un accroissement de 2°C (2050)[83].
Pénuries d'eau	Les nappes côtières sont surexploitées et exposées aux intrusions marines. Taux de mobilisation des ressources en eau conventionnelles =95%.	Les nappes côtières subiront une accélération de l'intrusion marine (risque de disparition de 53% des réserves littorales). 3000 ha des côtes urbaines sont menacés de submersion due l'Elévation du Niveau Moyen (ENM)[84].	Ressources en eau conventionnelles diminueront de 28% (2030). Ceci affectera les aquifères côtiers peu profonds à forte salinité. Les réserves d'eau de surface vont chuter de 5%
	Les nappes phréatiques sont principalement situées sur littoral et leur vulnérabilité est élevé (pression due à la forte densité de population/ activités économiques).	En cas d'ENM et sans mesures d'adaptation efficaces, ces nappes seront menacées par l'intrusion d'eau de mer et donc la salinisation. La pression sera déplacée vers les aquifères profonds pour compenser la pénurie d'eau.	En 2050, les pertes dans les nappes côtières dues à l'intrusion marine (IM) et à la salinisation serait de 152 millions m^3/an (zone vulnérable 1400 km^2). L'IM entraînerait la perte de 53% des réserves des aquifères côtières.
Capital culturel	Il existe un patrimoine culturel très important et qui est au coeur en partie de l'activité tourisme en Tunisie (phénicienne punique, romaine et byzantine,, berbère, arabo islamique,	Risques non évalués de manière séparés pour le sites culturels mais si l'on tien compte des scénarios retenus pour le tourisme et les zones côtières en général, les risques seraient importants	Amplification es effets négatifs dans un scénario aggravé de En 2100, une EANM de 50 cm

[77] Diminution de –5% au Nord, de –8% au Cap Bon et dans le Nord-est et de –10% à l'extrême Sud.
[78] BM, 2011; MAE et GIZ, 2011.
[79] Même tendance à l'horizon 2100 avec une diminution plus importante des moyennes de précipitations qui varie entre 10% et 35%.
[80] Le tourisme contribue à 7,5% du PIB et assure près de 400 000 emplois. La Tunisie capte entre 0,5% et 0,7% des flux touristiques mondiaux et près de 0,2% des recettes drainées par l'industrie touristique mondiale. Sérieusement affectée par la crise internationale qui a touché le tourisme après les événements du 11 septembre 2001, la Tunisie a dû faire face en 2011 à un effondrement des arrivées de touristes (-2,1 millions de touristes/2010). L'objectif est de gagner 1 million de touristes/an pour atteindre 6.8 millions en 2013 et 10 millions en 2016, et de doubler les dépenses moyennes par touriste et par jour à horizon 2020.
[81] Le modèle de tourisme de Hambourg Utilise les données annuelles (par rapport à une base avec aucun changement)
[82] La fréquence du «balnéaire refuge » passe de 5,2% à 17% des jours à Nabeul, de 8,8 à 21% des jours à Monastir et de 7,6 à 19% des jours à Djerba ;
[83] En 2050, le balnéaire favorable subit léger fléchissement (de 34,7% actuellement à 31% des jours à Djerba).
[84] Selon l'étude de vulnérabilité au changement climatique (APAL-PNUD, 2012).

	coloniale française) Il existe une forte corrélation entre le tourisme culturel et le tourisme balnéaire ce qui amplifie le risque, notamment lié aux activités humaine et la surfréquentation des sites sur le patrimoine culturel de la Tunisie.					
Perte de la biodiversité	Taux du couvert végétal =13%.		TCF : 12% en 2030.		TCF : 18% en 2050.	
	Cas de mortalités massives de gorgones et d'éponges au Sud (2000-2006) (anomalie thermique : cas de Cap Bon et de Tabarka) & espèces invasives.		Nombre et abondance d'espèces introduites augmente (nouvelles signalisations de plus en plus nombreuses).		Aggravation de la situation	

Areas of impact	Currently (2017)		Near future (2020-2030)		Longer term (2030-2050-2100)	
Problématique des infrastructures	Impacts sur les infrastructures côtières. Près de 1% du littoral global est protégé par diverses structures (digues : 55%, brise-lames en mer : 25%). Les épis sont utilisés pour prévenir l'érosion marine des rives. La Tunisie compte 41 ports de pêche, 6 ports commerciaux et 10 marinas.		L'ENM entraînerait des pertes et des coûts croissants d'entretien des ports[85]. Une ENM et une forte houle, entraîneraient la submersion de ces structures de protection. Les infrastructures touristiques risquent d'être endommagées et devront alors être surélevés ou renforcés. Un déclassement de certains hôtels peut être conduit entraînant la perte d'emplois[86].		3 scénarios de vulnérabilité (V) en 2100: (**1**) hypothèse optimiste de politique littorale efficace et d'adaptation au CC (V-modérée), ENM=38 cm. (**2**) tendanciel pour une V-forte et une ENM=50 cm. (**3**) absence de mesures de protection et d'adaptation à l'ENM pour une V-extrême (VE) et ENM=100 cm.	
Èrosion côtière	8% (127 km) du linéaire côtier est affecté par l'érosion[87]. Plusieurs dunes côtières ont disparu ou sont menacées. 1% des plages est naturellement engraissées. Les terres submersibles sont situées sur la côte orientale et sur les îles.		En cas d'une ENM, les sebkhas seront inondées plus souvent et deviendront des plans d'eau permanents (lagunes)[88].		En 2100, une EANM de 50 cm ferait perdre 4500 ha à l'archipel des Kerkennah (30% de sa superficie). Les superficies potentiellement submersibles, sont estimées à 18 000 ha.	
Réchauffement des eaux	Les effets CC se manifestent à travers la prolifération des espèces introduites et l'impact du réchauffement des eaux sur la reproduction (effets encore minimes et maîtrisables).		La pêche traditionnelle et la pêche lagunaire seront les plus touchées par l'augmentation des températures et par l'élévation du niveau de la mer (MEE[89], 2013).		Pas de scénario réalisé mais si la tendance actuelle se maintient les risques sont importants à très importants	

MDT: Million de Dinars Tunisien

Comment les mesures identifiées ont-elles l'intention d'aborder chaque impact spécifique? Quels résultats (documents) et résultats (actions) sont prévus et quand?

Document stratégique	Année & Porteur	Objectifs et consistance	Comment les mesures approuvées vont traiter les différentes impacts
Stratégie d'adaptation du tourisme au changement climatique (SNATCC)	2011 MEATDD	• Réduire la vulnérabilité du secteur tourisme aux effets adverses des changements climatiques. • Maintenir la compétitivité du secteur touristique en l'appuyant sur des ressources naturelles et paysagères durables.	• Maintenir la part du tourisme au PIB et des services sociaux du secteur tourisme. • Maintenir les caractéristiques naturelles et des services environnementaux comme base de la durabilité du tourisme. • Assurer l'adaptation du secteur tourisme aux CC en saisissant les opportunités.
SNCC	2012 Ministère de l'environnement	• Définir le cadre général de l'action de la Tunisie contre les CC. • Définir les mesures d'adaptation des secteurs clés en vue de consolider leur résilience vis à vis des CC.	• Mise en place des structures de gouvernance de l'action climatique • Mettre en œuvre les actions sectorielles (e.g. spécifique au tourisme) ou transversales (efficacité du bâtiment)
1er rapport	2014	• Etablir l'inventaire national des	• Etablir un état de référence qui permet de

[85] Les ouvrages de protection des ports et abris de pêche seraient particulièrement vulnérables à l'ENM ce qui engendrerait des coûts supplémentaires de gestion et de maintenance (coûts annuels occasionnés par l'ENM seraient de 0,13% du PIB, ils s'élèveraient à 0.63% du PIB si on tient compte des pertes économiques directes (BM, 2004).
[86] Ministère de l'Equipement et de l'Environnement, 2013.
[87] Près de 40% des plages et des côtes basses sont considérées comme moyennement vulnérables à très vulnérables à l'ENM (golfe de Hammamet (40% de ces plages), de Tunis (30%), les îles de Kerkennah (14%) et Djerba (24%) sont les plages les plus vulnérables.
[88] Dans le golfe de Hammamet par exemple, les surfaces risquant d'être annexées par la mer sont estimées à 4500 ha (1900 ha pour la sebkha de Sidi Khlifa, 1400 ha pour la Sebkha de Halk El Menjel et 1200 ha pour la sebkha de Skanès).
[89] Ministère de l'Equipement et de l'Environnement

biennal de la Tunisie-Convention cadre des nations unies sur les changements climatiques	MEATDD/ SEDD	émissions anthropiques de GES de par les différentes sources. • Bilan vis à vis du Protocole de Montréal (lignes directrices du GIEC (2006)) • Identifier les mesures d'atténuation des émissions anthropiques des GES. • Mettre en relief les progrès réalisés par la mise en œuvre des NAMAs (exploiter le potentiel d'atténuation des E-GES.	mesurer l'efficacité des mesures prises par les producteurs de GES en vue de réduire leurs émissions. • Mettre en place un système de Monitoring, Reporting et Vérification des E-GES. • Faciliter l'identification des besoins financiers, de transfert de technologies et de renforcement de capacités.
NDC	2015 MEDD	• Restauration de la côte touristique et protection des zones touristiques contre l'avancée de la mer. • Définition des régions climatiques et touristiques et adaptation de la division des circuits écotouristiques, • Développer une offre alternative et complémentaire au tourisme balnéaire (santé, culture, sport, environnement). • Promouvoir le concept d'hôtels écologiques.	• Aider le secteur du tourisme à améliorer la résilience de leur activité. • Réduire les pertes économiques dues aux dommages environnementaux liés aux CC ou amplifiés par ces changements. • Aider à optimisation la gestion des ressources en eau, l'espace et les services écosystémiques liés au secteur touristique et installation de mini-stations de dessalement d'eau de mer utilisant des énergies renouvelables.

2. Options politiques pour traiter de tels impacts

Elaboration des politiques et mesures et état d'avancement

La Tunisie a bénéficié de plusieurs cadres de coopération bilatérale et multilatérale en vue de mettre en place de son cadre stratégique pour la lutte contre les changements climatiques en général et pour l'adaptation du secteur (activités) du tourisme aux effets adverses (connus et/ou attendus) des changements climatiques. A ce titre, l'Agence de la coopération Allemande (GIZ), le programme des Nations Unies ainsi que la Banque Mondiale ont contribué financièrement et ont mobilisée une expertise adaptée pour appuyer la préparation et l'élaboration des différents documents stratégiques mentionnés dans la présente analyse.

Quelles sont les principales étapes suivies et quelle est l'étape du processus?

Documents stratégiques	Pilotage	Processus	Acteurs associés
Premier rapport biennal dans le cadre de la UNFCCC	MCE[90]	Le processus de préparation: - Mise en place d'un comité de pilotage pour le suivi et la coordination des travaux de préparation du premier rapport biennal (ce comité coordonné par le point focal CC. - Mise en place d'un groupe de travail chargé de la préparation de l'inventaire national des émissions de GES et des travaux sur l'atténuation.	- Principalement les institutions et les concernées par la problématique de l'atténuation en Tunisie en terme d'inventaire et mesures d'atténuation. - Regroupement de 3 sous-groupes sectoriels. 1: énergie et procédés industriels, 2: agriculture, forêt et utilisation des sols, 3 : déchets solides et liquides.
Stratégie Nationale de lutte contre les changements climatiques (SNCC)	MCE	Large processus de concertation[91] : Atelier **1**: appropriation de la thématique, et état des lieux. Atelier **2**: Evaluer la faisabilité des instruments pour la mise en œuvre de la politique climatique (multicritère). Atelier **3**: valider les instruments de mise en œuvre de la vision préférentielle, initier la préparation d'un plan d'accompagnement pour la mise en œuvre de ces instruments à travers l'identification des mesures d'accompagnement. Définition des responsabilités de mise en œuvre.	Un large processus de concertation impliquant l'ensemble des acteurs concernés. Les travaux ont été menés par un groupe d'experts nationaux et internationaux en prospective, vulnérabilité et adaptation, en atténuation, membre du GIEC changement climatique, en adaptation, En atténuation et finance carbone, en économiste et agroéconomiste et experts institutionnels.
Contribution déterminée au niveau national (NDC/UNFCCC)	MEDD	Les phases préparatoires de l'INDC ont été initiées en juillet 2014 avec le lancement d'une série d'ateliers de concertation réunissant les principaux acteurs impliqués dans le processus de changement climatique.	Les acteurs concernés par l'adaptation et l'atténuation des CC (institutionnels et non institutionnels, le secteur privé et experts de l'industrie et de l'énergie, les scientifiques et la société civile).
Stratégie nationale d'adaptation au changement climatique du secteur touristique (SNATCC)	MEATDD[92]	Large processus participatif avec la tenue de plusieurs ateliers de réflexion.	Tous les acteurs du tourisme, y compris les professionnels, le privé, les acteurs scientifiques, la société civile. Ce processus a été appuyé par l'Agence de coopération allemande.

Quels acteurs ont été impliqués, comment et à quel stade?

[90] Ministère chargé de l'environnement
[91] Trois rapports ont été produits : le rapport de diagnostic sur le changement climatique en Tunisie, la note de synthèse présentant les principales recommandations en matière de SNCC et le rapport final (SNCC)
[92] Ministère de l'Equipement, de l'Aménagement du Territoire et du Développement Durable

- La coordination des travaux sur les changements climatiques relève du **Ministère chargé de l'environnement**. Cette responsabilité concerne aussi la mise en œuvre de la CCNUCC et l'élaboration de la communication nationale, les rapports biennaux et l'INDC. Pour mener à bien les activités habilitantes ayant trait aux obligations de la Tunisie envers la CCNUCC et garantir l'appropriation nationale, l'approche retenue est celle de la concertation et la participation de toutes les parties prenantes concernées (institutions publiques et privées, ONG, université/recherche, … ministères, organismes, groupes de travail.
- **Comité National sur les Changements Climatiques** (CNCC) : Créé en 2000, il regroupe le point focal-CC (coordinateur) et les représentants de l'Agence Nationale pour la Maîtrise de l'Energie., le ministère de l'agriculture, l'Institut National de la Météorologie, l'Ecole Nationale des Ingénieurs de Tunis et une ONG. La mission du CNCC consiste à assurer le suivi des travaux sur les changements climatiques et la mise en œuvre de la CCNUCC. Le CNCC a été remplacé dans un premier temps par la Structure Focale-CC et à partir de 2005, d'autres organismes, structures et groupes de travail ont été chargés de poursuivre les travaux sur les CC.
- **Agence Nationale pour la Maîtrise de l'Energie (ANME) :** L'une des missions de l'ANME est de dresser l'inventaire des émissions de GES et de mener toutes les études portant sur l'atténuation dans le secteur de l'énergie. En collaboration avec le PNUD, l'ANME a aussi créé une Cellule d'Information sur l'Energie Durable et l'Environnement (CIEDE) qui a pour principal mandat la mise en œuvre de l'article 6 de la CCNUCC et le renforcement de capacités dans le domaine des CC.
- **Autorité Nationale Désignée (AND) : Le MAEDD** (décret N°2008-4114) a créé le 30 décembre 2008 le bureau national du Mécanisme du Développement Propre (MDP). Ce bureau est présidé par le ministre chargé de l'environnement et regroupe les institutions concernées par le MDP et la vente des unités de réduction certifiées de gaz à effet de serre (URCEs). La principale mission de l'AND consiste à approuver la contribution des projets au développement durable et faciliter la vente des URCEs.

Quelles sources et quelles données ont été considérées?

La réalisation des principaux documents stratégiques en rapport avec les effets des changements climatiques depuis 2010 a été menée sur la base des données issues de trois sources principales: (**i**) Les données produites par les secteurs eux mêmes (environnement, industrie, agriculture, tourisme, etc.). Certaines de ces données sont organisées dans des bases de données nationales (exemple: forêts), régionales ou locales soit couvrant plusieurs thématiques ou sont spécifiques (exemple : réseau d'observation météorologique[93]). (**ii**) Les données produites par la recherche scientifiques et menée dans le cadre de projets de recherche, des travaux de fin d'étude (thèse PhD, MSc, etc.) (exemple: érosion côtière). (**iii**) Les données des simulations, en particulier pour les scénarios d'évolution du climat (température et précipitation, élévation du niveau de la mer, consommation énergétique).

Document	Source
Bilan - GES	Secteur industriel et énergétique (Entreprises), forets et agriculture, déchets et autres (secteur expert)[94].
SNCC	Données des secteurs
NDC	Essentiellement les données de l'industrie, énergie, transport, déchets, agriculture et foresterie, l'habitat.
SNATCC	Essentiellement les données du secteur touristique et des modèles climatiques du rapport biennal.

[93] L'Institut National de la Météorologie (INM)[93]: (i) Densité du réseau d'observation météorologique et climatologique est satisfaisante dans le Nord et dans le Centre ; toutefois, elle est insuffisante dans le Sud-ouest. (ii) Des services climatologiques sont développés pour certains secteurs. (iii) La faible couverture radar ne permet pas d'avoir un système d'alerte précoce aux phénomènes extrêmes. (iv) Un projet de jumelage avec l'UE visant l'élaboration d'un plan stratégique a été formulé. Le plan stratégique est articulé autour de quatre grands axes: renforcer les capacités techniques, améliorer la gestion administrative et financière, renforcer les capacités à l'échelle régionale et améliorer la communication avec les partenaires. Des modélisation/simulations climatiques ont été utilisées pour compenser les insuffisances de donnés.

[94] Les estimations des émissions ont été conduites conformément au guide du GIEC 2006. Concernant les GES indirects (NOx, CO, COVNM et SO2), les méthodologies proposées par le guide EMEP/EEA 2013. Dans certains cas des indicateurs moyens de composition des intrants carbonés du secteur ont été utilisés.

3. Analyse croisée: options politiques et impacts climatiques

L'analyse de la pertinence et de la cohérence de l'action de la Tunisie pour lutter contre les changements climatiques est menée à partir de trois documents stratégiques (la stratégie nationale de lutte contre les changements climatiques, la stratégie d'adaptation du tourisme aux changements climatiques et la stratégie du secteur du tourisme).

Cependant dans le tableau de l'analyse (ci après), ne seront mentionnées que les deux premières stratégies, car la stratégie touristique de la Tunisie, même élaborée en 2012 ne contient d'importantes dispositions et/ou orientations qui concernent directement les changements climatiques. Cependant, la stratégie du secteur du tourisme souligne trois éléments clés de l'action contre les CC qui peuvent avoir des incidences directes sur le développement du tourisme et le maintien de sa compétitivité au niveau régional. Ces mesures sont liées (i) au risque/assurance contre les aléas climatiques, (ii) à la considération de la vulnérabilité lors de la planification et des aménagements des installations et des infrastructures touristiques et (iii) au développement du réseau interne pour le transport aérien et du rail.

Tableau 2. Tourisme et changement climatique "fiche d'analyse croisée"

Considère entièrement		*Considère faiblement*	
Considère les composantes clés		*Ne considère pas ou pas de connaissance précise*	

Areas of impact	**Policy A (CC)**		Stratégie nationale d'adaptation du secteur touristique	
Risques et assurance	• Assurance contre les aléas climatiques & Paiement des services écologiques		• Mieux exploiter le potentiel climatique en améliorant la gestion de la chaleur et en modifiant la répartition spatiale et saisonnière du tourisme	
Variabilité climatique	• Considérer la variabilité climatique comme base essentielle de la stratégie d'adaptation spécifique aux CC.		• Considérer la variabilité climatique dans la planification spatiale et temporelle dans le développement	
Transport aérien	• (2012-2016 & 2017-2021) • Réglementation sur l'efficacité énergétique		• Usage touristique du transport interne par rail et faire émerger un schéma et une planification de la desserte Euro-Méditerranéenne basée sur le rail offre "bas carbone"	
Energie	• Réglementation pour ouverture du réseau électrique national à la production EnR par le privé • Plan énergie/climat de territoire • Schémas de déplacement urbain • Transport ferroviaire vers les régions intérieures • Système national de quotas de réduction de GES (entreprises / régions)		• Réduire la vulnérabilité du tourisme aux prix de l'énergie, à la «contrainte carbone» en limitant sa dépendance des énergies fossiles et en réduisant ses émissions de CO2. • Renforcer le programme de mise à niveau des hôtels sur la composante de rénovation thermique et le développement de la production d'énergie solaire	
Pénuries d'eau	• Incitations à l'économie d'eau, à la réutilisation des eaux usées traitées et au capter l'eau pluviale • Nouveau schéma national d'aménagement prenant en compte les CC • Conseils National et Régionaux des Ressources Naturelles • Transformation du droit de propriété de l'eau en droit[95] d'usage • Modifications d'ouvrages existants, soumis à autorisation[96] et périmètre d'interdiction[97].		• Réduire la vulnérabilité du tourisme en limitant sa dépendance des ressources en en eau douce. • Renforcer la politique d'économie d'eau dans l'hôtellerie et les contrôles réglementaires. • Adapter les stations littorales pour réduire le risque lié au recul du trait de côte et à la submersion marine et modifier les règles d'urbanisme pour prendre en compte l'ENM et vérifier le respect de ces règles.	
Perte de la biodiversité	• Conseil National (CNRN)[98] & Conseils Régionaux des Ressources Naturelles (CRRN) • Système de tarification des eaux agricoles reflétant la rareté de la ressource • Incitations au développement des cultures d'exportation à faible impact		Réduire la vulnérabilité du tourisme tunisien en limitant sa dépendance aux ressources susceptibles de se dégrader (en priorité les plages et l'eau douce) et en valorisant des ressources moins vulnérables ;	
Patrimoine culturel	• Non considérés séparément, plutôt intégrés aux considération liées au tourisme (élévation du niveau de la mer et intrusions marines)		Le principe de tourisme durable impliquant la préservation des ressources naturelles, historiques et culturelles . Respectent les capacités de renouvellement des ressources qu'elles soient naturelles, sociales ou	

[95] Obligeant les utilisateurs à solliciter une concession à l'Etat qui fixe les priorités d'attribution (eau potable, agricole, industrielle et commerciale) et les modalités d'évolution des droits anciens

[96] Zone où tout travail de recherche ou d'exploitation, à l'exclusion des modifications apportées aux ouvrages déjà existants, doit être soumis à autorisation (Code - Eaux/Art. 15)

[97] Zone où l'Etat soumet à autorisation toute modification apportée sur les ouvrages existants et peut limiter leur débit, voire supprimer des prélèvements nuisibles à la conservation des ressources (Code des Eaux, Art. 13). Dans les cas où la conservation ou la qualité des eaux sont mises en danger par le l'exploitation

[98] Pour la planification de la ressource et arbitrage entre usages

			culturelles,.	
Déclin des paysages	• Nouveau schéma national d'aménagement prenant en compte les CC • Intégration des Exigences des CC dans les Plans d'Aménagement Urbain		Réduire la vulnérabilité du tourisme tunisien en limitant sa dépendance aux ressources susceptibles de se dégrader (en priorité les plages et l'eau douce) et en valorisant des ressources moins vulnérables ;	
Maladies à transmission vectorielle	• Dégradation des ressources en eau et du littoral, la submersion de terres avec ont des conséquences sur les activités socio-économiques (agriculture, tourisme, urbanisme, infrastructures portuaires etc.), des risques sanitaires liés à l'émergence de certaines maladies vectorielles.		Pas d'actions.	
Problématique des infrastructures	• Considérer la vulnérabilité et l'adaptation dans la régionalisation de la Tunisie • CC pris en compte dans le Schéma National d'Aménagement et Plans d'Aménagement Urbain • Les bâtiments et infrastructures tiennent compte[99] des risques climatiques (ne pas imposer des coûts supplémentaires prohibitifs).		Revoir la conception architecturale (pour les nouvelles constructions) en adaptant les conceptions traditionnelles	
Offre touristique/ visites			• Diversifier et renforcer l'offre (tourisme de découverte, de la santé et du bien-être, de fraîcheur" dans les régions de l'intérieur et montagneuses. • Etaler la saison touristique, développer et promouvoir l'offre intersaisons et hiver (modifier les rythmes quotidiens des activités) • Renforcer l'information touristique locale • Renforcer les marchés peu dépendants de l'aérien (fin de réduire la vulnérabilité à la conjoncture internationale en limitant les émissions de GES).	

[99] Par exemple en adoptant une loi sur l'obligation d'utiliser certains matériaux ou certaines techniques de construction