CLIMATE CHANGE IMPACTS ON THE BLUE ECONOMY IN MOROCCO:
Prospects for Jobs in Coastal Tourism
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Acknowledgments

This technical note aims to examine the potential impacts of climate change on coastal tourism jobs in Morocco. This note was prepared to inform a preliminary discussion with the government to strengthen coastal tourism’s climate resilience under the ongoing Blue Economy Program for Results (PforR) framework. This note may serve as technical input for the work of the Interministerial Commission for the Blue Economy to develop the blue economy strategy.

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The team would like to thank Ms. Siham Fellahi (co-coordinator of the Blue Economy Program, Ministry of Economy and Finance, government of Morocco) and Mr. Hassan Aboutayeb (Regional Development Corporation - tourism Micro, Small and Medium Enterprises- Souss Massa) for their partnership and technical input.

This study was funded by PROBLUE, a multi-donor trust fund housed at the World Bank, that supports the development of integrated, sustainable, and healthy marine and coastal resources.
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ICZM</td>
<td>Integrated Coastal Zone Management</td>
</tr>
<tr>
<td>INDH</td>
<td>National Initiative for Human Development Support Project</td>
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<tr>
<td>IOT</td>
<td>Input-Output Tables</td>
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<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
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<td>MSMEs</td>
<td>Micro, Small and Medium Enterprises</td>
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<tr>
<td>NDCs</td>
<td>Nationally Determined Contributions</td>
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<tr>
<td>NDM</td>
<td>New Development Model</td>
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<tr>
<td>PforR</td>
<td>Program for Results</td>
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<tr>
<td>SDR</td>
<td>Regional Development Corporation (<em>Société de Développement Régional</em>)</td>
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<tr>
<td>SESIA</td>
<td>Strategic Environmental and Social Impact Assessment</td>
</tr>
<tr>
<td>SIBE</td>
<td>Site of Biological and Ecological Interest (<em>Sites d'Intérêt Biologique et Ecologique</em>)</td>
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<tr>
<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
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EXECUTIVE SUMMARY

The government of Morocco is committed to unleashing the potential of its blue economy. The New Development Model underscores the importance of harnessing the potential of Morocco’s rich marine and coastal resources in the Mediterranean Sea and the Atlantic Ocean. Coastal areas are home to 81 percent of the country’s industry, contribute 59 percent of Gross Domestic Product (GDP), and provide 52 percent of jobs. Boosting the blue economy means enhancing the productivity of the existing blue sectors, such as coastal tourism and fisheries, as well as investing in new sectors, such as aquaculture and marine renewable energies, while sustainably managing marine and coastal resources.

Coastal tourism is a key economic driver in Morocco. In 2019, the tourism sector made a significant contribution of seven percent to the country’s GDP, and was a major source of foreign currency, accounting for 42 percent of service exports. International arrivals reached 13,109,000 and international tourism receipts reached US$ 9.95 billion in 2019. Transport made up around 25 percent of total spending. The importance of tourism as an employer cannot be overstated. In 2019, it provided 565,000 direct jobs, of which 300,000 were in coastal tourism. Agadir, Tangier-Tetouan, and Casablanca are the main touristic coastal areas. In the Souss-Massa region, coastal tourism—concentrated around Agadir—accounts for 70 percent of that region’s tourism demand.

Climate change poses a major and urgent threat to Morocco’s blue economy. Temperatures have been on the rise, with an observed average increase of 0.2°C per decade since the 1960s (above the global average). The government has acknowledged that coastal ecosystems are among the most vulnerable ecosystems in the country. Climate change impacts such as sea-level rise, coastal flooding, ocean warming, ocean acidification, and changing temperatures and rainfall patterns all affect blue sectors.

Coastal tourism is vulnerable to climate change impacts. Coastal erosion and coastal flooding could damage key tourism infrastructure. As weather conditions are a key resource for coastal tourism, high temperatures could reduce the attractiveness of these destinations. Forest fires and other extreme weather events would also deter tourists. Climate change can also trigger the spread of infectious diseases, a matter of great concern to tourists. However, it remains unclear how these impacts on climate change would affect jobs in the coastal tourism sector in Morocco.
Therefore, an analysis was conducted to examine possible climate change impacts on coastal tourism jobs in Morocco. This analysis aims to initiate a crucial discussion with the government to strengthen coastal tourism’s climate resilience under the ongoing Blue Economy Program for Results (PforR) framework, which supports the government in building the foundation of the government’s blue economy program. The results of the analysis could be considered by the Interministerial Commission for the Blue Economy as it develops the blue economy strategy for the country.

The analysis estimated inbound tourists’ spending structure in Morocco based on the experience of countries in the same climatic zone (for lack of relevant Moroccan data). Climate change impacts were then translated into losses of tourist visits—using tourists’ responses to the risk of wildfires and high temperatures. Losses in tourist spending led to changes in demand in Morocco. Input-output analysis was applied to estimate losses along the value chain of the coastal tourism-related sectors and job losses along the value chain. The share of beds in coastal and other regions has been used to differentiate coastal tourism from other tourism types in Morocco.

The analysis revealed a concerning projection: tourists’ expenditures could decline by 8–18 percent by 2035. This potential decline in spending could have a varying impact on the coastal tourism value chain. Restaurants and hotels would suffer the largest relative losses, followed by services for entertainment and the arts and the transport sector.

Coastal tourism could face a severe blow with a potential loss of up to around 32 percent of jobs. The accommodation and food segment of the coastal tourism sector was estimated to face the highest job losses: in excess of 32 percent under the upper bound of the scenario (see figure below). This alarming prospect is due to the labor-intensive nature of this segment. Small enterprises, often lacking the financial capacity to cope with large shocks, are particularly vulnerable. Previous studies have also indicated that women, youth, and low-income workers are more likely to lose employment when tourism is in a crisis.

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1 The Interministerial Commission has been established through a circular issued by the head of government (N3/2023). The Commission will serve as a horizontal and vertical coordination mechanism and involve coastal regions in the context of Morocco’s regionalization.
A paradigm shift is needed to move from traditional “sea, sun, and sand” tourism toward a more sustainable and resilient tourism model. To do so, Morocco could boost investments to build the resilience of the coastal tourism sector. This technical note suggests possible actions the government could take to prevent potential job losses associated with climate change. The government could consider those recommendations as part of implementing the Tourism Strategic Roadmap 2023–2026.
### RECOMMENDATIONS

<table>
<thead>
<tr>
<th>Policy and institutional actions:</th>
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<tr>
<td>Improve planning to enhance resilience of coastal tourism</td>
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| Implement integrated coastal zone management | Preparing regional integrated coastal zone management plans, which consider climate vulnerability assessments, could help improve the planning of coastal tourism development. |
| Promote participatory planning | A participatory planning approach could help strengthen vertical and horizontal coordination. Integrated planning tools could be used, such as integrated coastal zone management. |
| Invest in further developing ecotourism | Ecotourism products could be further developed to diversify the experience in coastal areas and link coastal tourism with tourism in inland regions. An action plan on ecotourism development could be considered. |
| Enhance access to finance and incentivize transition to sustainable business practices in coastal tourism | The government could provide direct finance, such as grants and incentives, to encourage tourism firms to develop sustainable tourism projects and products. |

| Investments: |  |
| Invest in developing climate-resilient coastal tourism |  |

| Build climate resilience and sustainability measures into the development of tourism infrastructure | New coastal tourism infrastructure should be planned, designed, and built with climate resilience measures. Other sustainability measures, such as water, energy and resource use efficiencies, should also be included in the infrastructure design. For existing coastal tourism infrastructure, climate adaptation action plans could be developed based on climate risk and vulnerability assessments. |
| Invest in grey and nature-based solutions to protect coasts | Both infrastructure-based and nature-based solutions could be used to increase coastal protection. |
**EXECUTIVE SUMMARY**

**Cross-cutting:**
*Broaden understanding of climate change impacts and bolster capacity for adaptation and response*

<table>
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<tr>
<th>Action</th>
<th>Description</th>
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<tr>
<td>Map tourism employment across the coastal tourism value chain</td>
<td>Mapping the coastal tourism value chain, including the informal sector and microenterprises, would help the government better understand the impact of climate change across the value chain.</td>
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<tr>
<td>Collect data on tourism expenditure and tourists’ responses to climate change impacts</td>
<td>The results of this study could be refined by collecting field surveys on: (i) expenditure data specific to coastal tourism in Morocco and (ii) tourists’ responses on different climate change impacts such as higher temperatures.</td>
</tr>
<tr>
<td>Strengthen data collection on coastal tourism’s environmental performance</td>
<td>The government could strengthen data collection and monitoring of coastal tourism’s environmental performance, building on the existing regional monitoring systems.</td>
</tr>
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<td>Enhance the capacity of tourism actors, including Micro, Small and Medium enterprises (MSMEs), to take climate-related actions</td>
<td>Climate actions need to be taken across the entire coastal tourism value chain. Given that MSMEs account for 85 percent of the value chain, capacity development of these actors is critical. In addition, a targeted approach is needed to strengthen the resilience of the most vulnerable tourism workers, such as women and youths.</td>
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The private sector will play a significant role in mitigating and adapting to the impacts of climate change. The private sector could take action to make their business net-zero. Examples of possible actions include the following: assessing its own carbon emissions; investing in decarbonization measures such as installing energy-efficiency appliances; designing tourism activities that generate lower emissions; and raising awareness and communicating about sustainability and climate initiatives. Public-private partnerships are a key element, particularly in investing in enhancing the resilience of tourism infrastructure.

Investing in climate change actions will lead to better development outcomes. Climate-resilient coastal tourism will support socioeconomic development, create new jobs, and drive economic growth. The government has an opportunity to build resilience by mainstreaming climate actions as part of implementing the Tourism Strategic Roadmap 2023–2026. Actions need to be taken now to move toward a climate-resilient and inclusive development model.
Le Gouvernement du Maroc s'emploie à exploiter pleinement le potentiel de son économie bleue. Le nouveau modèle de développement montre à quel point il est important de tirer le meilleur parti du potentiel des ressources marines et côtières abondantes que le Maroc recèle dans la mer Méditerranée et dans l’océan Atlantique. Les zones côtières concentrent 81 % de l’industrie du pays, contribuent à hauteur de 59 % au produit intérieur brut (PIB) et génèrent 52 % des emplois. Donner un coup d’accélérateur à l’économie bleue signifie accroître la productivité des secteurs de cette économie qui existent déjà — tels que le tourisme côtier et la pêche —, et investir dans de nouveaux secteurs comme l’aquaculture et les énergies marines renouvelables tout en assurant une gestion durable des ressources marines et côtières.

Le tourisme côtier est un moteur économique majeur au Maroc. En 2019, le secteur du tourisme a apporté une contribution non négligeable de 7 % au PIB du pays, et a constitué une source majeure de devises étrangères représentant 42 % des exportations de services. Le nombre d’arrivées internationales s’est établi à 13 109 000 touristes et le tourisme international a généré 9,95 milliards de dollars de recettes en 2019. Les transports ont concentré près de 25 % des dépenses totales. On ne saurait trop insister sur l’importance du tourisme en tant que source d’emplois. En 2019, le secteur du tourisme a généré 565 000 emplois directs, dont 300 000 emplois dans le tourisme côtier. Agadir, Tanger-Tétouan et Casablanca sont les principales zones touristiques côtières du pays. Dans la région du Souss-Massa, le tourisme côtier, qui se développe principalement autour d’Agadir, concentre 70 % de la demande touristique de la région.

Le changement climatique constitue une menace majeure et urgente pour l’économie bleue au Maroc. Les températures ne cessent de s’élever, avec une augmentation moyenne observée de 0,2 °C par décennie depuis les années 1960 (supérieure à la moyenne mondiale). Le gouvernement marocain a reconnu que les écosystèmes côtiers sont parmi les plus vulnérables du pays. Les effets néfastes du changement climatique tels que l’élévation du niveau de la mer, les inondations côtières, le réchauffement des océans, l’acidification des océans et l’évolution des températures et des régimes pluviométriques affectent les secteurs de l’économie bleue.

Le tourisme côtier est vulnérable aux effets du changement climatique. En effet, l’érosion côtière et les inondations pourraient endommager les principales infrastructures touristiques. Étant donné que les conditions météorologiques constituent une ressource essentielle pour le tourisme côtier, des températures élevées pourraient réduire l’attrait de ces destinations. Les
incendies de forêt et d’autres phénomènes climatiques extrêmes pourraient également dissuader les touristes. Le changement climatique peut aussi entraîner la propagation de maladies infectieuses, une question qui préoccupe au plus haut point les touristes. Cela dit, on ne sait pas encore comment ces répercussions du changement climatique affecteront les emplois dans le secteur du tourisme côtier au Maroc.


L’analyse a estimé la structure des dépenses des touristes qui arrivent au Maroc en se fondant sur l’expérience des pays de la même zone climatique (faute de données marocaines pertinentes). Les effets du changement climatique ont ensuite été traduits en des pertes de visites touristiques — en utilisant les réponses des touristes au risque d’incendies de forêt et de températures élevées. Les pertes de dépenses touristiques ont induit des changements dans la demande au Maroc. L’analyse des échanges interindustriels a été appliquée pour estimer les pertes d’un bout à de la chaîne de valeur des secteurs liés au tourisme côtier, tout comme les pertes d’emplois le long de la chaîne de valeur. La part des lits dans les régions côtières et dans les autres régions a été utilisée pour différencier le tourisme côtier des autres types de tourisme au Maroc.

L’analyse a révélé une projection préoccupante, à savoir que les dépenses des touristes pourraient baisser de 8 % à 18 % d’ici à 2035. Cette baisse potentielle des dépenses pourrait influer de diverses façons sur la chaîne de valeur du tourisme côtier. Les restaurants et les hôtels pourraient subir les pertes relatives les plus importantes, suivis par les services de divertissement et les arts, ainsi que par le secteur des transports.

Le tourisme côtier pourrait subir un coup dur avec une perte pouvant culminer à 32 % des emplois. Selon les estimations, c’est le segment du secteur du tourisme côtier relatif à l’hébergement et à la restauration qui devrait enregistrer les pertes d’emplois les plus importantes, de l’ordre de plus de 32 % dans la limite supérieure du scénario (voir figure ci-dessous). Cette perspective alarmante tient à la nature à forte intensité de main-d’œuvre de ce segment. Les petites entreprises sont particulièrement vulnérables, car la capacité financière pour faire face à des chocs importants leur fait généralement défaut. Des études précédentes ont également indiqué que la probabilité de perdre leur emploi est plus forte chez les femmes, chez les jeunes et chez les travailleurs à faible revenu lorsque le tourisme est en crise.

Un changement de paradigme s'avère donc nécessaire pour passer du tourisme traditionnel « mer, soleil et sable » à un modèle de tourisme plus durable et résilient. Pour y parvenir, le Maroc pourrait relancer les investissements afin d’accroître la résilience du secteur du tourisme côtier. La présente note technique décrit des mesures que le gouvernement marocain pourrait prendre afin de prévenir d’éventuelles pertes d’emplois induites par le changement climatique. Le gouvernement pourrait tenir compte de ces recommandations dans la mise en œuvre de la feuille de route stratégique pour le tourisme 2023-2026.
### RECOMMANDATIONS

<table>
<thead>
<tr>
<th>Mesures de politique générale et institutionnelles :</th>
<th>Améliorer la planification pour renforcer la résilience du tourisme côtier</th>
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<tr>
<td><strong>Appliquer une gestion intégrée des zones côtières</strong></td>
<td>La préparation de plans régionaux de gestion intégrée des zones côtières tenant compte des évaluations de la vulnérabilité climatique pourrait contribuer à une meilleure planification du développement du tourisme côtier.</td>
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<td><strong>Encourager une planification inclusive</strong></td>
<td>Une approche inclusive de la planification pourrait aider à renforcer la coordination verticale et horizontale. Des outils de planification intégrée pourraient être utilisés, par exemple la gestion intégrée des zones côtières.</td>
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<tr>
<td><strong>Investir dans le développement de l’écotourisme</strong></td>
<td>Les produits de l’écotourisme pourraient être développés plus en substance pour diversifier l’expérience dans les zones côtières et lier le tourisme côtier au tourisme dans les régions intérieures du pays. Un plan d’action sur le développement de l’écotourisme pourrait être envisagé afin de soutenir la mise en œuvre de la feuille de route stratégique.</td>
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<td><strong>Élargir l’accès au financement et favoriser la transition vers des pratiques commerciales durables dans le tourisme côtier</strong></td>
<td>Le gouvernement pourrait fournir un financement direct, sous forme par exemple de subventions et de mesures incitatives, pour inciter les entreprises touristiques à développer des projets et des produits touristiques s’inscrivant dans la durée.</td>
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<thead>
<tr>
<th>Investissements :</th>
<th>Investir dans le développement d’un tourisme côtier résilient au changement climatique</th>
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<td><strong>Faire en sorte que les mesures de résilience climatique et de durabilité soient prises en considération lors de la mise en place des infrastructures touristiques</strong></td>
<td>Les nouvelles infrastructures touristiques côtières devraient être planifiées, conçues et construites avec des mesures de résilience climatique. D’autres mesures de durabilité telles que l’efficacité dans l’utilisation de l’eau, de l’énergie et des ressources devraient aussi être incluses dans la conception des infrastructures. Pour les infrastructures touristiques côtières qui existent déjà, l’on pourrait formuler des plans d’action d’adaptation au climat sur la base d’évaluations des risques climatiques et de la vulnérabilité.</td>
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<td><strong>Investir dans des solutions « grises » et fondées sur la nature pour protéger les côtes</strong></td>
<td>Les solutions fondées sur les infrastructures et les solutions fondées sur la nature pourraient être toutes les deux utilisées pour améliorer la protection côtière.</td>
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**Domaines transversaux :**

*Mieux comprendre les effets du changement climatique et renforcer les capacités d'adaptation et d'intervention*

| Cartographier l'emploi touristique dans la chaîne de valeur du tourisme côtier | La cartographie de la chaîne de valeur du tourisme côtier, y compris le secteur informel et les microentreprises, pourrait aider le gouvernement à mieux comprendre les effets du changement climatique sur l'ensemble de la chaîne de valeur. |
| Collecter des données sur les dépenses touristiques et sur les réponses des touristes aux effets du changement climatique | Les résultats de cette étude pourraient être affinés en collectant des enquêtes de terrain : i) sur les données sur les dépenses spécifiques au tourisme côtier au Maroc ; et ii) sur les réponses des touristes concernant les divers effets du changement climatique tels que les températures plus élevées. |
| Renforcer la collecte de données relatives aux résultats obtenus par le tourisme côtier en matière d'environnement | Le gouvernement pourrait renforcer la collecte de données et le suivi des performances environnementales du tourisme côtier en s'appuyant sur les systèmes de suivi régionaux qui existent déjà. |
| Renforcer la capacité des acteurs du tourisme, y compris les micro-, petites et moyennes entreprises (MPME), à prendre des mesures liées au climat | Des mesures climatiques doivent être prises dans l'ensemble de la chaîne de valeur du tourisme côtier. Étant donné que les MPME représentent 85 % de la chaîne de valeurs, le développement des capacités de ces acteurs s'avère primordial. En outre, une approche ciblée paraît nécessaire pour renforcer la résilience des travailleurs du tourisme les plus vulnérables tels que les femmes et les jeunes. |

**Le secteur privé jouera un rôle important dans l'atténuation des effets du changement climatique et dans l'adaptation à ces effets.** Le secteur privé pourrait prendre des mesures pour atteindre l'objectif de zéro émission nette de gaz à effet de serre. Voici quelques exemples d'actions possibles : évaluer ses propres émissions de carbone ; investir dans des mesures de décarbonation telles que l'installation d'appareils écoénergétiques ; concevoir des activités touristiques qui génèrent moins d’émissions ; sensibiliser et communiquer sur les initiatives en faveur de la durabilité et du climat. Les partenariats public-privé constituent un levier important à actionner, surtout lorsqu'il s'agit d’investir dans l’amélioration de la résilience des infrastructures touristiques.
L’investissement dans des actions de lutte contre le changement climatique se soldera par de meilleurs résultats sur le plan du développement. Le tourisme côtier résilient au changement climatique soutiendra le développement socio-économique, créera de nouveaux emplois et dopera la croissance économique. Le gouvernement a la possibilité de renforcer la résilience en intégrant des mesures climatiques dans le cadre de la mise en œuvre de la feuille de route stratégique pour le tourisme 2023-2026. Des mesures doivent être prises dès à présent pour évoluer vers un modèle de développement participatif et résilient au changement climatique.
ملخص تنفيذي

تلتزم الحكومة المغربية بإطلاق إمكانات الاقتصاد الأزرق. ووفقًا للنموذج التنموي الجديد أهمية الاستفادة من إمكانات الموارد البحرية والساحلية الفنية للمغرب في البحر المتوسط وال.MONSOON، المناطق الساحلية موطن 81% من الصناعة في المملكة، وتسهم بنسبة 59% من إجمالي الناتج المحلي، وتتوفر 52% من قطاعات الزراعة والاقتصاد الأزرق. وتعرف الإقتصاد الأزرق بزيادة إنتاجية القطاعات الزرقاء الحالية، على سبيل المثال، السياحة الساحلية وصيد الأسماك، فضلاً عن الاستثمار في قطاعات جديدة، مثل تربية الأحياء البحرية ومشروعات الطاقة المتجددة البحرية، وفي الوقت نفسه إداراً الموارد البحرية والمحلية نحو مستدام.

وتعد السياحة الساحلية محركًا رئيسيًا في النشاط الاقتصادي في المغرب. وفي عام 2019، ساهم قطاع السياحة بنسبة 27% من إجمالي الناتج المحلي، 59% من الصناعة في المملكة، وتسهم بنسبة 81% من القيمة المضافة لل заводادي والبحر المتوسط والمحيط الأطلسي. والمناطق الساحلية موطن 30% من فرص التشغيل. وتعزيز الاقتصاد الأزرق يعني زيادة إنتاجية القطاعات الزرقاء الحالية، على سبيل المثال، السياحة الساحلية وصيد الأسماك، فضلاً عن الاستثمار في قطاعات جديدة، مثل تربية الأحياء البحرية ومشروعات الطاقة المتجددة البحرية، وفي الوقت نفسه إداراً الموارد البحرية والمحلية نحو مستدام.

ويشكوّن تغير المناخ خطراً كبيراً ووجهًا على الاقتصاد الأزرق في المغرب. ووجد أنه درجات الحرارة أخذت في الارتفاع، مع زيادة ملحوظة في المتوسط قدرة 3.2 درجة مئوية لكل 10 سنوات منذ ستينيات القرن الماضي (أعلى من المتوسط العالمي). وقد أقرت الحكومة بأن النظم الإيكولوجية الساحلية هي من بين النظم الإيكولوجية الأكثر تأثرًا بالمناخ في المملكة. وفي حالة تغير المناخ مثل ارتفاع مساح البحر، والقيمة المضافة للمجال الساحلي، وارتفاع درجة حرارة الطقس، وانخفاض الموارد الطبيعية على القطاعات الزرقاء.

وتعد السياحة الساحلية متوسط مخاطر تغير المناخ. ويمكن أن يؤدي تغير المناخ إلى تأثيرات، مثل تغير المناخ على الصيد، وانخفاض مساح البحر، والقيمة المضافة للمجال الساحلي، وانخفاض الموارد الطبيعية على القطاعات الزرقاء.

ولذلك، تم إجراء تحليل لدراسة الأثر الممكن التغير المناخ على فرد المدخلات والمخرجات لتقدير الخسائر للقطاعات. وقد تم تطبيق تحليل المدخلات والمخرجات لتقدير الخسائر للقطاعات في المغرب.

وتمكن التقديرات المتاحة التي تتعلق بتأثير التغير المناخ على فرد المدخلات والمخرجات لتقدير الخسائر للقطاعات في المغرب.


ملخص تنفيذي

تم تقديم هذه اللجنة من خلال قرار صادر عن رئيس الحكومة (رقم 2013). ويتعلق هذا التحليل بتغطية اقتصادية وسياسية، وستُعد البيانات المبهرة في سياق الجهوية البحرية.
وكشف التحليل عن توقع مثير للقلق: قد ينخفض إقليل الساحليين بنسبة 19.8% بحلول عام 2035. وقد يكون لهذا الانخفاض المحتمل في الارتفاع مفتاحًا على سلسلة القيمة الخاصة بالسياحة الساحلية. وستتكبد المطاعم والفنادق أكبر الخسائر النسبية، تليها خدمات الترفيه والفنون وقطاع النقل.

وقد تواجه السياحة الساحلية ضرورة قاسية مع احتمال فقدان ما يصل إلى 32% من الوظائف. وتشير التقديرات إلى أن قطاع خدمات الإقامة وخدمات الغذاء والمشروبات في قطاع السياحة الساحلية سيسافر أعلى معدل وقدن للوظائف بما يزيد على 36% في ظل الحد الأعلى للسيناريو (انظر الشكل أدناه). ويرجع هذا الاحتمال المثير للقلق إلى طبيعة هذه القطاعات كثيفة العمالة. وتعرض المشروبات ومنشآت الأعماق الصغيرة، التي غالباً ما تتكسر إلى الفترات المالية اللازمة لمواجهة الصدمات الكبيرة، للمخاطر بشكل خاص. وأشارت دراسات سابقة أيضاً إلى أن النساء والشباب والعمال منخفضي الدخل هم أكثر عرضة لفقدان الوظائف عندما يتعرض قطاع السياحة لأزمة.

وتتعرض المشروعات ومنشآت الأعمال الصغيرة، التي غالباً ما تفتقر إلى القدرات المالية اللازمة لمواجهة الصدمات الكبيرة، للمخاطر بشكل خاص. وأشارت دراسات سابقة أيضاً إلى أن النساء والشباب والعمال منخفضي الدخل هم أكثر عرضة لفقدان الوظائف عندما يتعرض قطاع السياحة لأزمة.

وتمنى هذا أن يكون لغزنا النتائج الأخرى التي تظهر في هذه التوصيات في إطار تنفيذ خارطة الطريق الاستراتيجية للسياحة.
توصيات

الإجراءات على مستوى السياسات والممارسات:

تعزيز إدارات المناخ والحافظة على الحياة البحرية

يمكن أن يساعد إعداد خطط جهوية للإدارة المتكاملة للمناطق الساحلية، تأخذ في الاعتبار تقنيات قابلية لتغيير المناخ والاعتدال لمشروعات عديدة في حماية سلامة المناطق الساحلية.

تخصيص التخطيط التشاركى

يمكن أن يساعد نهج التخطيط الشامل في تحويل المناخ إلى إجراءات تنوعية وطموحة.

اتخاذ إجراءات الآن للمضي قدم في مجال الطاقة، وتصميم آلات التعظيم الاستدامة، وتقسيم الصرف الصحي، وتصميم أجهزة التعظيم في المناطق الساحلية، وحماية البيئة في المناطق الساحلية، وتشخيص شركات الطاقة والمياه.

الاستدامة:

الاستدامة في حقول مراعاة والحلول البيئية

يمكن استخدام كل من الحلول القائمة على البنية التحتية والحلول الطبيعية لزيادة حماية السواحل.

الاستدامة في الحقول المراعية والحلول البيئية

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الاستدامة في حقول مراعة والحلول البيئية

الاستدامة في حقول مراعا...
1. INTRODUCTION

1.1 BACKGROUND

The blue economy drives socioeconomic development in Morocco. Coastal areas, hosting 81 percent of industries, contribute 59 percent of Gross Domestic Product (GDP) and provide 52 percent of jobs. Historically, the blue sectors, such as fisheries, coastal tourism, and maritime shipping have played a significant role in Morocco’s economy. Recently, new blue sectors have been emerging, creating new job and development opportunities. Examples of such emerging sectors include aquaculture, and marine renewable energy.

The government of Morocco is committed to unleashing the potential of the blue economy in line with the vision of the New Development Model (NDM), launched in 2021. The blue economy means sustainably using ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystems. The NDM calls for further developing existing blue sectors, investing in emerging sectors and creating coastal clusters to attract investment and generate wealth. The World Bank is supporting these government’s efforts through the Blue Economy Program for Results (PforR-P172926). The PforR assists the government in establishing the foundation of the new government-led blue economy program, which has three pillars: (i) national food security; (ii) economic development and job creation; and (iii) natural resource management.

Coastal tourism plays an important role in boosting Morocco’s blue economy. In 2019, coastal tourism provided more than 300,000 jobs. The government is committed to investing in this sector to enhance its competitiveness in the post-pandemic market. In this regard, the government has recently put forward the Tourism Strategic Roadmap 2023–2026. The roadmap seeks to attract 17.5 million tourists, generate DH 120 billion in foreign exchange earnings, and create 80,000 direct and 120,000 indirect jobs by 2026. Under the Blue Economy PforR

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5 Coastal tourism refers to tourism activities taking place in coastal and maritime areas.
program, the government is also investing in and providing support to women-led and youth-led micro, small and medium enterprises (MSMEs) to create more and better jobs in the sector.

Coastal tourism needs to adapt to the changing climate. Climate change effects, including rising temperature, extreme weather events, ocean warming and acidification, will all impact on the sector either directly or indirectly. These biophysical changes could have socioeconomic implications. A key socioeconomic impact of climate change could be the impact on jobs. Understanding climate change impact on jobs would help the government plan and prepare options and further build the resilience of this sector.

Against this background, this technical paper aims to analyze potential effects of climate change in coastal tourism jobs in Morocco. The paper focuses on analyzing the impact on jobs in different segments of the sector and along the sectors’ value chain (Chapter 2). Based on this analysis, this paper presents recommendations to help the government formulate measures to mitigate impacts or adapt to possible changes (Chapter 3). The results of the analysis are expected to inform a discussion with the government to strengthen coastal tourism's climate resilience under the framework of the ongoing PforR. Moreover, this brief could serve as a technical input for the preparation of the blue economy strategy, led by the Interministerial Commission for the Blue Economy.

1.2 TOURISM SECTOR IN MOROCCO

TOURISM SECTOR OVERVIEW

Tourism, including coastal and inland tourism, is a major sector driving Morocco’s economic growth. GDP from tourism and inbound tourist consumption decreased after 2014 but rebounded after 2016/2017. In 2019, the sector directly contributed DH 82.1 billion, equivalent to 7.1 percent of total GDP (Figure 1). The tourism sector is one of the main sources of foreign currency, accounting for 42 percent of service exports in 2019. Domestic tourism has also been increasing and total tourism consumption reached DH 45 billion in 2019. Local tourists accounted for 30 percent of all nights spent in tourist accommodation. Tourism increases tax revenues in Morocco, leads to profits and added value for enterprises of all sizes and any level of formality—over and above profits generated by handicrafts and services that primarily target tourists.

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9 Tourism is an economic activity with impacts across various sectors in statistical classifications. These do not establish a single economic sector called tourism. Despite recommendations of the United Nations and the World Tourism Organization (International Recommendations for Tourism Statistics 2008), measurements often differ slightly between countries, depending on country-specific emphasis and detail. Countries with high tourism influx have historically developed their own classifications and currency conversion procedures. Typically, adjustments for purchasing power in the country contribute to difficulties when attempting cross-country comparison. This study uses data provided by the Ministry of Tourism, Air Transport, Handicrafts and Social Economy and complemented the datasets with global data.

Morocco’s tourism sector has demonstrated considerable resilience. International tourism has been steadily growing over the years and in 2019 the total number of international arrivals reached 13,109,000 (Figure 2). Then the sector was severely hit by the pandemic and this had severe implications for the micro, small and medium-size enterprises (MSMEs) that account for more than 80 percent of the sector. In 2023, however, the tourism sector has shown a strong rebound, driving the growth of the national economy overall. The number of international arrivals in the first half of 2023 increased by 92.3 percent as compared to the previous year, surpassing the pre-pandemic level by more than 20 percent. Overnight hotel stays increased by 86 percent and travel receipts increased by 69 percent, reaching almost seven percent of GDP.

Figure 1: Growth of the tourism sector in Morocco

Figure 2: Number of international arrivals in Morocco

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11 As previous footnote.
Tourism is a major source of jobs in Morocco. In 2019, the tourism sector provided 565,000 jobs. It should be noted, however, that the informal economy plays a significant role in Morocco's tourism and hospitality industry.15 Although data are limited, a recent World Bank study did show that informal employment accounts for 77.3 percent of the country's workforce.16

Europe has been the main market for tourism in Morocco. France, Spain, United Kingdom, Germany and Belgium have been the traditional markets for tourism in Morocco. In 2018, France, Spain and Germany took a 57.7 percent share of the market.17 New markets, such as the United States and China, are also developing.18

COASTAL TOURISM

Coastal tourism currently accounts for no more than 30 percent of total tourism in Morocco, despite its significant potential.19 It provides more than 300,000 jobs across all age groups (Figure 3).20 The jobs in coastal tourism pay relatively well and thus the sector offers above-average jobs in terms of benefits for wealth generation.21 Agadir, Tangier-Tetouan and Casablanca are the main coastal regions with large tourism activities. In the Souss-Massa region, coastal tourism—highly concentrated in Agadir—accounts for 70 percent of that region’s tourism demand.22 In 2021, Agadir and Taghazout together hosted roughly 1.7 million overnight stays, while Casablanca hosted a further 1.7 million, and Tangier-Assilah 800,000 (Figure 4).23 Hotel capacity is being increased in these coastal destinations as tourists increase. Between 2014 and 2021, hotel capacity increased 21 percent in Agadir and Taghazout, 69 percent in Casablanca and 47 percent in Tangier-Assilah.24 Morocco’s coastal tourism has associated activities such as cruises and marine sports. Morocco’s coasts also offer opportunities for a range of marine sports, including surfing, windsurfing, jet-skiing, sailing, diving, sport fishing, and paragliding.

16 World Bank (2023). Informality and Inclusive Growth in the Middle East and North Africa
**Figure 3:** Blue tourism employees by age

![Pie chart showing Blue tourism employees by age](image)

Source: World Bank staff based on 2018 ENE.

**Figure 4:** Nights spent in tourist accommodation establishments in main coastal tourism destinations in Morocco.

![Line chart showing nights spent in tourist accommodation](image)

Source: The Ministry of Tourism, Air Transport, Handicrafts and Social Economy.

**Europe has been the main market for coastal tourism in Morocco.** In the Souss-Massa region, where coastal tourism in Agadir is the main offer, France and Germany are the two main markets, together accounting for 51 percent of the market share.\(^\text{25}\) Historically, coastal tourism

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in Agadir largely depends on tourism operators and the international tourists tend to use package deals.

**Coastal tourism is characterized by its seasonality.** Traditionally, summer has been the main season for coastal tourism, driven by the European summer holiday seasons. This seasonal aspect leads to instability in terms of employment and income at the local level. Climate change—with extended periods of high temperature and changing precipitation patterns—could alter this seasonality. Meanwhile, the development of domestic tourism could decrease seasonality by spreading the tourism seasons.

### 1.3 OVERVIEW OF CLIMATE CONTEXT IN MOROCCO

**Morocco is a “climate hotspot”**. Temperatures have increased since the 1960s, with an observed average increase of 0.2 °C per decade, which is above the global average. Precipitation has a high degree of variability, but overall, the trend has been on the decline. By the end of the century, rainfall will decline by 20 percent on average. The frequency and intensity of droughts are expected to increase. Increasing temperature and changing rainfall patterns are projected to limit availability of water resources for socioeconomic activities.

**Climate change is a major threat to the blue economy in Morocco.** Sea-level rise, ocean warming, ocean acidification and changing temperature and rainfall patterns affect the blue sectors that rely on marine and coastal resources. Saltwater intrusion into groundwater further limits the availability of freshwater resources in coastal areas.

**Coastal erosion and coastal flooding are of particular concern.** By 2030, approximately 42 percent of the coastline in Morocco could be subject to a high risk of coastal erosion and floods. The average yearly coastal erosion rate is 0.14 centimeters on the Mediterranean coast and 0.12 centimeters on the Atlantic coast. The estimated annual asset destruction from coastal erosion equates to 0.4 percent of GDP. Ports are under threat from sea-level rise: the World Bank’s climate profile for Morocco points out that if sea levels rise 0.86 m by 2100, Tangier Bay is projected to lose 99.9 percent of its port infrastructure and 63 percent of the city’s industrial zone. By mid-century, sea level-rise might make operating cruise terminals increasingly difficult. As the coastal areas are the center of socioeconomic activities, hosting 65 percent of

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28 HCP (n.d) Prospective Maroc 2030. AsAs above.
the population, climate change impacts in coastal areas would pose a significant threat to the nation’s overall development.32

**Coastal tourism is one of the key impacted sectors.** Tourism, like agriculture, is a climate-sensitive sector. Tourist activities in this context entail sports on and in the water, with and without ships, boats, or boards, as well as activities on the beach. All of these are intricately intertwined with the coastal infrastructure, the water quality, and the climate. Climate change impacts every aspect: it physically impacts natural and human-made environments, involving beach erosion, damage to coastal infrastructure, and changes in land habitats. Such changes can then affect the attractiveness and quality of coastal destinations, not least because the biodiversity and ecosystems of coastal areas are important attractions for tourists. Marine environments become less attractive with the loss of native species, any increase of invasive exotic species, and the degradation of landscapes.

**More imminent losses are losses of comfort due to thermal stress and heat waves.** Rising temperatures and heat waves can reduce the comfort of tourists, especially during the summer season. This can affect the overall tourist experience and satisfaction. Some studies have indicated that the Mediterranean region could be “too hot” for tourism by the 2030s.33 The increased threat of wildfires near hotels and resorts jeopardizes tourists’ psychological and physiological well-being. All these effects taken together will result in socioeconomic impacts, because changes in tourist behavior and preferences will soon have a knock-on effect on tourist arrivals (numbers) and expenditure.

**Recognizing the potential impacts, the government of Morocco has already started taking action to mitigate and adapt to climate change.** In the updated Nationally Determined Contributions (NDC) under the United Nations Framework Convention on Climate Change (UNFCCC), the government sets a 2030 target of greenhouse gas emissions down by 18.3 percent from the baseline level. In the NDC, coastal areas are identified as one of the most vulnerable ecosystems, along with oases and mountains. The NDC includes a specific mitigation measure for the tourism sector to implement an energy efficiency program.34

**To tap into the full potential of the blue economy, Morocco needs to boost investments in building climate resilience.** According to the Morocco Country Climate and Development Report (CCDR)35, it needs to invest around $78 billion to become resilient and attain low-carbon status by the 2050s. Enhancing the resilience of coastal areas is a high-priority climate action, given the sector’s importance to the national economy. In this regard, the coastal tourism sector should make changes to reduce its own greenhouse gas emissions while at the same time enhancing its resilience to climate change impacts.

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8 CLIMATE CHANGE IMPACTS ON THE BLUE ECONOMY IN MOROCCO: PROSPECTS FOR JOBS IN COASTAL TOURISM
2. CLIMATE CHANGE IMPACTS ON TOURISM RELATED JOBS IN MOROCCO

2.1 GENERAL MODELING APPROACH

The assessment of potential damages from progressive climate change is a focus of ongoing research and academic studies. Macroeconomic approaches relate GDP losses to temperature increases —examples are the original damage function used in the Nordhaus model DICE or its modifications by Weitzman, introducing tipping points at a certain temperature.36 Bottom-up approaches try to deduce future climate damages from damage data, collected, for example, by large insurance or re-insurance companies.37 In the tourism sector, survey-based approaches try to elicit tourists’ reactions to climatic changes in their destination country. Examples can be found for mountain and seaside landscapes, and, notably, ecotourism in Mexico.38

The approach followed in this analysis combines survey data39 on tourists’ reactions to warming under different IPCC scenarios with data on tourists’ expenditure and the Input-Output Table of Morocco. Figure 5 gives an overview. Monetary flows from tourists’ consumption are allocated to economic sectors and interpreted as demand for goods and services from the respective sector. Climate change events, such as higher temperatures, increasing risk of wildfires or extreme weather events lead to destination switches and losses of tourists’ consumption. The magnitude of this effect is based on surveys and published studies from regions with similar tourist profiles.

38 Deason et al., “Tourist Perceptions of Climate Change Impacts on Mountain Ecotourism in Southern Mexico.”
39 The survey data are taken from Arabadzhyan et al. (2021) and Georgopopoulos et al. (2019).
This negative impact is transmitted along the value chain of the respective sector, leading to multiplier effects, monetary losses and eventually job losses. The share of beds in coastal and other regions has been used to differentiate coastal tourism from other tourism types in Morocco.

**Figure 5: Modeling approach**

- **Receipts**
  - Inbound tourism receipts structure today
  - Based on OECD data
  - Combined with World Bank Data on tourism receipts

- **Losses**
  - Losses of tourism receipts under Climate Change
  - Loss estimates based on survey results, share of tourists who would choose another destination in response to climate change effects.

- **IO**
  - Propagation of losses along the value chains, applying Leontief equation

- **Jobs**
  - Resulting employment loss per impact and sector

**Tourism is not a single economic sector in any classification of economic activities.** Its cross-cutting nature led to specific satellite accounts, complementing the national accounts of a country. When they travel, individuals tend to demonstrate spending behavior that contrasts with the everyday local household expenditure. A large amount of tourists’ consumption—or receipts from tourists—goes into accommodation, food, transport, and recreational activities: into the holiday itself, so to speak. But tourists also spend money on goods and services broadly typical of everyday home life: they buy manufactured goods (not necessarily souvenirs), they buy groceries, or snacks (not necessarily from a restaurant), they go to the hairdresser, or buy a dress or a shirt.

**Indirect effects along the tourism value chain result in multipliers for job losses.** These sectors themselves buy intermediate goods produced by other sectors, an economic interlinkage that is perfectly captured by so-called Input-Output Tables (IOT). Input-Output Tables are symmetric matrices connecting deliveries and demand of economic sectors and allowing for estimates of indirect effects of demand shocks along a sector’s value chain. Employment factors derived from international statistics can then be used to translate these responses to demand shocks into job losses. The labor input needed to produce goods or services varies across economic sectors, potentially leading to uneven job losses from shocks.

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2.2 TOURISM RECEIPTS AND CONSUMPTION STRUCTURE

Morocco has had stable incomes from tourism, interspersed with phases of loss. Relatively recent losses were during the period after the financial crisis in 2008, then the Arab Spring and its aftermath, and then the worst downturn, occasioned by the pandemic. After each downturn over the past 15 years, the country has managed to regain or surpass earlier peaks. Figure 6 shows how tourist receipts developed over the past 15 years. It is broken down into spending on transport versus spending on all other purposes, plus the growth rate of total international receipts. Transport makes up around 25 percent of total spending (airplane tickets being relatively expensive compared to the overall cost of living in Morocco). However, precisely which sectors benefit most from the remaining 75 percent cannot be inferred from the available data. Disaggregated data on tourism receipts by expenditure category, are not provided for Morocco.

Figure 6: Tourism receipts in Morocco

To understand the structure of tourists’ spending in Morocco beyond travel costs, data for countries similar in geography and tourist profiles are used as a proxy (in the absence of direct field survey data in Morocco). Structural information is obtained from OECD statistics for several countries in the same climatic zone; these have similar tourist profiles in terms of activities and countries of origin, as well as similar climate challenges. In terms of climate and activities, Spain (particularly the Canary Islands) and Portugal (with Madeira) come closest. Like Morocco, those islands also mostly host European tourists. In Morocco the largest tourist group is from France, while in Spain the largest is from the UK, followed by Germany. The islands also are typically reached by plane, hence travel costs account for a high proportion of total spending. The data do not reveal what proportion of these flows is accounted for by emigrants who have dual citizenship and are visiting relatives in the ancestral country. In both Spain and Morocco, tourists spend roughly one quarter on accommodation, one fifth on food, another fourth to fifth on transport, and the rest on sport, recreation, arts, culture, and shopping. For the remainder of this study, the consumption structure of tourists in Spain is used as a proxy.
With this allocation of tourist spending to economic sectors it is easy to define tourist value chains. Economic sectors supply goods and services to other sectors, to their own sector, and to domestic and foreign consumers and firms. They use imported and domestic inputs for their production of goods and services. Payments for inputs, taxes and wages need to equal output produced, while total demand for intermediate and final products from abroad and home needs to equal sectoral output produced. The data to describe these mechanisms are collected in a symmetric matrix, called the Input-Output Table (IOT). With the help of this matrix, economy-wide effects of demand shocks can be easily computed.

Datasets for Input-Output Tables are compiled nationally and internationally, frequently in a sporadic or piecemeal manner. IOTs are quite often compiled by the National Statistical Offices or Bureaus of an individual country, but often are outdated, and inconsistent with international data. Global input-output datasets fill this gap, although they sometimes lose some granularity in the effort to produce consistent datasets for all countries within the same set of classifications and sectors. Nevertheless, the following simulation uses data from release 057 of the GLORIA global environmentally extended multi-region input-output (MRIO) database (Lenzen et al. 2022), constructed in the Global MRIO Lab (Lenzen et al. 2017). A salient advantage of this dataset is its availability for very recent years.

The tourism value chain covers several different economic sectors. Following the Guidelines to Input-Output Analysis for Tourism,41 hotels and supplementary accommodation, restaurants, entertainment, sport and attractions, retail, and domestic as well as international transport services can all be denoted as tourism sectors in IOTs. Obviously, none is restricted to consumption only by inbound tourists, being available for consumption by domestic consumers and domestic tourists too. However, to define the impact of climate change on the economy of Morocco, tourism expenditures will be separated from domestic consumption, and international tourism receipts will underpin the climate damage assessment. Figure 7 shows the different spending and consumption profiles of foreign tourists and domestic consumption.

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41 Economic and Social Commission for Asia and the Pacific, “Guidelines to Input Output Analysis for Tourism.”
2.3 CLIMATE CHANGE – EFFECTS, DAMAGES AND TOURIST RESPONSES

2.3.1. KEY CLIMATE CHANGE HAZARDS FOR COASTAL ACTIVITIES FROM THE TOURISTS’ PERSPECTIVE

Research shows that for coastal tourism, particularly beach tourism, the relevance of various climate factors is perceived differently compared to general sightseeing tourism. For example, surveys have found that temperature is ranked lower in importance than the absence of rain and cloud cover. Studies have also found that rain and high winds significantly impact beach attendance. However, there is an ideal temperature for beach tourists—and a threshold of unacceptability, albeit a hotter one than for other tourism markets such as urban or mountain tourism. Furthermore, as a tourist, your ideal temperature is influenced by your country of origin. Europeans, for example, have a slightly higher ideal temperature of up to 32°C than do respondents from Canada and the USA. Unacceptable temperatures also vary across different groups: > 33 °C for tourists from Canada, > 36 °C for those from the USA and northern Europe, and as high as > 39 °C for tourists from Greece (Georgopoulou et al. 2019).
Morocco is prone to temperature increases beyond this threshold. Climate change scenarios see the Projected Maximum of Daily Maximum Temperatures increase over time. The indicator represents the projected average single-day maximum value of the daily maximum temperatures over the data aggregation period. It is typically used to illustrate heat risks and explain how to survive the hottest part of the day, offering an insight into extreme heat conditions. Figure 8 shows the development of the indicator under two scenarios, presenting a worst-case scenario (RCP 8.5, in red) running above the scenario aligned with achieving the Paris targets (RCP 2.4, in blue). Both scenarios see the maximum temperature exceed 40°C in the next decade.

**Figure 8: Projected Maximum of Daily Max Temperatures, in °C**

Wildfires are a threat, in fact Morocco already has a high wildfire hazard, meaning there is a greater than 50 percent chance of encountering weather conditions that could trigger and sustain significant wildfires resulting in loss of life and property each year. Damage can occur not only from direct flames and radiation but also from ember storms and low-level surface fires. In extreme fire weather events, strong winds and debris can weaken infrastructure. Climate change is expected to increase the frequency of fire weather in the region, with higher temperatures and more variable rainfall. Areas already prone to wildfires may experience longer fire seasons and more risky days when fire could spread due to extended periods without rain. The severity of fires may also increase. Expanding wildfire zones may well encompass areas currently classed as low-risk for wildfires.

One additional burden for the owners of touristic premises is the increasing necessity of cooling their buildings. Figure 9 shows the additional cooling degree days for Morocco under different scenarios in 2040. The number of cooling degree days is the weighted sum of days per year on which temperatures reached or stayed above 22°C. This measure sheds light on the additional need for air conditioning in hotel rooms, theaters, and restaurants. It is strongly correlated with the need for additional electricity, and with additional costs for the owners of the premises.
2.3.2. TOURIST RESPONSES TO A CHANGING CLIMATE

Tourists’ responses to climate change have been researched for almost two decades. As evidence mounted that the period 2011–2020 was around 1.1°C warmer than 1850–1900, and snow cover and glacier loss, algae bloom, and extreme weather events occur more often, the tourism locations realized they will need to adapt, or suffer increasing losses. Many tourists, especially Europeans, flock to the coastal areas during the summer months to escape the colder weather at home. Tourist responses can be elicited either from past behavioral changes after certain events or directly based on surveys, choice experiments or other valuation methods. For the islands near Africa known as Macaronesia (the Azores, Madeira, Canary Islands and Cabo Verde), for instance, a H2020 research project has elicited tourist responses and projected behavioral change in the face of several potential climate challenges. Because the Macaronesian islands have a similar latitude to Morocco, and in parts a similar climate, the results from the tourist surveys on the Canaries and Madeira are used as a proxy for tourists’ responses to climate change in Morocco.
An average of 68.8 percent of surveyed tourists said they would change destination if their destination became uncomfortably hot, with less attractions. Many tourists reported that they would change location if at risk of experiencing a wildfire (69 percent) and if it became uncomfortably hot (68.3 percent) (Figure 10). The disappearance of beaches and deteriorating cultural heritage would prompt comparatively fewer tourists to seek another destination. The highest perceived threat is the spread of infectious diseases, followed by losses of marine wildlife. If we take an unweighted average over all categories, 69.9 percent of all Madeira tourists will change destination, as will 67.8 percent of visitors to the Canaries.

Due to the uncertainty of climate change scenarios, long-term effects of climate change and global climate policies, upper and lower bounds for the tourist responses are simulated. Some climate change effects will occur on a comparatively longer time horizon, for example sea-level rise and the destruction of beaches and marine infrastructure. Since the method used to estimate job losses is based on IOTs, and hence assumes constant production structures, it is better suited for short- to mid-term estimates. The simulations of job losses from climate change will hence refer to 2035. Moreover, the simulations will provide an upper boundary and a lower boundary for tourist losses and job losses, to reflect the uncertainty of human behavior, climate change and the development of carbon price policies. Importantly, if the international community started to tax aviation fuels—to curb flights—this would hurt the sector significantly, since most tourists in Morocco arrive by plane. The upper boundary takes the average of all effects and across both islands, for coastal international tourists and arrives at a loss of 18 percent. Projections from climate models foresee a three percent temperature increase for Morocco in the next decade. Since the upper comfort zone of most beach tourists has already
been reached, this will feel uncomfortable for most Northern European visitors. Around the years 2031/2032, predictions show that the 40°C mark will be surpassed. If possible, eight percent of tourists will travel at a different season if and when the temperature becomes uncomfortably high. This share is assumed as the lower boundary of tourism losses.

These estimates are in line with other estimates from the literature using top-down approaches or risk assessment tools. Dogru et al. (2019) use econometric analysis to show that tourism receipts are even more vulnerable to climate change than GDP. Dellink et al. (2019) use a macro computable general equilibrium (CGE) model to show sectoral and regional economic consequences of climate change to 2060, looking at agriculture, energy, tourism, and health globally and by region. Tourism losses of GDP were around 0.5 percentage points in the Middle East and North Africa region (MENA), which translates into losses of tourism receipts of around eight percent, matching our lower bound. Vrontisi et al. (2022) arrive at higher estimates for losses from tourism, with around 30 percent of tourism receipt losses.

### 2.4 RESULTS

Under the upper and lower bound scenario, tourists’ expenditures decline by 8–18 percent, leading to different impacts along the tourism value chain. Restaurants and hotels have the largest relative losses, followed by arts and entertainment, and transport—the three sectors composing tourism (Figure 11). Other economic sectors along the value chain suffer losses, namely industry and crafts producing goods that are bought by tourists, agriculture, selling less produce, and, to a lesser extent, public and private services.
Figure 11: Changes in output by sector in response to changing tourist demand (percentage compared to reference).

Sectors differ by labor intensity, leading to higher or lower relative job losses in different sectors. This is particularly evident in the service sector, where a small loss of output leads to a significant loss of jobs. In accommodation and food, the largest job losses are to be expected, a decrease of more than 32 percent under the upper bound of the scenario (Figure 12). The aggregate numbers mask the underlying enterprise structure of the respective sector—in other words, the smaller players forced out of business because they lack the financial capacity to cope with large shocks.
Enterprises with less than 10 employees comprised 86 percent of all enterprises in Morocco in 2019. Of all workers in MSMEs, 34 percent are in very small enterprises or micro-enterprises. Micro enterprises are highly vulnerable, because they struggle to access finance, or even information, to become more resilient. A vendor selling tourist goods, such as handicrafts or other souvenirs, will lose much of their livelihood when facing losses of up to 20 percent, and might need to go out of business altogether. More than 23,000 MSMEs can be found in the accommodation and food sector. This group includes small street vendors of snacks and beverages, and also hotels and accommodation unaffiliated to large international chains. More than 45,000 enterprises are MSMEs in warehousing and transport, comprising taxi enterprises, deliveries, and lately increasingly location-based gig workers, such as Careem drivers in Casablanca, Rabat, or Tangier.
Morocco, like other states in the MENA region, has low female labor force participation (fLFP). The fLFP rate was 23 percent before the COVID-19 pandemic and fell to 20 percent on average in 2021. It is highest in the 24–54 age group, but even here does not exceed 29 percent. The situation is reflected in the low shares of females employed in nearly all sectors. The highest share can be found in agriculture and household services, followed by the health sector and real estate. Hotels and restaurants belong to the few sectors with a share of female workers above 20 percent. If these opportunities are lost, overall female labor force participation could fall. On the other hand, health services will be in higher demand under climate change scenarios and hence provide more job opportunities for women.
3. CONCLUSIONS AND RECOMMENDATIONS

Morocco needs to invest more to develop climate-resilient coastal tourism and prevent potential loss of jobs in the sector. The analysis showed that tourists’ expenditures could decline by between eight percent and 18 percent by 2035. Around 32 percent of jobs in coastal tourism could be lost. The accommodation and food segment of coastal tourism was estimated to face the highest job losses. Job losses in coastal tourism, especially in hotels and restaurants, could negatively affect female labor force participation. It is thus important to address climate risks to move toward a more inclusive socioeconomic development.

A paradigm shift is needed to move away from the traditional “sea, sun and sand” tourism toward a more sustainable and resilient tourism model. Historically, coastal tourism has been characterized by massive tourism projects, and few sustainable tourism projects. The environmental impacts of such a tourism development model have been severe. Any new model needs to be socially sustainable and benefit local communities. Some studies suggest that the profits from coastal tourism have not been sufficiently captured by the local economy. While tourism infrastructure development is typically led by the public sector, international players are often predominant in the transportation segment, and among tour operators.

The government has already started shifting toward a sustainable tourism model. The government has adopted Law 80-1423, which considers the sustainability of tourism establishments. Sustainability criteria will be explicitly expressed in the regulations that implement this law. Although the data collection process presents hurdles that must be overcome, regional monitoring systems using sustainability indicators are reported to have been

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launched. The Vision 2020 strategy also embraced sustainability (Box 1) and the Moroccan Charter for sustainable tourism has been developed. Building on this experience, the newly launched Tourism Roadmap 2023–2026 also highlights sustainable tourism as one of the five cross-cutting elements.

**Box 1: Vision 2020**

Vision 2020 sought to strengthen the sector by creating 200,000 new beds, offering 470,000 new direct jobs, generating revenue of DH 140 billion and tripling domestic tourism by 2020. The strategy aimed to diversify tourism geographically, moving away from the concentration in Marrakesh and Agadir. It had six flagship programs, notably the Azur 2020 program, which focused on the seaside offer. The Azur 2020 program took over from Plan Azur, which was an investment project that the government launched in 2001 to achieve Vision 2010. The Azur program focuses on developing integrated smart coastal tourism; it has invested in previously overlooked coastal areas such as Saidia, Lixus, Mazagan, Mogador, Taghazout, and Plage Blanche. Vision 2020 embraced sustainability and has a project in Ouarzazate to develop the first carbon neutral destination in Africa. With the new Tourism Strategic Roadmap 2023–2026 in place, the government has an opportunity to build on the experience and lessons learned from Vision 2020 to enhance climate resilience of the coastal tourism sector.

The blue economy provides an opportunity to boost sustainable coastal tourism. The blue economy brings together different blue sectors to plan, develop, and manage marine and coastal areas in an integrated manner. Coastal clusters could be developed around coastal tourism, such as by bringing together activities around ports, yachting, marine sports, hotels, museums, and cultural heritage sites. The government could reimagine tourism in a more sustainable, resilient, and inclusive manner, moving away from the traditional mass beach tourism.

In moving forward, the government has an opportunity to mainstream climate actions when implementing the Tourism Strategic Roadmap 2023–2026. The roadmap embraces sustainability and there are opportunities to integrate mitigation and adaptation actions in the

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sector, in line with the National Climate Plan for the 2030 horizon.\textsuperscript{52} In this regard, the following recommendations were identified for the government to consider as part of the implementation of the Strategic Roadmap.

**POLICY AND INSTITUTIONAL ACTIONS: IMPROVE PLANNING TO ENHANCE RESILIENCE OF COASTAL TOURISM**

**Develop and implement integrated coastal zone management**

In accordance with Law 81-12 related to the coastline,\textsuperscript{53} regional integrated coastal zone management (ICZM) plans need to be developed, adopted, and implemented in all coastal regions. In preparing these regional ICZM plans, environmental and socioeconomic vulnerabilities need to be examined. The World Bank’s climate and disaster risk screening assessments\textsuperscript{54} could be a useful tool in understanding climate vulnerabilities. These regional ICZM plans would inform the development of coastal tourism, for example by identifying high risk-zones for coastal erosion and coastal flooding. The identification of high-risk areas will allow decision-makers to redirect infrastructure development away from those areas. The ICZM process would help balance interests across different sectors and promote the participation of stakeholders for long-term planning. As such, ICZM plans would serve as a planning vehicle to operationalize the blue economy strategy, which is being developed by the government.\textsuperscript{55} The government can build on the experience of the ICZM for the Rabat-Salé-Kénitra region and continue the development and implementation of regional ICZM plans.

**Promote participatory planning**

As Morocco advances the regionalization process, it is recommended to strengthen a participatory approach in planning tourism development. The participation of regional authorities will be key for ensuring vertical coordination between the national and subnational levels. Under the framework of the PforR, the government is strengthening vertical coordination with two pilot coastal regions to support the development of coastal clusters. The government already has long-standing experience of participatory approaches, including under the National Initiative for Human Development Support Project (INDH)\textsuperscript{56} to further strengthen participatory planning. Planning tools such as the Strategic Environmental and Social Impact Assessment (SESIA) could be used to support participatory planning. The establishment of the Interministerial Commission for Tourism as envisaged in the Tourism Strategic Roadmap


\textsuperscript{53} Article 6.

\textsuperscript{54} See https://climatescreeningtools.worldbank.org/

\textsuperscript{55} The Government will develop the blue economy strategy through the Interministerial Commission for the Blue Economy, which was set up by circular N3/2023.

\textsuperscript{56} The Bank supported this initiative through INDH project, which was implemented from 2006 to 2011. The project aimed to improve inclusiveness, accountability and transparency of decision-making and implementation processes at the local level to enhance use of social and economic infrastructure and services by poor and vulnerable groups.
2023–2026 would give additional impetus for enhancing coordination between the national and subnational actors.

**Invest in further developing ecotourism**

Morocco has a high potential for developing ecotourism. Morocco has 11 national parks and 154 Sites of Biological and Ecological Interest (SIBEs). Ecotourism products could be further developed to diversify the experience in the coastal areas as well as to link coastal tourism with other nature-based activities, including in national parks and in SIBEs. An action plan for developing ecotourism could be considered as a tool to support the implementation of the Strategic Roadmap. Such an action plan could include support to MSMEs in developing and marketing alternative products.

Regions that focus on ecotourism could benefit from a return to traditional building styles to enhance thermal comfort and sustainability. Morocco has always had a hot and arid climate and has consequently developed a vernacular architecture likely to withstand challenging climatic conditions. Large resorts and huge hotels consume large amounts of water and energy to operate and stay cool. By contrast, traditional architecture, such as riads or kasbahs built in cities, are energy efficient and said to be able to withstand heat waves. Moreover, they can be built and renovated by local construction companies and small enterprises.57

**Enhance access to finance and incentivize transition to sustainable business practices in coastal tourism**

The government could provide direct finance, such as grants, as well as incentives (for example, taxes, loans, and tax breaks) to encourage tourism enterprises to develop sustainable tourism projects and products and enhance their climate resilience. Such projects could include renovation of existing infrastructure to improve energy and water efficiency, and to improve the protection of infrastructure to guard against or withstand coastal floods and extreme weather events. Public–private partnerships could be used to leverage private financing for such investments as climate-resilient infrastructure development or nature-based solutions. The government has already started supporting ecotourism projects under the INDH.58 The MSMEs Souss-Massa’s incubator program by the Moroccan Agency for Tourism Development (Société Marocaine d’Ingénierie Touristique, SMIT) also supports ecological initiatives such as to install solar panels (Box 2). Building on these experiences, the government could consider including projects that would incentivize climate actions by tourism enterprises as part of the range of projects under the Tourism Strategic Roadmap 2023–2026.

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57 https://doi.org/10.48399/IMIST.PRSR/amjau-v4i1.33301
Box 2: Climate action in the Souss-Massa region

The Souss-Massa region, Morocco’s key beach tourism destination, is vulnerable to climate change, given its geographical location and its climatic conditions, which are influenced by the Atlantic Ocean, the Mediterranean Sea, and the Sahara Desert. In view of its climate vulnerabilities, the region has undertaken proactive steps to address climate change. In 2018, it developed Morocco’s first Territorial Plan to combat climate change (PTRC). The PTRC contains a range of mitigation and adaptation projects.59 The total investment required for 36 priority projects are estimated to be DH 507.41 million (US$ 52.5 million).60 For the coastal areas, the PTRC presents two priority projects: (i) prepare and implement a plan for integrated coastal zone management for the whole region; and (ii) improve knowledge of climate change affecting the fisheries sector and regularly monitor oceanographic parameters.

To further build its resilience to climate change, the Souss-Massa region could consider taking the following actions:

Further develop ecotourism products, combining beach tourism with other activities

For example, the tourism sector in the region could work with the forestry sector in Agadir—which is managing the Souss-Massa National Park—to develop new offers combining tours in the park with beach tourism. The coastal tourism operators could also work with local fishing communities. Authentic cultural and culinary experience offers could be developed to benefit both tourists and local communities. Such offers could include learning about the marine environment with fishers from a fishing boat and visiting local fish markets.

Widely communicate about climate and sustainability initiatives in the region

The region can use digital platforms to compile data and communicate widely about the climate and sustainability initiatives taken by the coastal tourism sector. Existing platform such as “Visit Agadir”61 could be used to showcase actions that are being taken by hotels, restaurants, and tourism operators, to attract travelers who wish to travel sustainably, and encourage mitigation and adaptation actions by other players in the sector. The regional development corporation (SDR) for tourism MSMEs is already planning to establish a regional labeling system for tourism MSMEs, including criteria on sustainability practices.62 The list of labeled MSMEs could be communicated widely to increase the visibility of those entities and stimulate further actions to build climate resilience within the sector.

(continued)

61 https://visitagadir.com/en/
62 This activity will be supported by the following World Bank project: Accelerating Blue Economy Development in the Kingdom of Morocco (P179612).
Box 2 (continued)

Set up an incentive mechanism for the tourism actors to invest in mitigation and adaptation actions

The region can set up an incentive mechanism to finance or co-finance initiatives and projects to build climate resilience in the coastal tourism sector. The SDR for Tourism MSMEs is starting to support MSMEs in installing solar panels, as in Agadir at the Surf Academy. Grants and other financing could be provided to incentivize and support tourism actors’ initiatives such as to increase energy efficiencies and to enhance the use of recycling water.

INVESTMENTS: INVEST IN DEVELOPING CLIMATE-RESILIENT COASTAL TOURISM

Build climate resilience and sustainability into tourism infrastructure

New coastal tourism infrastructure should be planned, designed, and built with climate resilience measures as well as other sustainability measures. Climate-resilient infrastructure should withstand, respond to, and recover rapidly from disruptions caused by climatic conditions.\(^{63}\)

To build climate-resilient infrastructure, climate vulnerability needs to be assessed to identify risks and plan measures to address those. Management measures (for example, using adaptive management to address uncertainties) and structural measures (such as building sea walls) could be used to build climate-resilient infrastructure.\(^{64}\) Measures to reduce carbon emissions and enhance water, energy, and resource use efficiencies can be integrated into the design of infrastructure. For example, tourism infrastructure could integrate renewable energy-sources such as solar power. Environmental and Social Impact Assessment (ESIA) is a useful tool to identify site-specific measures to enhance climate resilience and reduce environmental impacts of new coastal tourism infrastructure development.

For existing coastal tourism infrastructure, climate action plans could be developed to plan adaptation actions. Modeling and assessing possible climate impacts on key existing coastal tourism infrastructure could help identify necessary management and structural measures.

Invest in grey and nature-based solutions to protect coasts

Defending against beach loss protects natural and cultural resources. Coastal protection will involve installing breakwater blocks, reinforcing corniches and refilling gaps in the beaches regularly. Nature-based solutions, including the restoration of dunes and the preservation of wetlands, could also be used to protect coastal areas (Box 3). These actions require data-based prioritization to plan interventions as well as the participation of communities. As several cultural

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\(^{63}\) OECD (2018). Climate-resilient Infrastructure.

\(^{64}\) OECD (2018). As previous footnote.
heritage sites are found at the coast, such as the Medina of Essaouira, coastal reinforcement and protection would benefit both coastal tourism and cultural tourism activities. Under the Blue Economy PforR, the National Agency of Water and Forest (ANEF) has already been working on building coastal resilience through the restoration of coastal forests and fixation of coastal dunes. These efforts could be further supported, especially in vulnerable areas, to enable long-term adaptation planning.

Box 3: Developing the resilience of coastal tourism in Senegal

The World Bank supported the government of Senegal in addressing coastal vulnerability and developing a sustainable tourism model in Saly through the Senegal Tourism and Enterprise Development project. This project was implemented in line with the government’s Integrated Coastal Zone Management Plan. Under the component on sustainable tourism development, the project supported the restoration of 375,000 square meters of Saly beach, and the installation of 19 groins and breakwaters to mitigate erosion. It is estimated that the beach restoration activities under the project prevented a loss of US$ 30 million that hotel closures and job losses would otherwise have caused. The beach restoration also helped at least nine hotels to remain open and to invest in improving their facilities.

CROSS-CUTTING: BROADEN UNDERSTANDING OF CLIMATE CHANGE IMPACTS AND BOLSTER CAPACITY FOR ADAPTATION AND RESPONSE

Map tourism employment across the coastal tourism value chain

A mapping of tourism jobs throughout the tourism value chain in Morocco is not readily available. The mapping needs to be done to better describe the structure and size of coastal tourism enterprises. Improving the understanding of the value chain, including the informal sector and microenterprises, would enhance knowledge on the impact of climate change on coastal tourism jobs across the value chain. Furthermore, such mapping would help strategize value chain development and assist in planning necessary training and capacity development programs to strengthen climate resilience, based on the types and sizes of enterprises and their workers.


Collect data on tourism expenditure and tourists’ response to climate change impacts
Collecting field data on tourists’ expenditure per category in Morocco would improve the accuracy of the estimates presented in this study. It is thus recommended that on-site surveys be conducted to collect expenditure data in coastal tourism sites. In addition, it is recommended that surveys be conducted in key coastal destinations to elicit the responses of tourists to different climate change impacts such as higher temperature, increased wildfires, and potential occurrence of infectious diseases. These data could be stored in the well-established database under the Tourism Observatory67 to better understand climate change impacts on coastal tourism.

Strengthen data collection on coastal tourism’s sustainability
The government could strengthen data collection and monitoring of coastal tourism’s sustainability performance. Such data could include socioeconomic and environmental indicators such as carbon emission, waste management and tourism impact on local communities. In addition, the tourism sector could work with other sectors such as the Department of Sustainable Development and the Department of Maritime Fisheries to better understand the interlinkages between tourist activities and the status of the marine and coastal ecosystems. The blue economy portal, which is currently being developed by the Ministry of Economy and Finance, could be used to help integrate these sectoral data to support integrated decision-making for the blue economy.

Enhance the capacity of tourism actors, including MSMEs, to take climate-related actions
The government has an opportunity to integrate climate actions as part of the training and human capacity development program envisaged under the Tourism Roadmap 2023–2026. Through the training program, the government could encourage climate actions across the entire tourism value chain, especially for MSMEs. Given that most of Morocco’s tourism businesses are classified as MSMEs and have fewer than 10 employees, it is crucial for the government to develop the capacity of these enterprises. Smaller enterprises tend to have less capacity to implement adaptation measures (Box 4). Supporting these actors to build resilience would be necessary for adapting coastal tourism to the changing climate context, thereby protecting jobs in coastal tourism.

Such training would deepen the understanding among tourism enterprises of climate change as well as actions that they could take. For example, rising temperature could impact the occupational safety and health of workers, especially those who work outdoors. They may be more likely to experience heatstroke and thus they need to be trained to take preventive measures. The training could also encourage tourism establishments to prepare their climate action plans, which could include actions such as enhancing energy efficiencies; using renewable energy, such as with solar panels; reusing wastewater for gardens; and reducing the use of single-use plastics.

In designing the training program, a targeted approach needs to be taken to strengthen the resilience of the most vulnerable coastal tourism workers, including women and young people. Studies have indicated that women, youth, and low-income workers are more likely to lose employment when tourism is in a crisis, as was the case during the COVID-19 pandemic.68 It is recommended that a training program be designed around their specific needs.

67 See https://www.observatoiredutourisme.ma/
Table 1: Summary of recommendations to build climate resilience of the coastal tourism sector

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<th>Policy and institutional actions: Improve planning to enhance resilience of coastal tourism</th>
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<tr>
<td>Implement integrated coastal zone management</td>
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<tr>
<td>Promote participatory planning</td>
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<tr>
<td>Invest in further developing ecotourism</td>
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<tr>
<td>Enhance access to finance and incentivize transition to sustainable business practices in coastal tourism</td>
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</tbody>
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<table>
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<tr>
<th>Investments: Invest in developing climate-resilient coastal tourism</th>
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<tbody>
<tr>
<td>Build in climate resilience and sustainability measures in developing tourism infrastructure</td>
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<tr>
<td>Invest in grey and nature-based solutions to protect coasts</td>
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</tbody>
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<tr>
<th>Cross-cutting: Broaden understanding of climate change impacts and bolster capacity for adaptation and response</th>
</tr>
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<tbody>
<tr>
<td>Map tourism employment across the coastal tourism value chain</td>
</tr>
<tr>
<td>Collect data on tourism expenditure and tourists’ responses to climate change impacts</td>
</tr>
<tr>
<td>Strengthen data collection on coastal tourism’s environmental performance</td>
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<tr>
<td>Enhance the capacity of tourism actors, including Micro, Small and Medium enterprises (MSMEs), to take climate-related actions</td>
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</table>

The government needs to work closely with the private sector to build climate resilience in coastal tourism. The private sector will play a significant role in mitigating and adapting to climate change impacts. The private actors, including hotels, restaurants, and tourism operations, can take a range of measures to build climate resilience and make their businesses net-zero (Box 4). These actions could include the following:

- Assess own carbon emissions and monitor performance;
- Invest in decarbonization measures such as installing solar panels and using energy-efficiency appliances;
- Design lower emission tourism activities, such as bike tours;
- Raise awareness of and engage travelers on sustainable initiatives, such as nature restoration activities; and
- Communicate and discuss own sustainable practices to attract tourists who are seeking sustainable travel options.
Public-private partnerships are a key instrument, especially for financing tourism infrastructure projects, and provide opportunities for embedding energy and resource use efficiency in the design.

**Morocco stands at the crossroads in its development process.** Investing in climate change actions not only reduces environmental and socioeconomic impacts but also could lead to better development outcomes. Decisions need to be made now to take actions and prevent potential long-term job losses and other negative impacts of climate change in the coastal tourism sector. By investing in building resilience of coastal tourism as part of the Tourism Strategic Roadmap 2023–2026, Morocco would have more opportunities to boost its blue economy, sustainably managing its rich and unique marine and coastal ecosystems.

**Box 4: Case study: Climate change adaptation measures taken in the hotels of Alexandria, Egypt**

Alexandria is a major tourism destination located on Egypt’s north coast. It has the country’s largest harbor. Hotels, yacht docks, and seaside facilities have been constructed along the coastline. The city is vulnerable to climate change and facing risks of sea-level rise and coastal submersion. By 2100, 6.5 million people are projected to move out of Alexandrina due to coastal flooding. To examine the current adaptation efforts by hotels in Alexandria, Abou Kamar et al. (2023) conducted a survey in 36 hotels.

The results showed that the hotels are already using a variety of adaptation measures. Among the four types of adaptation measures (technical, managerial, policy and awareness raising), the technical adaptation measures were the most applied by the hotels in Alexandria (Table 2). Many hotels have improved their insulation and ventilation to adapt to heat waves and reduce the energy required for air conditioning. Measures included the following: using energy-efficient windows; applying double insulation in walls, ceilings, and floors; maximizing the use of natural light and using windows or skylights for enhancing ventilation. Many hotels are also using water conservation measures and reusing water. The results also indicated that larger hotels with more than 100 rooms and four or five stars had a wider range of adaptation measures as compared to smaller hotels with fewer than 100 rooms.

(continued)

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### Table 2: Adaptation measures used in the surveyed hotel in Alexandria

<table>
<thead>
<tr>
<th>Types of adaptation measures</th>
<th>Measures</th>
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</table>
| Technical measures          | - Improving hotel building insulation and natural ventilation  
- Reducing the energy consumption for cooling, heating, and ventilation  
- Optimizing building materials to withstand severe storms or heavy rains during winter  
- Expanding the drainage systems for heavy rainfall during winter  
- Planting a wall of trees and other plants to reduce wind force  
- Improving the efficiency of water use and building additional water storage capacity  
- Reinforcing beaches and coastal areas using natural or artificial barriers  
- Creating emergency plans and procedures for evacuation |
| Managerial measures         | - Suggesting safe activities for customers during and after severe weather events  
- Carrying out hotel operations in an environmentally sustainable manner  
- Preparing both immediate and long-term strategies for effective adaption |
| Policies                    | - Complying with the national environmental laws and regulations  
- Complying with environmental initiatives to protect and conserve natural resources  
- Complying with the terms of environmental permits that are required for operations |
| Awareness raising measures  | - Educating staff about potential climate risks  
- Educating staff and community about climate change implications and adaptation  
- Instructing guests and staff on how to handle climate change threats  
- Participating in public campaigns about climate change  
- Informing all stakeholders about the hotel’s environmental performance |

*Source: Abou Kamar et al. (2023)*