



ENVIRONMENTAL AND SOCIAL ASSESSMENT (SEA) FOR THE JORDAN TOURISM STRATEGY (2021-2025)

SEA Report

May 2022

REV1



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Issue and Revision Record:

Template Code		QF-PM-01-15	Template Revision No.	1.0
Version	Date	Description	Prepared by	Checked & Approved by
Rev 0	7 April 2022		ECO Consult	ECO Consult
Rev 1	29 May 2022		ECO Consult	ECO Consult
Rev 2				

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LIST OF ACRONYMS

Aqaba Special Economic Zone (ASEZ)
 Aqaba Special Economic Zone Authority (ASEZA)
 Department of Antiquities (DoA)
 Department of Statistics (DOS)
 environment and social (E&S)
 Environmental and Social Framework (ESF)
 Environmental Impact Assessment (EIA)
 European Union (EU)
 Global Sustainable Tourism Council (GSTC)
 Greater Amman Municipality (GAM)
 International Union for Conservation of Nature (IUCN)
 Jordan Environment Society (JES)
 Jordan Hotel Association (JHA)
 Jordan Tourism Board (JTB)
 Jordan Valley Authority (JVA)
 MICE (Meetings, Incentives, Conferences, Events)
 Ministry of Environment (MoEnv)
 Ministry of Health (MoH)

Ministry of Local Administration (MoLA)
Ministry of Tourism and Antiquities (MoTA)
Jordan National Tourism Strategy (JNTS)
Non-Government Organisation (NGOs)
Petra Development Tourism Region Authority (PDTRA)
Royal Society for The Conservation of Nature (RSCN)
Strategic Environmental Impact Assessment (SEA)
Sustainable Development Goals (SDGs)
Terms of Reference (TOR)
United National Development Programme (UNDP)
United Nations (UN)
United Nations Economic Commission for Europe (UNECE)
United Nations Environment Programme (UNEP)
World Bank (WB)

EXECUTIVE SUMMARY

Recognizing the importance of environmental and social development aspects, the Ministry of Tourism and Antiquities (MoTA) is keen to develop and implement a Strategic Social and Environmental Assessment (SEA) for the 2021-2025 National Tourism Strategy (JNTS) which comes at a critical time as the tourism sector in Jordan has been severely impacted by the COVID-19 pandemic in 2020 and 2021. The SEA aims to integrate environmental and social considerations into tourism sector policies, plans, and action plans. The SEA also ensures environmental impacts are identified and avoided or reduced/mitigated as much as possible and that environmental consideration are considered as early as possible in the implementation of the strategy.

This SEA is developed based on well-established guiding international protocols and procedures since there is currently no SEA regulations adopted by the Ministry of Environment in Jordan. The main SEA guiding protocols and procedures that were used:

- United Nations Environment Programme (UNEP) SEA guidelines
- European Union (EU) SEA Directive “Directive 2001/42/EC of the European parliament and of the council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment”
- United Nations Economic Commission for Europe (UNECE) Protocol on strategic environmental assessment
- World Bank (WB) Environmental and Social Framework (ESF) 2018

Brief About the JNTS

The JNTS was the result of input from stakeholders and beneficiaries from the tourism sector value chain including the various tourism associations, as well as other key stakeholders from the private sector which were well represented in various workshops headed by leading figures from the private tourism sector. Such engagement provided the sector with a sense of involvement in the development of the strategy and hence their buy-in. Ministry of Tourism and Antiquities (MoTA) played a pivotal key role in the logistics and facilitation of these consultative workshops.

Additionally, MoTA, Jordan Tourism Board (JTB) and Department of Antiquities (DoA) will take the lead in coordinating activities, efforts, projects, policies and strategies with counterparts in Aqaba Special Economic Zone Authority (ASEZA), Petra Development Tourism Region Authority (PDTRA), Baptism Site Commission etc., possibly through the re-constituted National Tourism Council as well as representation on the Jordan Tourism Board.

The JNTS main objectives are:

Objective-1: Product Development. The Jordan National Tourism Strategy will focus on Culture and Heritage Tourism, Well-being Tourism (Mind, Body & Soul), MICE Tourism (Meetings, Incentives, Conferences, Events), and Domestic Tourism

Objective-2: Human Resources Development. With main focus on Education and training of qualified human resources, increasing employment of Jordanians, engaging women and people with disabilities in tourism careers and jobs, Involvement of local communities in tourism activities, and promoting training programme for MoTA/DoA/JTB/Sector staff.

Objective 3 Marketing. With focus on Enhancement and effectiveness of marketing, branding and positioning, minimising the impact of seasonal tourism through the disbursement of regional and international visitors, enhancing digital marketing, building resilience and the ability to bounce back after adverse events, and enhancing travel to Jordan via Low-Cost Carriers

Objective 4 Heritage Protection. Site Preservation, Conservation, Consolidation, Restoration, Rehabilitation – this activity is within the remit of the DoA, Site Improvement – this activity is undertaken by MoTA

Objective 5 Reforms. with focus on Empowerment of MoTA/JTB/DoA through increase government funding/grants, Review all pertinent laws/bylaws in order to remove inhibitors to investments and growth as well as reduction of operational costs to the sector, Business realignment of MoTA/JTB and DoA organisations in order to deliver focus on core activities and synergies, Improve access to Jordan for tourists including e-visas, review of restricted nationalities etc., and Improved customer experience for the tourist.

SEA Extend and Methodology

The special extend of the SEA covered the entire kingdom and the temporal extend was up to 2030 which is the time frame of the 2030 agenda for sustainable development. The main steps utilized through to develop the SEA include the following in accordance with best practices and mainly inspired by the EU SEA directive:

- Delineation of Study Boundaries and Scope of Assessment
- Stakeholder Consultation and Engagement session
- Analysis of Alternatives within the JNTS
- Legal Review
- Assessment of Environmental and Social Baseline Conditions
- Impact Identification and Assessment (to include assessment of cumulative impacts)
- Development of recommendation and conclusions
- SEA monitoring and evaluation plan
- SEA validation workshop

MoTA Strategic Environmental and Social Objectives

The first set of outcomes of the SEA are the strategic environmental and social objectives (SEOs) of MoTA which are measures developed from environmental and sustainability objectives of the ministry of tourism and other relevant ministries in Jordan such as ministry of environment, ministry of water, and ministry of agriculture. The adopted SOEs for MoTA were:

Visual and landscape. To contribute towards avoidance or, where infeasible, minimisation of significant adverse visual impacts within and adjacent to the cultural and natural sites (V1).

Biodiversity, Flora and Fauna. To ensure compliance and mainstreaming Biodiversity conservation into tourism projects and actions including protection of the identified key biodiversity areas (B1).

Water and Wastewater. Ensure that water bodies and Ground water near tourism projects are protected, maintained and improved (W1), Ensure that water resources are sustainably managed to deliver tourism growth targets in the context of existing and projected water supply and wastewater capacity constraints (W2), and Avoid inappropriate development in areas at risk of flooding and implement flood warning systems in areas prone to flooding (W3).

Air Quality. To avoid, prevent or reduce harmful effects on human health and the environment as a whole resulting from emissions to air from all tourism activities with particular reference to emissions from transport, heating and cooling of hotels and other buildings (A1)

Climatic Change and Energy. Integrate sustainable design solutions into tourism projects (e.g. energy efficient buildings; green infrastructure) (C1), Contribute towards the reduction of greenhouse gas emissions in line with national targets (C2), Promote the use of renewable energy, energy efficient development (C3), and Increased use of public transport (C4).

Waste Management. Promote circular economy principles, reduce waste, and increase recycling (WM1), and Adopt a policy to minimize the use of Single Use Plastics (SUPs) in touristic sites (WM2).

Cultural Heritage. Protect places, features, buildings and landscapes of cultural, archaeological or architectural heritage (CH1).

Socio-Economic. Promote economic growth to encourage creation and retention of good jobs for local communities near to tourist attractions (S1), Restrict land acquisition and compensate for any involuntary resettlement (S2), Gender equality and empowerment of women (S3).

Recommendations for Mitigating Impacts and Optimizing Opportunities

For each environmental and social parameter, an assessment of the possible negative impacts and the positive opportunities were developed with recommendations for each parameter including:

Recommendations for Visual and landscape.

- Develop a plan for steering MICE tourism towards sustainable tourism
- Provision of suitable Water, Sanitation and Hygiene (WASH) facilities within the touristic destinations
- Protect Jordan's natural environment through enforcing the relevant laws and regulations especially through the Royal Rangers and the RSCN
- Provision of clear signage in touristic destinations regarding sanitation, hygiene and sustainable environmental behaviour
- Prohibit littering and impose penalties as per the National Waste Framework Law No. (16) of 2020
- Preserve cultural heritage sites against uncontrolled access through implementing necessary measures (e.g. provision of a proper entrance gate, hiring security men, installing security cameras)
- Implement green building codes in relation to the recreational facilities
- Development of cultural heritage sites shall be checked and approved by a specialized team to ensure that the development adds value to the cultural heritage and has no negative impacts.

Recommendations for Biodiversity, Flora and Fauna.

In order to limit the impact of building hospitality services on sensitive ecosystems, building in areas rich with biodiversity should be adequately planned and organized. Alternative location should always be considered. A full environmental impact assessment study that considers potential impacts on biodiversity through an environmental management plan should be undertaken and implemented for all development projects near sensitive areas. This in fact is required by the EIA Bylaw and should therefore be strictly enforced.

Code of Conduct for Natural Sites. Each natural site needs to be complemented with a code of conduct. This code should provide guidelines of the activities that are not permitted within the designated area. Raising awareness among the visitors on this code of conduct is essential to ensure that tourists appreciate the value of natural resources as well as understand the consequence of committing violations. Adequate resources to ensure proper communication and enforcement are also essential.

Planning and Managing Events. Any event that will take place in a sensitive area needs to get approval from the proper authorities. The organizer for the events should develop plans that will manage various aspects of the event (such as waste management and water consumption).

Planning Developments. Any development planning for touristic purposes should take into consideration the existing and planned protected areas network, and species diversity in Jordan. In addition, mitigation measures for significant adverse impact shall be highlighted and considered

Adherence to Environmental Regulations. The strict adherence to all environmental and other regulations is needed to avoid the haphazard development of the tourist sector that encroaches on the ecosystem and landscape. The consumption of resources need to be taken into consideration in every tourist facility to ensure no area gets completely depleted. All EIAs need to present the required resources during the construction and operation of any facility in order to have a better understanding on the possible future impacts, including cumulative impacts of existing facilities.

Recommendations for Water and Wastewater.

In order to cope with upcoming challenges, Jordan needs to implement measures on both the water demand and supply side. Water saving measures in sectors like agriculture and industry are essential to improving the situation. However, and despite the fact that the tourism sector does not belong to the high-water consumers, due to its importance in some tourist regions and seasonality of its demand, it needs to be included in the water saving activities.

There are many different water saving measures to consider for the tourism sector, depending on the water demand component considered. These include a more rational use of water in toilets and showers, in addition to recycling of pool water.

Applying existing technology to save water in hotels and households in tourist areas could bring about a significant reduction in water demand and could possibly accommodate a further increase in tourism without additional supply

measures. Water saving devices can save up to 50% of water. Many effective water-saving devices can be purchased at a reasonable price with some of the devices not requiring any significant modifications.

Significant efforts can also be made to promote rainwater harvesting in hotels. Furthermore, larger hotels close to the sea in Aqaba could be encouraged to invest in their own desalination plants (e.g. reverse osmosis). Newly constructed hotels and tourism facilities may be encouraged to use treated wastewater supplied from a treatment plants in toilet flushing systems if feasible. In some cases, eco-tourism labels and certification systems can be effective in ensuring the implementation of water saving measures in the tourism industry.

Tourist awareness of water scarcity and motivation of the tourists to reduce water consumption could be important in reducing water consumption. However, this is a difficult task as it requires changing consumption habits of visitors who are not normally aware of the country's challenges and the impact of their water consumption.

Information and awareness raising to reduce the frequency of towel and bed sheet laundering, or in drastic cases reducing showering, are the type of actions most frequently put in place by the hotel industry to reduce water demand directly. The installation of individual water meters for tourist infrastructure composed of a series of individual lodges/flats rented for longer periods can also be considered as a mean for reducing water demand.

In case wastewater cannot be discharged to a sewer to be treated in a municipal effluent treatment plant, decentralized wastewater treatment plants are a recommended option. Sequencing batch reactors have been proven to be a satisfactory option to fulfil these requirements. However, other types of biological treatment may also be appropriate as long as they achieve high removal efficiencies. Environmental factors should be considered when selecting this option.

Recommendations for Climatic Change and Energy.

There are many technological, behavioural, managerial, and policy initiatives that can bring tourism to a more sustainable emissions pathway. Tourism initiatives have the responsibility of not only reducing its GHG emissions but also to be an example for other initiatives and sectors. A collaborative effort is needed for the energy and GHG mitigation as no sector can be successful on its own and the best approach for tourist activities is to get involved in existing GHG reduction efforts and sustainable development practices.

The tourism sector should support national initiatives in Jordan that aim at reducing GHG emissions, energy efficiency initiatives, and use of alternative energy. The main initiative in Jordan includes the Intended Nationally Determined Contribution (INDC) document, which is a commitment to reduce greenhouse gas emissions by 14% until 2030 in Jordan. In addition to support of INDC, the tourism sector should support the national energy strategy, the Jordan national green growth plan, and the biodiversity-friendly tourism charter in. The main proposed solutions include:

- Encourage implementation of green building codes and eco-tourism labelling in hotels, camps, and other tourist accommodation locations such as green key, travel life, blue flag, Leadership in Energy & Environmental Design (LEED), etc.;
- Encourage the use of renewable energy such as solar and wind power by direct use and by carting approach;
- Raise awareness among tourists and the community about the renewable energy and energy conservation activities;
- Expand the use of solar water heating and cooling in commercial and industrial facilities.
- Encourage the use of sustainable transportation solutions
- Develop a system for sorting, re-using and recycling of solid waste and enhancing the waste collection and disposal practices;
- Improve energy use efficiency in water utilities, and implement a number of projects based on renewable energy sources (solar, wind), as well as biogas and energy production from sludge.

Recommendations for Waste Management.

Increased littering. As one of the most visible and significant impacts of tourism in natural areas, strict specifications and conditions must be enforced in any newly developed project related to tourism in natural areas. These specifications must be result-oriented and be practical and implementable with clear and measurable key performance indicators that assure prevention of littering and cleaning of the already littered natural areas.

Increased burden of MSW collection and disposal. Waste minimization and recycling activities should be integrated and mainstreamed in the tourism sector with the objective of reducing the produced waste amounts that must be disposed in landfills.

Waste treatment and proper waste disposal must be insured. Any tourism activity must utilize a cradle to grave approach of following waste produced to ensure it is collected, treated, transported, and disposed appropriately. Although the task of waste collection and disposal can be transferred to subcontractors and other entities, the responsibility of proper waste management is on the producer as a tourism facility and cannot be transferred to anybody.

The tourism sector should also support the national solid waste strategy in Jordan which promotes closure of unlined facilities and establishment of lined landfills in addition to development of recycling programs and facilities and transfer stations.

Increased medical waste. Medical waste as a specialty waste and has a specific way of management which includes careful labelling, separation, care in handling, treatment, and disposal in order to ensure safe management and disposal of the waste. This is done by specialized and certified teams. The responsibility of the tourism sector is to ensure specialized teams are engaged in such activity and that they are always compliant with the local regulations.

Increased construction and demolition waste. This element can give a tourism project a bad reputation from day one if not dealt with carefully. During construction of new facilities and rehabilitation of existing sites, construction and demolition waste must be collected and disposed in the dedicated disposal locations for this type of waste. Again the task of waste management can be transferred to other entities but the responsibility remains with the tourism site.

Increased amount of agricultural waste. This type of waste if kept free of contamination from other wastes can be reused in a beneficial way. Tourism projects that can potentially produce such wastes should utilize existing reuse schemes for these wastes in the local areas or encourage development of new recycling plants. Examples of recycling of this waste include composting to produce soil additives and anaerobic digestion to produce energy.

Recommendations for Cultural Heritage.

Develop standards for site development. Detailed rehabilitation and restoration standards should be developed and implemented that insures all developed projects enhance the cultural heritage value. These standards could be developed for general cultural heritage sites development but also to be developed specifically for major sites. These standards should be introduced, enforced, and monitored with the assistance of the local communities. These construction standards should preferably include heritage protection standards, Biodiversity protection standards, in addition to environmental protection standards.

Develop site operation and management plans. Each site has its own specific requirements related to optimizing its use for the benefit of tourism, the local community and its protection from vandalism and littering. An operation and management plan at the site provides much needed instructions and guidance for operators on how to manage the site. The principles upon which this plan should be developed include:

- Focus on creating new jobs and economic prosperity to the local community;
- Protection of the natural and cultural heritage at the site from littering and vandalism is a priority;
- Determine the site's carrying capacity and ensure it is not exceeded;
- Utilization of the services of the local community to participate in its growth;
- Reduce environmental impacts of the operations;
- Provide a satisfying and pleasant experience to all visitors;
- Ensure site maintenance activities are performed when needed.

Protection plan of intangible cultural heritage. Participate in and support efforts to protect cultural heritage within communities that are planned to be exposed to increasing amounts of visitors. The main function of this plan is to ensure the preservation of the culture and to ensure it is not reduced to a commercial commodity only used to attract tourists. This plan must be developed, approved and adopted with the support of the local community at the important sites, with focus on the Badia region.

Recommendations for Socio-Economic.

When hiring, contractors and hospitality facility operators should give priority to local qualified residents. Locally manufactured equipment and supplies should also be given priority. In order to avoid any illegal practices, all labour and construction regulations need to be abided by.

Policies that support local employment in the tourism sector, particularly in rural areas, need to be put in place to allow residents with little experience in the tourism sector to reap potential economic benefits. This can be done through a local community training program. In addition, government support should be given to the development of tourism-related micro and small enterprises (MSEs) in rural areas.

Private sector investment in the rural tourism sector may need to be regulated to ensure that the local residents benefit from collectively owned heritage resources. Otherwise, there is a risk that the private sector will benefit disproportionately.

According to the recommendations of the International Labour Organization (ILO), the promotion of decent work and sustainable employment in the tourism sector requires the following:

- Strengthening the sector's linkages with related sectors in its supply chain (e.g. agriculture, handicrafts, transports, infrastructure, construction) while supporting and promoting an integrated approach and local sourcing.
- Reinforcing initiatives to promote employment creation at local level, including in rural areas, contributing to social and economic development and poverty reduction through social inclusion, regional integration and expansion of local incomes.
- Investing into skills development and vocational education and training, and improving working conditions to enhance the sector's image and service quality, bearing in mind that the skills level, professionalism, commitment, loyalty and soft skills of workers are key for competitiveness.
- Strengthening social dialogue mechanisms and collective bargaining. These can enhance working conditions, career prospects and job security to the benefit of the workers, and make it easier for companies to better respond to the needs and demands of the labour market.

SEA Implementation Arrangements

Finally, the SEA recommendations were used to propose implementation arrangements including the following main points

Social and environmental policy. It is recommended that MoTA should develop and adopt a social and environmental policy which provides guidance to private and public entities involved in the tourism sector towards green and sustainable tourism. The policy shall include clear commitment towards social and environmental issues and shall be communicated and announced in a manner that is easily accessible to all entities at any time.

Review existing practices. It is recommended that MoTA shall look at their existing practices at all touristic sites in the kingdom specifically studying all existing impacts and practices at the sites in relation to visual impacts, water use, waste and waste water disposal.

Review existing permitting and inspection procedures to make sure SEA recommendations are integrated well within the regular procedures when permitting new facilities and through the regular periodic inspection visits and audits.

Incorporate green elements into licencing of new projects. New projects being developed in the tourism sector should be required or at least encouraged and motivated to implement best practices related to water and energy saving in addition to use of renewable energy and sustainable waste management within the project design, construction, and operation phases.

Increase coordination with SEA relevant public entities. The main entities that can support MoTA in implementing the SEA recommendations include MoENV, MoLA and the municipalities, and MWI.

Awareness raising and capacity building. One of the most important activities related to SEA implementation is awareness raising which could be done through actual implementation of projects and initiatives to lead by example in addition to awareness campaigns. It is recommended the MoTA should start with its prominent buildings for example implementing water efficiency, energy efficiency, and waste recycling. Another possible opportunity is to encourage MICE venues to implement similar best practices in order to lead by example.

Also for capacity building and increasing know how within tourism human resource, it is recommended the MoTA shall include sustainable tourism best practices within the training curricula for courses that are provided directly by MoTA or tough Ammon and any other tourism schools and universities.

Work with tourism NGOs to incentivise positive behaviour. it is recommended the MoTA shall invite the tourism NGOs especially the hotels and restaurants associations to develop and adopt a green grading system for their members particularly focused on water, energy, material use, and waste management. This rating system shall be fair and adoptable to the Jordanian tourism industry. After implementation of such grading system, MoTA shall acknowledge the best performers and shall study ways of incentivising all the rest to improve their level of performance.

Develop an action plan for the implementation of the SEA recommendation Based on the recommendations of the SEA, an action plan is proposed to be developed by MoTA which sets clear specific targets and actions to be implemented and identifies monitoring and evaluation approach. The proposed action plan can be based on the following table.

1 INTRODUCTION

The Ministry of Tourism and Antiquities (MoTA) in Jordan is in the process of adopting the 2021-2025 National Tourism Strategy (JNTS) which comes at a critical time as the tourism sector in Jordan has been severely impacted by the COVID-19 pandemic. MoTA recognises that it is of great importance to make sure tourism driven activities and projects do not have negative impacts on environmental and social receptors locally and regionally such as impacts on biodiversity, water resources, air quality, solid waste, and social impacts which is why this SEA was initiated.

A Strategic Environmental and Social Assessment (SEA) of the tourism sector goes in parallel with the JNTS in order to integrate environmental and social considerations into tourism sector policies, plans, and action plans. The SEA ensures that environmental impacts are identified and avoided or reduced/mitigated as much as possible and that environmental consideration are considered as early as possible in the implementation of the strategy.

ECO Consult is commissioned by the United Nations Development Programme (UNDP) to conduct the Strategic Environmental Assessment (SEA) for the National tourism strategy of Jordan (2021-2025) in compliance with the relevant legislations and practices and in coordination with the Ministry of Tourism and Antiquities (the custodian of the strategy) and the Ministry of Environment.

1.1 TOURISM SECTOR IN JORDAN

Located in a sensitive region in the Middle East; Jordan is characterized by its stability among a somehow destabilized region. Additionally, Jordan has an abundance of unique tourism sites such as Petra, Dead Sea, Baptism Site and a myriad of heritage/cultural sites as well as a large variety of tourism products. Despite of this variety in tourism products and stability, Jordan has to compete with regional tourism players such as Egypt and Turkey which are much larger countries with much more tourism products to offer. However due to the uniqueness of Jordanian sites, tourism is still prosperous and growing with 2019 having a record number of visitors of 5.3 million including 1 million visitors to Petra and revenues of 4.1 billion JD which represents approximately 13% of GDP (JNTS, 2021).

There are several tourism attractions in Jordan, including (JIC, 2017):

- Cultural and heritage tourism
- Medical and wellness tourism
- Eco and nature tourism
- Faith-based tourism
- Adventure tourism
- Meetings, incentives, conferences, and events tourism (MICE)
- Domestic tourism

As mentioned earlier, 2019 was a record year for the tourism industry. However, the tourism sector in Jordan was severely impacted by the COVID-19 pandemic in 2020 and beyond. Like most or all countries worldwide, the pandemic caused severe economic impacts in the months following the outbreak until our current time, with travel and tourism sector being the hardest hit and most likely the last to recover. Every aspect of Jordan's tourism value chain (hotels, restaurants, transport, tour guides & operators, airlines etc.) ground to a sudden halt, thus threatening the very survival of the tourism establishments and those who work in them (JNTS, 2021).

Upon easing travel restrictions in 2021, Jordan has witnessed a gradual increase in the number of visitors (**Figure 1**), the number of domestic visitors (**Figure 2**), and number of Petra visitors (**Figure 3**).

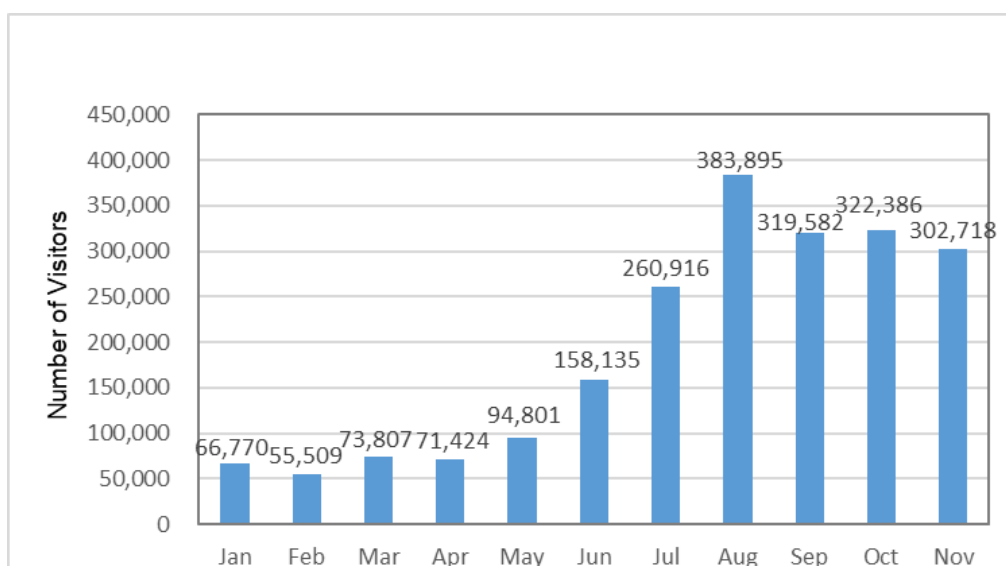


Figure 1: Number of Visitors to Jordan in 2021: Source (JNTS, 2021)

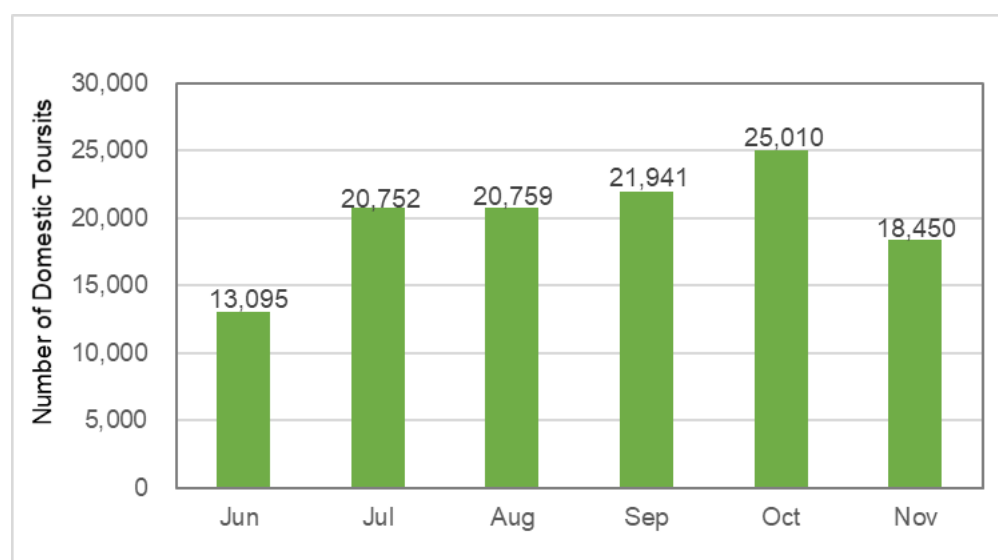


Figure 2: Number of Domestic Tourists in 2021: Source (JNTS, 2021)

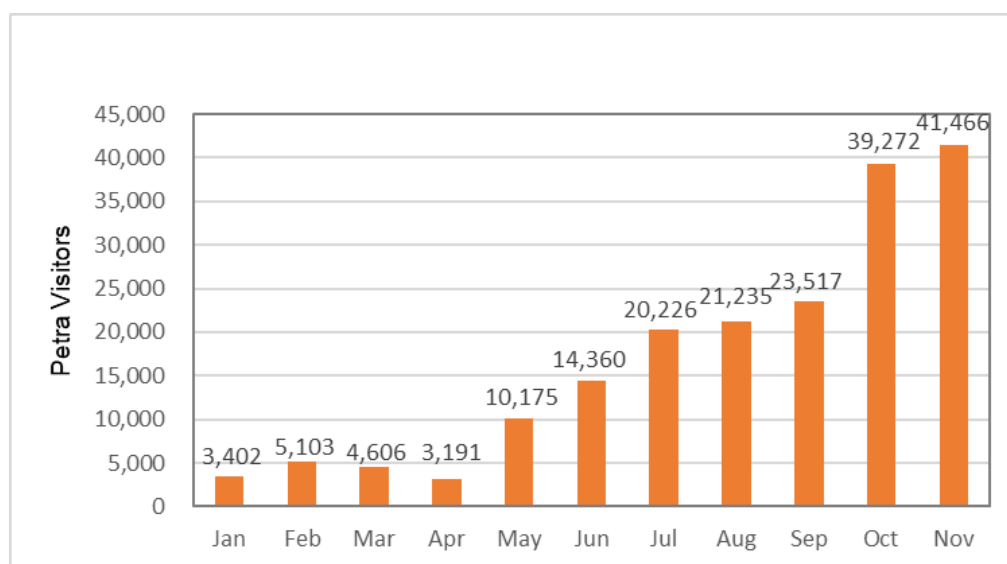


Figure 3: Number of Petra Visitors in 2021: Source (JNTS, 2021)

1.2 SEA GUIDING PRINCIPLES AND OBJECTIVES

This SEA is developed based on well-established guiding international protocols and procedures since there is currently no SEA regulations adopted by the Ministry of Environment in Jordan. The main SEA guiding protocols and procedures that shall be used are:

- United Nations Environment Programme (UNEP) SEA guidelines
- European Union (EU) SEA Directive “Directive 2001/42/EC of the European parliament and of the council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment”
- United Nations Economic Commission for Europe (UNECE) Protocol on strategic environmental assessment
- World Bank (WB) Environmental and Social Framework (ESF) 2018

The main objective of the SEA is to develop the Jordanian tourism sector and allow it to grow in revenue, employment, infrastructure, and sites developed in a sustainable manner which promotes real green development and growth in the society taking into consideration the Jordanian regulations and policies, UN sustainable development goals, and World Bank Environmental and Social Standards (ESS). Specific strategic environmental objectives are defined in section 7.

1.3 THE STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) PROCESS

The purpose of this SEA is to ensure that the environmental implications of options within the JNTS have been assessed. The main stages of the SEA process are as follows:

Stage-1 Screening and scoping:

The screening step includes initial screening of environmental and social impacts of the JNTS. The SEA scoping process includes a scoping session and produced a scoping report. It included the following main steps:

- Investigating the spatial extend of SEA
- Identification of environmental and social issues that can be affected by the JNTS
- Identification of regulatory framework and other relevant policies
- Identification of key stakeholders
- Proposed SEA Assessment Methodology

Stage-2 Preparation of the SEA

After the scoping stage, the SEA is prepared as Draft and Final SEA report which included the following steps:

- Literature review
- Screening of environmental issues
- Scoping
- Stakeholder consultations
- Development of the analytical framework and alternatives
- Development of environmental and social baseline conditions
- Environmental and Social Impact assessment
- Development of recommendations and conclusions
- SEA monitoring and evaluation plan

An SEA validation session is was conducted in 30 May after the completion of the final SEA draft report. The SEA process is summarised in **Figure 4** below.

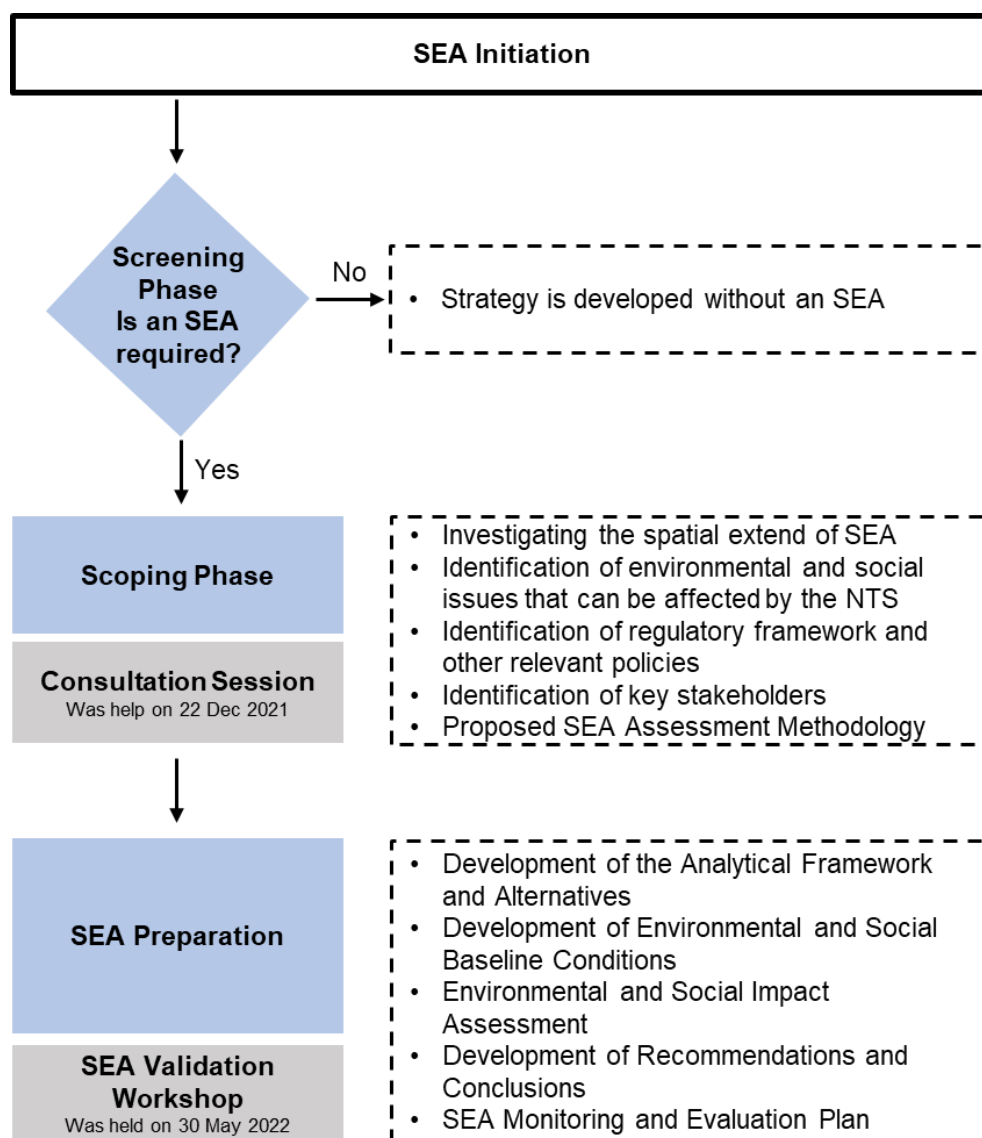


Figure 4: SEA Process

2 SUMMARY OF THE NATIONAL TOURISM STRATEGY (JNTS) 2021 -2025

The Jordan National Tourism Strategy 2021-2025 places the tourism sector at the heart of Jordan's economy and society. The Strategy addresses the challenges and gaps Jordan faces and aligns them with the strengths and opportunities the country can build on to bolster national economic growth and job creation.

This Strategy is the result of input from stakeholders and beneficiaries from the tourism sector value chain – the various Tourism Associations, as well as other key stakeholders from the private sector, were well represented in the various workshops, each of which was headed by a leading figure from the private sector. Such engagement provided the sector with a sense of involvement in the development of the strategy and hence their buy-in. Ministry of Tourism and Antiquities (MoTA) played a pivotal key role in the logistics and facilitation of these consultative workshops.

Additionally, MoTA, Jordan Tourism Board (JTB) and Department of Antiquities (DoA) will take the lead in coordinating activities, efforts, projects, policies and strategies with counterparts in Aqaba Special Economic Zone Authority (ASEZA), Petra Development Tourism Region Authority (PDTRA), Baptism Site Commission etc., possibly through the re-constituted National Tourism Council as well as representation on the Jordan Tourism Board.

This strategy espouses a number of noble causes including the protection of Jordan's abundance of cultural heritage, development of human resources as well as the design/marketing of rich products/services/experiences. It will also tackle the needed reforms in order to rid the industry from inhibitors that are stunting growth, investments and efficiencies and thereby increase its competitiveness in the face of major regional players in the tourism domain.

The National Tourism Strategy's (2021-2025) vision is: "To create inclusive economic growth through authentic and sustainable tourism products & experiences and eliminate the impact of COVID-19".

To realise this vision, the following mission is identified:

- Highlighting the uniqueness of Jordan's history and heritage
- Development of products and experiences which exceed the expectations of international, regional and domestic tourists
- Solid partnership between the private sector and an empowered Ministry of Tourism and Antiquities
- Inclusiveness of local communities
- Preservation and protection of Jordan's heritage and cultural sites
- Initiating meaningful reforms to accelerate investment and improve competitiveness.

The JNTS has also identified 5 specific objectives which are summarised below:

Objective-1: Product Development. The Jordan National Tourism Strategy will focus on the following products:

- Culture and Heritage Tourism
- Well-being Tourism (Mind, Body & Soul)
 - Wellness
 - Medical
 - Faith
 - Adventure Tourism
- MICE Tourism (Meetings, Incentives, Conferences, Events)
- Domestic Tourism

Objective-2: Human Resources Development

- Education and training of qualified human resources for tourism sector employment
- Increasing employment of Jordanians
- Engaging women and people with disabilities in tourism careers and jobs

- Involvement of local communities in tourism activities and businesses throughout Jordan
- Training programme for MoTA/DoA/JTB/Sector staff.

Objective 3 Marketing

- Enhancement and effectiveness of marketing, branding and positioning
- Minimising the impact of seasonal tourism through the disbursement of regional and international visitors
- Enhancing digital marketing
- Building resilience and the ability to bounce back after adverse events
- Enhancing travel to Jordan via Low-Cost Carriers

Objective 4 Heritage Protection

- Site Preservation, Conservation, Consolidation, Restoration, Rehabilitation – this activity is within the remit of the DoA
- Site Improvement – this activity is undertaken by MoTA

Objective 5 Reforms

Reforms have been identified as a key Enabler/Strategic Objective to the success of the tourism industry and will endeavour to deliver the following:

- Empowerment of MoTA/JTB/DoA through increase government funding/grants
- Review all pertinent laws/bylaws in order to remove inhibitors to investments and growth as well as reduction of operational costs to the sector
- Business realignment of MoTA/JTB and DoA organisations in order to deliver focus on core activities and synergies
- Improve access to Jordan for tourists including e-visas, review of restricted nationalities etc.
- Improved customer experience for the tourist.

In order to ensure successful execution of the Jordan National Tourism Strategy, initiatives in the form of Activity Packages and Action Plans need to be detailed and elaborated. The following schematic includes a summary of the main proposed activities (**Figure 5**).

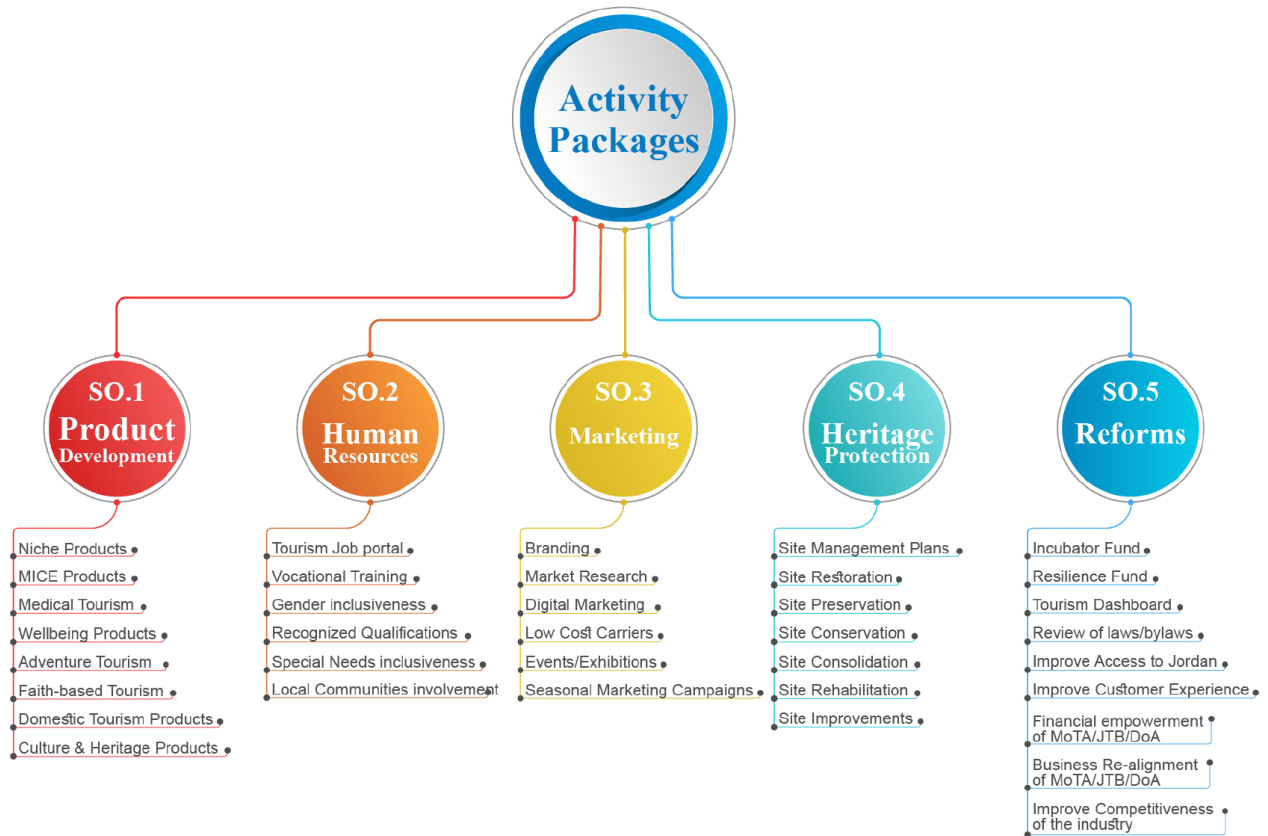


Figure 5: JNTS Objectives and Activities (Source JNTS, 2021)

3 SEA SCOPE AND METHODOLOGY

3.1 Spatial Extend of the SEA

Since the JNTS was developed to cover the entire kingdom and since Jordan is full of touristic and cultural heritage sites the SEA shall have a spatial extent of the entire Kingdom of Jordan as well. This includes 12 governorates and two coastal areas (the Dead Sea and the Red Sea). The adjoining countries are Syria, Iraq, Saudi Arabia, Palestine and Israel as demonstrated in **Figure 6** below.

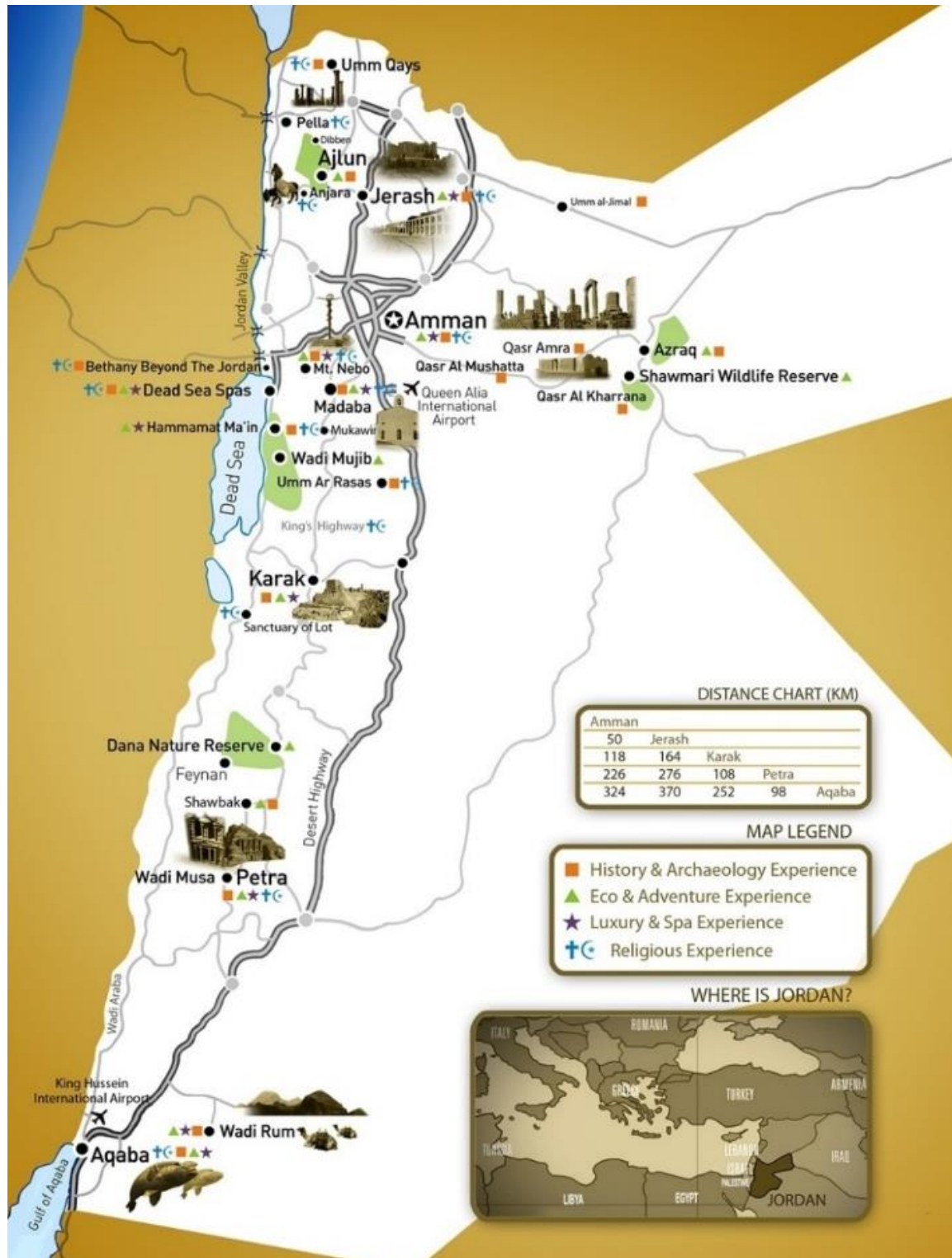


Figure 6: Spatial Extend of SEA (Source: Jordan Tours Travel and Tourism)

3.2 Temporal Extend of SEA

The temporal scope refers to the time horizon considered in the SEA. The duration period of the JNTS is from 2021 until 2025. The SEA approach considers this period as the short or medium term (5 years) and to the extent possible, also shall look further into longer term, until 2030 which is the time frame of the 2030 agenda for sustainable development.

3.3 Methodologies adopted for the SEA Development

The following presents the methodology utilized for conducting the SEA study in accordance with best practices and mainly inspired by the EU SEA directive. In addition, the methodology for the SEA will reflect as much as possible the World Bank environmental and social framework as several of the JNTS components may be supported by the World Bank.

In general, the methodology includes the following main components.

- Delineation of Study Boundaries and Scope of Assessment
- Stakeholder Consultation and Engagement
- Analysis of Alternatives within the JNTS
- Legal Review
- Assessment of Environmental and Social Baseline Conditions
- Impact Identification and Assessment (to include assessment of cumulative impacts)
- Development of recommendation and conclusions
- SEA monitoring and evaluation plan
- SEA validation workshop

3.3.1 Stakeholder Consultation and Engagement

Consultations with stakeholders in the SEA are very important and critical as the JNTS describes activities and initiatives that shall be implemented by the entire tourism sector stakeholders. It is therefore very important that these stakeholders play an active role in the SEA in order to understand it and be able to implement its recommendation and conclusions as they go about doing their day to day work.

Communication with tourism sector stakeholders is an essential component of the environmental and socio-economic impact assessment process. The SEA consultation was in two parts: During Scoping with selected stakeholders and upon completion of the Draft SEA. The latter will provide stakeholders and the local community the opportunity to review the findings of the SEA and discuss these with tourism sector representatives.

The approach to consultation and communication will be developed prior to the visits, including key stakeholders to be engaged, key messages to communicate and material to be presented.

The first part of the key stakeholder consultations was completed and documented in the scoping report (attachment A). The second part which is the SEA validation workshop was held on 30 May 2022.

3.3.2 Environmental and Social Impact Assessment

In order to evaluate the predicted impacts of the two proposed scenarios (JNTS with SEA and JNTS without SEA), the SEA used benchmarks of relevant objectives and referred to the baseline environmental and social conditions. The impacts addressed two main sources of potential environmental impacts that may arise as a result of the tourism sector:

- Seasonal and intensive increases in population density as a result of tourist influx. This includes use of natural resources and pressure on infrastructure and tourist behaviour linked to overuse of resources and damage to natural areas and historical sites;
- Construction of facilities, accommodation and accompanying infrastructure.

Each impact was evaluated and given a score that represents the severity of the impact and the likelihood of the impact occurring.

3.3.3 Impact Assessment and Identification

The adverse and beneficial environmental and social impacts of the JNTS were identified and assessed against the established baseline – as highlighted above. A consistent approach to the assessment of impacts was followed to enable environmental and social impacts to be broadly compared across the SEA. A set of generic criteria was used to determine significance (see below) which was applied across the various environmental social and environmental parameters.

The assessment of the impacts was based on qualitative assessment conducted using professional experience, judgment and available knowledge, and including the consideration of stakeholder views. Where there are limitations to the data, and/or uncertainties, these will be recorded, along with any assumptions that were taken during the assessment.

In order to determine the significance of each impact, two overall factors are considered:

- The importance and/or sensitivity of the environmental and social receiving parameter, as determined during the assessment of baseline conditions; and
- Magnitude and Nature of the impact.

3.3.4 Sensitivity of the Receiving Parameter

Receiving parameter sensitivity was determined using information taken from the baseline description on the importance, significance or value of the social or environmental component under examination. It is important to understand the sensitivity of the receiving parameter, as this is a measure of the adaptability and resilience of an environmental parameter to an identified impact. The following categories of sensitivity will be applied to the assessment:

- *High:* The environmental parameter/receptor is fragile and an impact is likely to leave it in an altered state from which recovery would be difficult or impossible.
- *Medium:* The parameter/receptor has a degree of adaptability and resilience and is likely to cope with the changes caused by an impact, although there may be some residual modification as a result; and
- *Low:* The parameter/receptor is adaptable and is resilient to change.

Magnitude and Nature of the Impact

The magnitude of the impact is the scale of change which the impact may cause compared to the baseline and how this change relates to accepted thresholds and standards. The following categories were applied to the assessment:

- *High:* a large change compared to variations in the baseline. Potentially a clear breach of accepted limits;
- *Medium:* change which may be noticeable and may breach accepted limits; and
- *Low:* when compared with the baseline, change which may only just be noticeable. Existing thresholds would not be exceeded.

Furthermore, in determining the magnitude of the impact it was important to take into account and consider several other factors which define the nature of the impact. This includes the following:

Type of Impact

- *Positive:* applies to impacts that have a beneficial environmental result, such as enhancement of the existing environmental conditions; and
- *Negative:* applies to impacts that have a harmful aspect associated with them such as loss or degradation of environmental resources.

Type of Effect

- *Direct:* applies to impacts which can be clearly and directly attributed to a particular environmental or social parameter (e.g., generation of dust directly impacts air quality); and
- *Indirect:* applies to impacts which may be associated with or are subsequent to a particular impact on a certain environmental or social parameter (e.g., high levels of dust could entail nuisance and health affects to construction workers onsite).

Duration (how long the stressor or its effect last)

- *Short Term*: applies to impacts whose effects on the environment will disappear within a 1-year period, or once construction activities are completed;
- *Medium Term*: applies to impacts whose effects on the environment will disappear within a 5-year period; and
- *Long Term*: applies to impacts whose effects on the environment will disappear in a period greater than 5 years.

Reversibility

- *Reversible*: applies to impacts whose significance will be reduced and disappeared over time (either naturally or artificially), once the impacting activity ceases; and
- *Irreversible*: applies to impacts whose significance will not be reduced nor disappeared over time (either naturally or artificially), once the impacting activity ceases.

Assessing the Significance of the Impacts

The concept of 'significance' is central to the SEA process and aids the identification and categorisation of environmental and social effects. As noted, in order to determine impact significance, the sensitivity of each environmental and social parameter/receptor is considered in combination with the magnitude of the impact. The table below (**Table 1**) demonstrates how these parameters are considered in the assessment of significance.

Table 1: Determination of Significance

Sensitivity of receiving receptor	Magnitude of Significance		
	Low	Medium	High
Low	Not significant	Minor	Minor
Medium	Minor	Minor	Moderate
High	Minor	Moderate	Major

While the above matrix provides a framework for the determination of significance, and enables comparison across environmental and social parameters, a degree of professional judgement must be used and some parameter-specific factors to be considered in making the determination of significance.

Below provides additional guidance to the degrees of significance to be used in the SEA.

- *Major significance*: requires thorough investigation in the SEA and thus such impacts need to be studied extensively by consulting expertise in the areas of the identified impacts to design needed mitigation and environmental management measures. Moreover, conducting specific studies and assessments to some of the key issues identified;
- *Moderate significance*: requires reasonable investigation in the SEA. These impacts will be studied by expertise in the areas of the identified impacts to design needed mitigation and environmental management measures.
- *Minor significance*: must be listed, and addressed in some way, but which did not require detailed assessment in the SEA.
- *Not significant*: For completeness, impacts which have been included in the assessment but determined not to be significant, will be rated formally as 'not significant'.

3.3.5 Development of Recommendations and Conclusions

Based on the Environmental and Social impacts assessment, mitigation recommendations and conclusions are made to encourage certain activities and discourage other activities associated with implementing the JNTS. The objective is to minimise, mitigate and manage potential adverse impacts, and enhance the benefits that tourism development policies and plans may bring to local communities. The recommendations shall be consolidated into strategic actions which shall be integrated into the JNTS implementation plans.

3.3.6 SEA Validation Workshop

The SEA consultation was in two parts: During Scoping with selected stakeholders (which is already completed and documented in Appendix A) and upon completion of the Draft SEA through a validation workshop. The latter will provide stakeholders and the local community the opportunity to review the findings of the SEA and how it relates to the JNTS and discuss these with the tourism sector leaders in the Kingdom.

The approach to the validation workshop will be developed prior to the event, including key stakeholders to be engaged, key messages to communicate and material to be presented. To ensure familiarity for the stakeholders, it will be consistent to previous approaches by MoTA, MoEnv and UNDP and supported by ECO Consult project team.

4 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

SEA in Jordan is not a legally required document and has no regulatory framework for its development but is rather a voluntary policy driven process for institutes who wish to integrate environmental and social aspects into their strategic planning process. This is of great importance to the JNTS as tourism activities proposed by the JNTS intersect with many laws and regulations in Jordan as summarised in the following table.

4.1 National Regulatory Framework in Relation to the JNTS SEA

The main laws and regulations that control and interact with the JNTS and the SEA are summarized in the following table.

Table 2: National Regulatory Framework in Relation to the JNTS SEA

Law	Description
Tourism Law (No 20) 1988 with latest modification by 2017	This is the law that established the Ministry of Tourism and Antiquities with the main aim to encourage and improve tourism.
Monitoring and inspection on economic activities (No 33) 2017	This law assigns the ministry of tourism the responsibility of inspection and monitoring of economic activities related to touristic attractions and facilities
Protection of Urban and Cultural Heritage Law (No 05) 2005	The law aims to conserve, protect, and maintain Jordanian heritage sites. According to Article 11 of the law, destruction or damage of any heritage site is strictly forbidden.
Antiquities Law (No 21) 1988 with its modifications (No 55) 2008	This law requires all significant archaeological sites to be documented and protected by a buffer zone ranging between 5 and 25 meters. Any site discovered prior to or after commencement of project activities must be assessed by the Department of Antiquities (DoA)
Environmental Protection Law (No 06) 2017	This law states that the Ministry of Environment (MoEnv) will cooperate and coordinate with the authorities concerned with environmental affairs at the local, regional and international level. The Ministry is responsible for protecting the country's biodiversity and determine environmentally sensitive locations. It also sets the legal framework for environmental impact assessment in Jordan.
Solid Waste Management Framework law (No 16) 2020	Under this law, the MoEnv is responsible for designing solid waste management practices including solid waste collection, transport, storage, recycling, treatment and disposal. The MoEnv cooperates with the municipalities (including Greater Amman Municipality (GAM)) to implement waste management activities. The law also assigns the MoTA in charge of waste collection and management from touristic sites.
Environmental Classification & Licensing Regulation (No 69) 2020	This regulation categorises facilities based on their risk to cause environmental pollution. There are three categories and the categories that are considered a higher risk to the environment get inspected more frequently. This regulation requires that all development projects to get an environmental permit from the MoEnv through preparing an Environmental Impact Assessment (EIA). Projects relevant to the tourism sector "Tourism and entertainment projects including parks, golf clubs and shooting ranges." are subject to the EIA from category 2 which is a medium risk category

Law	Description
Soil Protection Bylaw (No 25) 2005	The applicability of this bylaw is in Article 3-E, which states that the MoEnv, in coordination with the Ministry of Agriculture, is responsible for studying the sites of development projects and their impacts on land and natural resources. Environmental considerations should be taken into account when developing these projects
Air Protection Bylaw (No 28) 2005	The aim of this bylaw is to control air pollutants emitted from stationary and mobile sources to protect the environment and public health. It states that all emissions should be kept within their legal limits.
Agricultural Law (No 13) 2015	Defines the role of the Ministry of Agriculture and reorganises the agricultural sector. The Law regulates fishing, wildlife protection, hunting season, protected species, management of waste materials that have been used for agricultural purposes; inspections.
Local Administration Law (No 22) 2021	The law specifies the responsibility of municipalities and the elected municipal councils regarding cleaning, collection, transportation and disposal of solid waste from both households and commercial entities. It also stipulates the responsibility of municipalities in development activities within their area including touristic activities.
Petra Development and Tourism Regional Authority Law (No 15) 2009	This law established PDTRA's governance structure and jurisdiction, in order to develop touristic, economic, social, and cultural aspects of the Petra region.
Management and Protection of Petra Bylaw (No 82) 2014	This law updates the legal framework for the operation of the Petra Archaeological Park.
Jordan Valley Authority Law (No 19) 2001	This law established the Jordan Valley Authority (JVA) and tasked it with the responsibility of the development of the Jordan Valley. The JVA are responsible for developing and exploiting water resources in the agriculture, domestic, municipal, and industrial affairs.
Aqaba Special Economic Zone (ASEZ) Law (No 32) 2000	The Aqaba Special Economic Zone (ASEZ) Law sets the establishment and perimeters of ASEZ, the Zone's Authority (ASEZA), as well as the administration and financial affairs of ASEZA. Article 52 of the law specifies that the ASEZ Board of Commissioners is responsible for protecting and maintaining the environment in the Zone and for ensuring sustainable development.
Public Health Law (No 47) 2008	The Public Health Law regulates the duties of the Ministry of Health (MoH) in protecting the health of general public from various hazards. Article 46 of the law stipulates that it is the role of the MoH to monitor the working environment and its compliance with related legislation, in addition to ensuring employees healthy working conditions.
Labour Law (No 08) 1996	This law contains regulations related to labour inspections, recruitment, contracts, occupational safety and health, work injuries and occupational diseases and trade unions.
Water Authority Law (No 19) 1988	This law defines the Water Authority of Jordan's mandate for connecting the public to the water and sewer networks, as well as maintaining, operating, and managing these networks.
Cities, Villages and Buildings Planning Law (No 79) 1966	This law is one of the key pieces of legislation regarding urban development in Jordan. It declares the Ministry of Local Administration (MoLA) as the main responsible entity for urban development.

4.2 Other Relevant Plans and Programmes

In addition to the laws and regulations, the SEA shall study the interactions between the JNTS and other relevant plans and programmes as identified the following table

Table 3: JNTS SEA Relevant Plans and Programmes

Relevant plans or programmes	How it interacts with the JNTS 2021 – 2025
United Nations (UN) Sustainable Development Goals (SDGs) /	SEA shall promote the SDGs within the JNTS as much as possible

Relevant plans or programmes	How it interacts with the JNTS 2021 – 2025
Sustainable Development Agenda 2030	
Flood water management plans and early warning system	Several cultural heritage sites in Jordan are impacted by flooding which can cause serious injuries and even fatalities
Poverty reduction strategy	Jobs and training opportunities provided by the JNTS can help with reducing poverty
National Social Protection Strategy	that aims at breaking the intergenerational cycle of poverty and to provide a “social protection floor” in the context of the country’s vision for a state of solidarity, production and justice. The strategy is based on three pillars, the first one focuses on opportunities for families to be economically self-sufficient through the labour market. The second pillar focuses on empowerment of the population through education, health care and social services that support those with special needs to remain integrated within their families and communities. The third pillar focuses on targeted social assistance that allows the poor to maintain a basic level of consumption with dignity.
National Water Strategy 2016 – 2025	Water supply issue in Jordan is a severe and chronic pressure. The JNTS must consider the Jordanian water scarcity and work with that limitation in mind. The National Water Strategy is a sectorial cross-cutting documents that aims at sustainable management of water and sanitation. The strategy sets the following strategic objectives for water management for industrial and tourism sectors: <ul style="list-style-type: none"> - Water allocation and movement among sectors have to be driven by economic aims and motives, with maintaining the current share of irrigation in the Jordan Valley. - Developing water-use efficiency guidelines and regulations requiring the tourism industries to use and recycle water more efficiently within their premises, reuse treated wastewater and adopt technologies that can accomplish the same productive output with (Ministry of Water and Irrigation (MWI), 2016)
Energy Strategy 2020 -2030	The energy sector in Jordan has proven to be a reliable and robust sector as energy supply is stable and abundant. It is however noted that the switch to renewable solar power appear to be slower than expected
The national climate change policy of the Hashemite kingdom of Jordan 2013-2020	Jordan has country wide commitments to reduce climate change emissions and the tourism sector should play its role in the reduction
Green Growth National Action Plan (GG-NAP) for Jordan 2021 - 2025	National Green Growth Plan (NGGP) was developed in 2017 by MoENV as part of its efforts to support Jordan’s green growth transformation, which is environmentally sustainable and socially inclusive. The plan targets six sectors that were identified in the Jordan Vision 2025: Waste, Transportation, Energy, Water, Agriculture, and Tourism. As tourism was determined one of the main sectors of green growth in Jordan. Therefore, the JNTS should take green growth projects into account. The plan sets the following main objectives for the tourism sector which were then translated into 18 sub-objectives: Increase private-public coordination and collaboration in Jordan’s tourism sector; Increase the skills and competitiveness of firms, communities and employees of the sector to raise the profitability of the sector; Mainstream sustainability and resilience into sector-level investment planning; Present investment opportunities in ecotourism and sustainability in key touristic locations (Ministry of Environment (MoEv), 2020)
National Solid Waste Management Strategy (NSWMS)	National Solid Waste Management Strategy (NSWMS), was developed by MoLA in 2015 with the objective of improving SWM in the country. The strategy set objectives and targets for waste collection, waste minimisation, and recycling activities which should be considered in the JNTS.

Relevant plans or programmes	How it interacts with the JNTS 2021 – 2025
Empowerment of women participation in the labour market	Gender equity and women and youth empowerment should be integrated in the JNTS
Environment education for sustainability strategy	The JNTS has within its objectives of training and education and should integrate the concept of environmental education within their training objectives
MOTA Gender Inclusion Plan	<ul style="list-style-type: none"> • MoTA has developed a gender inclusion plan for implementing the JNTS which covering the following main topics: • Support Community and Civil Society: the plan suggests activities to promote active participation of women organizations in tourism programs, and encourage volunteering initiatives through the active participation of women and youth • Institutionalize Gender inclusion within MoTA: the plan aims at institutionalizing gender approach in MoTA, through establishing Gender Inclusion and Women Empowerment unit, and building the capacity of its staff on gender to improve their knowledge on gender sensitive tourism. Also, MoTA will improve data collection and management, as well as developing women economic empowerment action plan. • Enhance Employment: MoTA will carry out rapid assessment of gender and the tourism workforce, and prepare visitor centres in the cultural and historical heritage sites across Jordan to be attractive platforms for promoting businesses and creating jobs for the community. As well as, MoTA will develop new routes for agritourism and organic farming, and developing traditional handicrafts products. The assessment might support in reforming licensing. • Provide Tourism Education and Training: MoTA will carry out awareness campaign on the importance of tourism and hospitality in Jordan, and how women are vital to the economic thrive in the sector. The plan recommends supporting the Skills Council for Tourism and Hospitality to provide further support to women and youth on skills and expertise development in specialized areas of tourism, career advice, as well as build on the previous activities with UNWTO on gender mainstreaming in tourism and hospitality sectors, in collaboration with the related entities. • Promote Leadership and Entrepreneurship: MoTA must first set the initial steps for a greater leadership of women in tourism, and encourage basic gender sensitive employment services and support for women working in tourism. The plan sets actions for supporting business incubators
National Climate Change Policy (CCP) of the Hashemite Kingdom of Jordan 2022-2050	<p>The CCP 2022-2050 is an overarching document for mainstreaming climate change in all sectoral policies, strategies, and action plans. The high-level strategic directives are expected to foster the development of strategies, plans and processes to:</p> <ul style="list-style-type: none"> • Reduce greenhouse gas emissions across all sectors of the economy to contribute to the global effort of stabilizing the climate system, while simultaneously delivering sustainable development dividends. • Avoid, minimize or adapt to the negative impacts of climate change on key natural assets, including, among others, agriculture, water, and other vulnerable sectors. • Avoid or reduce damage to human settlements and infrastructure caused by climate change. • Harmonize the approach to CC policies, strategies and action plans using cross-sectoral issues and opportunities. • Address enabling factors such as capacity development, technology transfer and climate finance as means to formulating and implementing CC policies, strategies and action plans.

Relevant plans or programmes	How it interacts with the JNTS 2021 – 2025
	<ul style="list-style-type: none"> • Build capacity to understand, analyse and proactive in the wake of future climate change impacts within the country. • Address cross-cutting and emerging issues that may offer opportunities or act as additional stressors such as inclusiveness, women enabling, disaster risk management, urban migration and refugees, respectively. • Integrate and mainstream climate change into core development policies, strategies and plans as part of an agenda for constructing a green economy for sustainable development. • Endeavor to obtain, to the extent feasible, the involvement and participation of all stakeholders at the national and local level in addressing issues related to sustainable development (institutional mechanisms for inclusiveness and transparency); • Establish clear and reliable indicators for policy formulation and evaluation. • Procure and allocate financial and other resources, as appropriate and feasible, to ensure that climate change policies and investments are addressed in the manner required.

5 ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS

In order to properly assess all possible impacts, a baseline of the current environment and social (E&S) situation was developed. The baseline consists of environmental and economic characteristics of the current situation. Since the strategy is a national strategy, the baseline covered the whole country with some emphasis on particular tourist attraction areas and key biodiversity areas. The baseline was used as a benchmark to assess all potential impacts the JNTS may have.

5.1 Visual and Landscape

Jordanian land surface elevation ranges from -430 m at the surface of the Dead Sea to 1,854 m at the top of Jabal Umm ad Dami in Wadi Rum with an average elevation of 812 m (2 664 ft) above sea level. The geology includes basaltic rocks, sandstone, limestone, chalk, marl and chert and various Pleistocene and Holocene deposits, both of alluvial and eolian origin. Jordan can be divided into four main geographic and climatic areas (FAO, 2019):

- Jordan Valley
- Mountain Heights Plateau
- Eastern desert or the Badia region
- Steppe region found between the Badia and the Highlands.

The landscape is controlled by the climate. Western Jordan has a Mediterranean climate with a hot, dry summer, cool-wet winter and two short transitional seasons. The Eastern parts (about 75% of the country) can be described as having a desert climate with less than 200 mm of annual rainfall. The country relies heavily on underground water to meet the demands of the population and is prone to periodic droughts. The most recent and worst drought period the country faced was from 1998 to 2000, which caused severe economic and environmental losses (FAO, 2019).

The majority of urban areas in Jordan are concentrated around the Zarqa river which starts from Amman downtown and flows through Russeifah and Zarqa till it reaches King Talal dam in the Jordan valley. This river used to be the main attraction historically for the development of the major cities in Jordan which are Amman and Zarqa. Green areas and natural forests on the other hand are concentrated in the North. Whereas the majority of the agricultural areas are Jordan river valley and on the Northern and central uplands (FAO, 2019). A presentation of the land cover in Jordan is presented in **Figure 7** below as captured by Sentinel-2 satellite (ESRI, 2021).

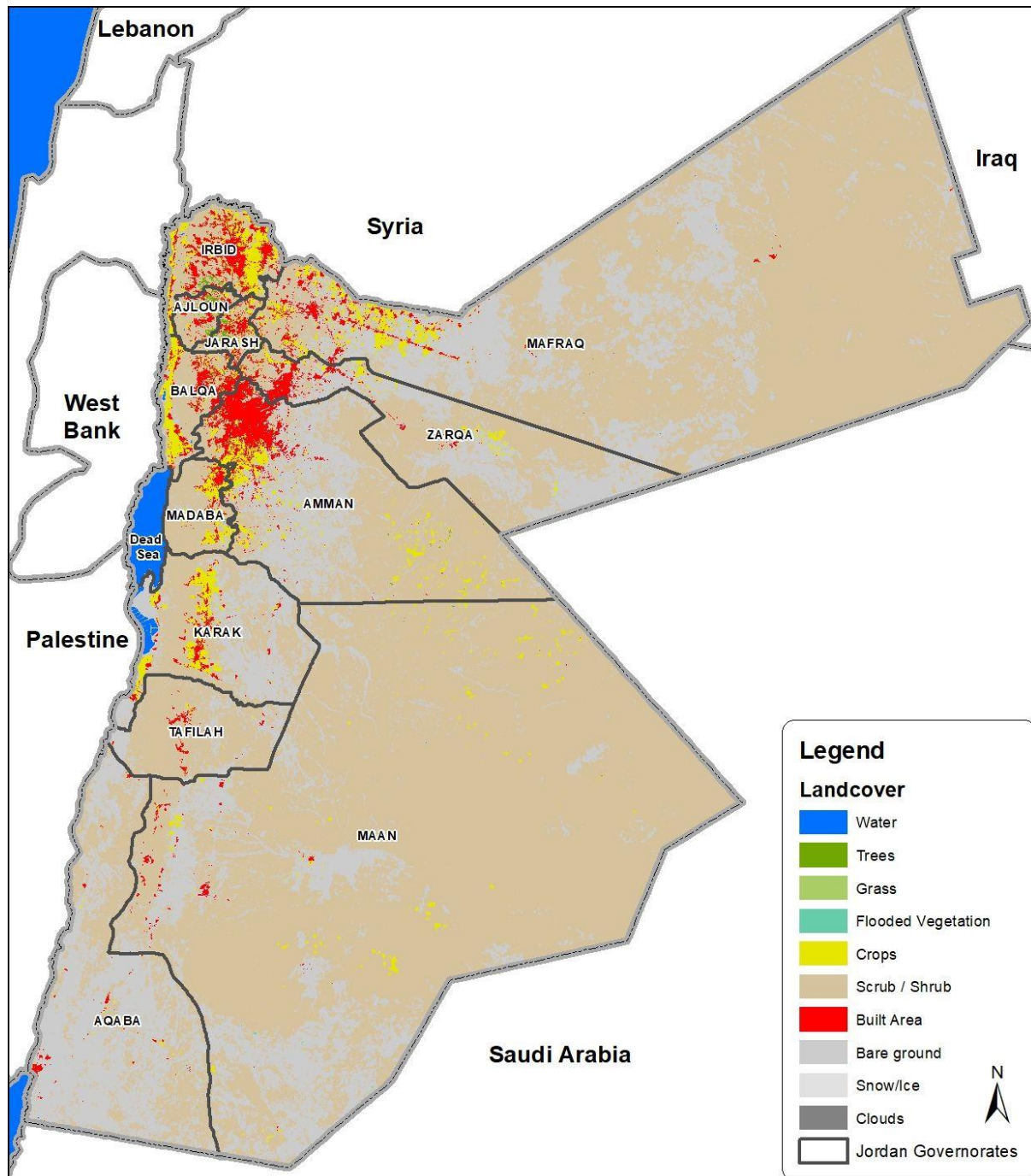


Figure 7: Land Cover in Jordan (Source ESRI, 2021)

Within urban areas, land use in Jordan is classified according to the “Buildings and Planning of Towns and Villages By-law” No. 1 of the year 2022, lands within the planning zone may be classified as follows (Article 4 and Article 11) :

- A. Residential Zones
- B. Commercial Zones
- C. Mixed-use Zones
- D. Industrial Zones
- E. Agricultural Entities

- F. Car Parking
- G. Public Buildings
- H. Offices and Departments

The below table (**Table 4**) provides further details regarding the aforementioned zones.

Table 4: Land Use Classification within Urban Areas

Zone	Categories	Notes
Residential Zone	a. Residential A b. Residential B c. Residential C d. Residential D e. Green/rural zone f. Agricultural zone	Article 5 of the Buildings and Planning of Towns and Villages By-law No. 1 of the year 2022 provides a list of projects other than residential buildings that may be established on lands classified within the residential planning zone based on the decision of the Supreme Planning Council, the concerned committees and the Mayor/Head of the Municipality's Committee.
Commercial Zone	a. Central commercial zone b. Commercial showrooms c. Local commercial zone d. Longitudinal commercial zone	<ul style="list-style-type: none"> • Commercial purposes • Housing • Public services • Temples • Offices • Exhibitions • Hotels • Oil change • Car washing services • Warehouses • Restaurants • Renewable energy projects • Stadiums
Mixed-use Zone	–	<ul style="list-style-type: none"> • Commercial purposes • Renewable energy projects • Stadiums • Housing • Offices • Exhibitions • Conferences • Showrooms • Other uses outlined in the detailed structural plans
Industrial Zone	a. Handicrafts b. Light industries c. Medium-scale industries d. Heavy industries Manufacturing industries	Article 8 of the Buildings and Planning of Towns and Villages By-law No. 1 of the year 2022 provides the types of industries that fall under each category.

Zoning as per the above-mentioned categories are for urban areas and the surrounding lands and is referred to as the “planned zone”. Investment projects to be established on lands within the planned zones must adhere to the land use classification. Whereas investment projects outside the “planned zone” may only be licensed in accordance with the provisions determined by the Supreme Planning Council based on the nature of the project and its requirements. Such projects include but are not limited to (Article 10):

1. Universities, colleges and private schools
2. Hospitals, hotels, restaurants, parks, malls, residential suburbs, sport stadiums and entertainment cities
3. Wedding halls, entertainment halls, public restrooms, and cinemas and theatres
4. Gas stations, warehouses, car washing stations and grain mills

5. Factories
6. Housing projects
7. Renewable energy projects

When developing new projects such as tourism projects, one of the important early aspects of the project is to ensure the land classification allows for such a project as changing the land use classification may be a difficult endeavour and could very possibly be denied.

5.2 Biodiversity

Jordan has four major biogeographic regions (Al-Eisawi (1985) and Disi & Amr (1998)), namely, the Mediterranean region, the Irano-Turanian region, the Sudanian Penetration region and the Saharo-Arabian region (**Figure 8**). These regions were delineated based on vegetation cover, animal distribution in Jordan (Amr & Disi, 2011) as well as soil texture, altitude and annual rainfall. Below is a description of these biogeographic regions.

1. The Mediterranean region: This region is represented by the mountain ranges extending from the north near Irbid, to Ra's an Naqb in the south. It consists of forested vegetation with an abundance of *Juniperus phoenicea*, *Retama raetam*, *Pistacia atlantica*, *Pinus halepensis*, *Quercus calliprinos*, *Quercus coccifera* and *Quercus ithaburensis*. Open areas are characterized by high cover of the Thorny Burnet, *Sarcopoterium spinosum*. The altitude varies from 700 to 1500 m asl, with an average annual rain fall of 400 – 600 mm. The soil consists of several types, *terra rosa*, sandy and sandy-loamy due to erosion of the Nubian sandstone that dominates much of southern part of Jordan, and calcareous soil in the centre and north.

2. Irano-Turanian region: This region is represented by a narrow strip that surrounds the Mediterranean ecozone except in the far north. The Irano-Turanian region extends to the north-east, joining the Syrian Desert. The vegetation is dominated by *Anabasis articulata*, *Artemisia herba-alba*, *Astragalus spinosum*, *Retama raetam*, *Urginea maritima*, *Ziziphus lotus*, *Zygophyllum dumosum* and scattered *Juniperus phoenicea* and *Pistacia atlantica* trees. The altitude ranges from 400 to 700 m asl, with average annual rainfall of 50 – 100 mm. The layer of surface soil is very thin or absent in some instances and surface rockiness is very high.

3. Sudanian Penetration region: This region extends from the south near 'Aqaba along Wadi 'Araba reaching as far north as Deir Alla in the Jordan Valley, then extends to south eastern Jordan around Wadi Ramm, with sand stone mountains and granite mountains to the east. Acacia subtropical vegetation extends from 0 to 400 m asl, with annual precipitation of less than 50 mm. Trees of both *Acacia raddiana* and *Acacia tortilis* are common in varying densities (**Figure 11**). Other trees such as *Tamarix* spp., *Ziziphus spina-christi*, *Zygophyllum dumosum*, are also common. Shrubs including *Aanabasis articulata*, *Gymnocarpus decandrum*, *Haloxylon persicum*, and *Lycium* sp. are abundant. Soil is mostly sandy with rocky areas. Wadis are filled with alluvial materials washed from the calcareous sandstones.

4. Saharo-Arabian region: This is the largest biogeographical region of Jordan and covers over 70% of the total area of the country. It is located to the east bordering the Irano-Turanian region from the west and the Sudanian Penetration region from the southwest. The sand dune desert vegetation is dominated by *Haloxylon persicum*, *Hammada scoparia* and *Ochra denus baccatus*. Open areas and wadi beds are characterized by *Achillea fragrantissima*, *Artemisia herba-alba* and *Astragalus* sp. Few scattered *Acacia tortilis* are also found. The soil mostly consists of gravel, sandy Hamada, saline and sandy soils. The altitude ranges from 100 m bsl to 800 m asl, with rainfall not exceeding 50 mm annually. Within this region, Azraq Oasis, stands as landmark in the middle of Jordan's eastern desert.

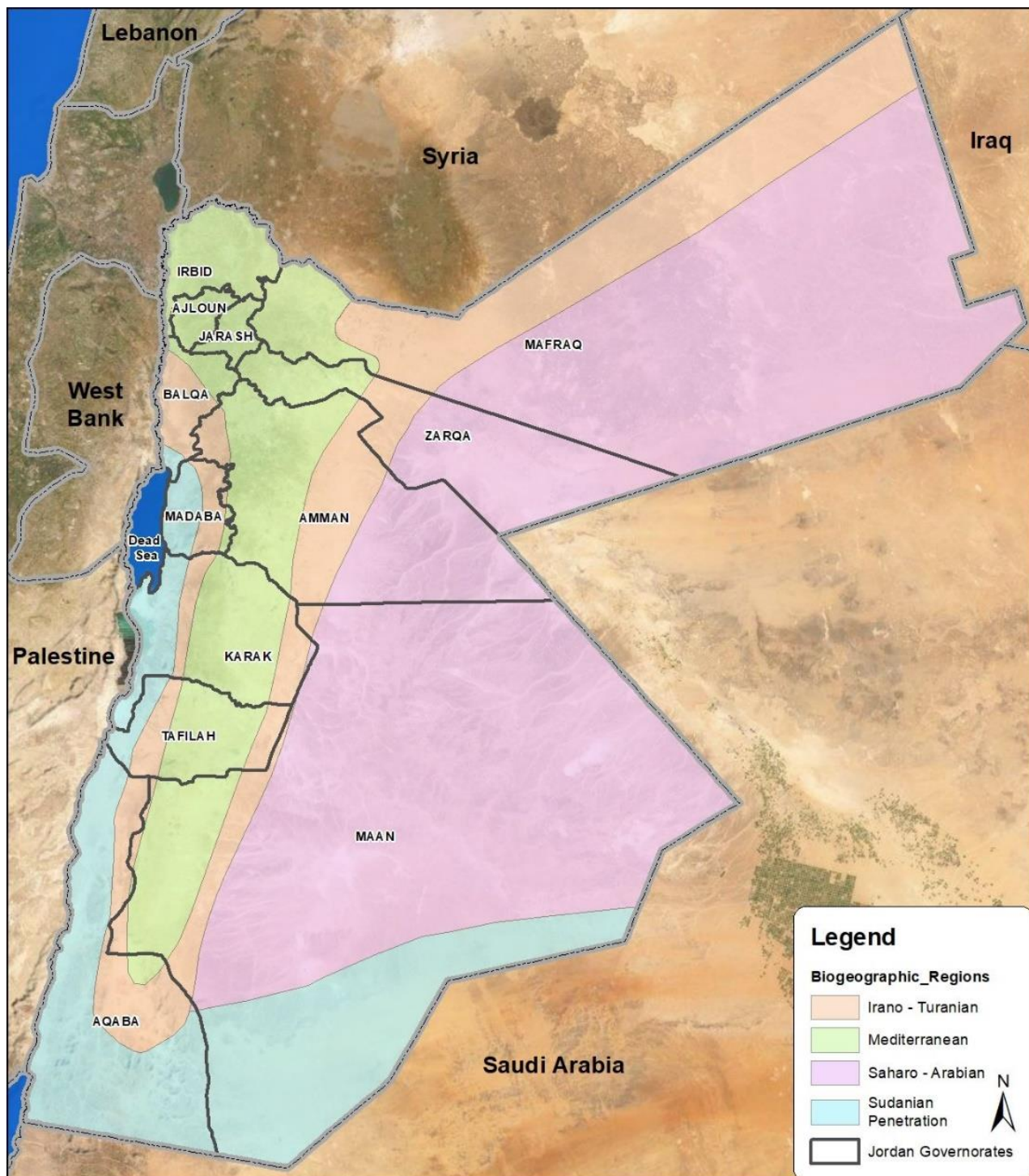


Figure 8: Biogeographic Regions of Jordan

Jordan's biodiversity is rather interesting due to its location, where three different faunal elements meet, namely: the Ethiopian, Oriental and Palearctic. This diversity is a combination of these elements in addition to the occurrence of endemic forms. In addition, the entire area underwent many geological changes in the past that resulted in the formation of very different habitats and ecological regions (Amr & Disi, 2011).

Although Jordan is a relatively small country, it enjoys a wide variation of habitats, including forested areas, sand stone, gravel and black lava deserts, freshwater habitats as well as sand dunes (**Figure 9**).

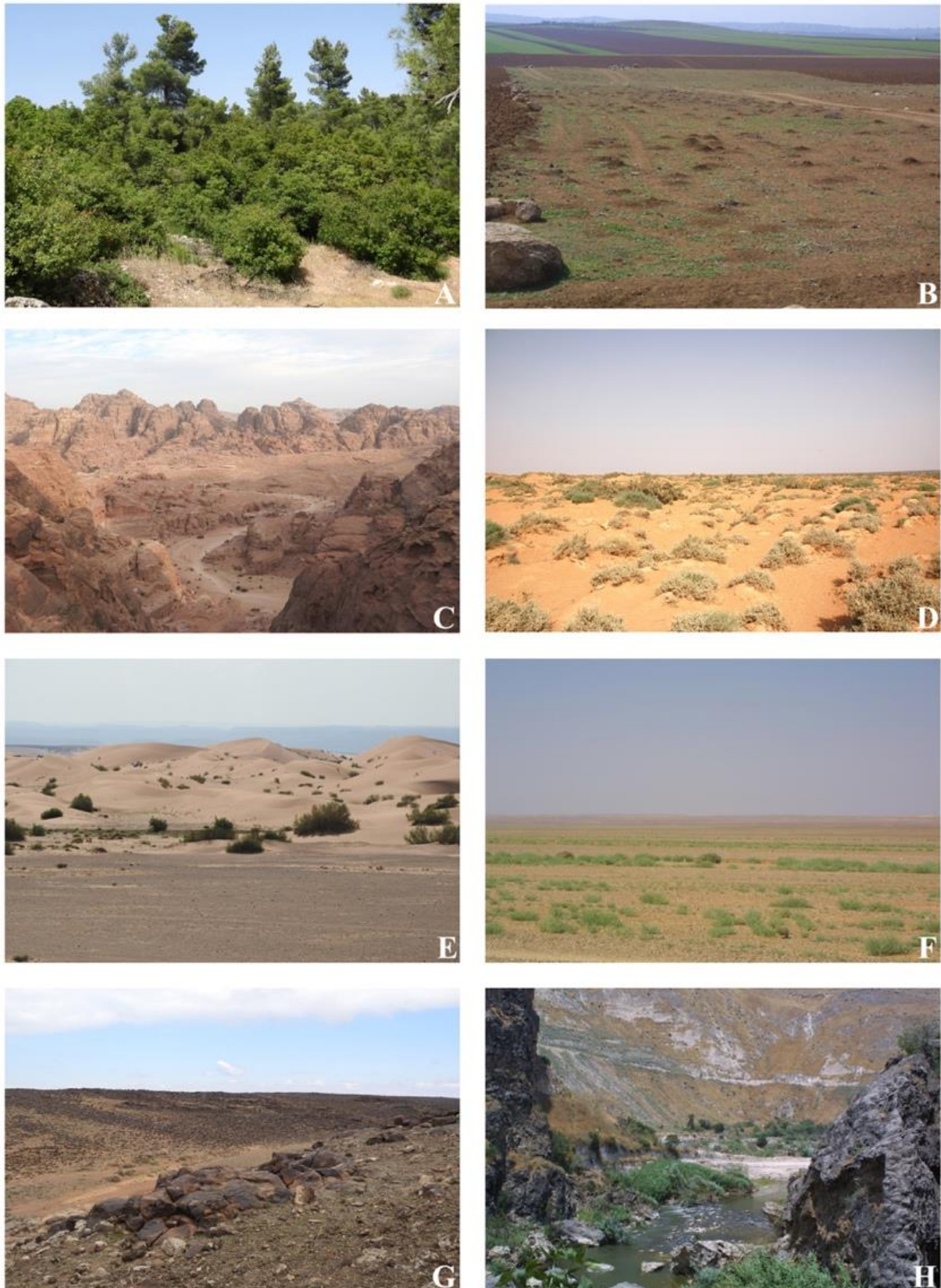


Figure 9: Habitat Types A,B,C,D,E,F,G, and H

The habitats elaborated in Figure above can be described as following:

- Habitat Type A: Temperate Mediterranean habitat with abundance of evergreen oak (*Quercus* sp.) and pine forests in northern Jordan
- Type B: Non- forest Mediterranean habitat with agricultural fields
- Type C: Desert rocky slopes and sandstone mountains
- Type D: Wadi-beds with silt dunes and loess substrates
- Type E: Sand dunes with *Haloxylon* shrubs and *Acacia* trees in Wādī ‘Araba
- Type F: Open Hamada in eastern Jordan with ample bushes of *Seidlitzia rosmarinus*
- Type G: Boulders of black lava desert in eastern Jordan
- Type H: The riparian habitat at the Yarmouk River Basin in northern Jordan

5.2.1 Flora

a) Plant Species

About 2,545 plant species belonging to 113 families and around 810 genera have been recorded in Jordan. Of these, 100 species are considered endemic to Jordan, Palestine and Syria and are represented in several genera such as *Crocus*, *Colchicum*, *Iris* and *Verbascum*, while only eight species are endemic to Jordan (Table 5). A total of 375 species are considered rare or very rare, such as species of the genera *Orchis*, *Romulea*, *Biarum* and *Globularia*, while more than 70 species are considered extinct (Taifour & El-Oqlah, 2016; MOE. 2020).

Table 5: Endemic Species restricted to Jordan

Family	Species
Asteraceae	<i>Artemisia jordanica</i> Danin, 1999
Caryophyllaceae	<i>Silene danaensis</i> Danin, 1997
Lamiaceae	<i>Origanum jordanicum</i> Danin & Künne, 1996
	<i>Origanum petraeum</i> Danin, 1990
	<i>Origanum punonense</i> Danin, 1990
	<i>Satureja nabateorum</i> Danin & Hedge, 1998
Plantaginaceae	<i>Kickxia petrana</i> Danin, 1991
Rubiaceae	<i>Rubia danaensis</i> Danin, 1997

b) Orchids and Irises of Jordan

Of the attractive species, 30 species of orchids have been recorded in Jordan (Table 6). The taxa belong to the genera *Anacamptis*, *Cephalanthera*, *Epipactis*, *Himantoglossum*, *Limodorum*, *Ophrys* and *Orchis* (Al-Eisawi, 1986; Taifour & El-Oqlah, 2016). Four species of *Iris* have also been recorded in Jordan (Table 7, Error! Reference source not found.). Many of these species are associated with forested areas.

Table 6: Orchids Recorded in Jordan

Family	Species
Orchidaceae	<i>Anacamptis collina</i> (Banks & Sol. ex Russell)
	<i>Anacamptis laxiflora</i> (Lam.)
	<i>Anacamptis palustris</i> (Jacq)
	<i>Anacamptis papilionacea</i> (L.)
	<i>Anacamptis pyramidalis</i> (L.)
	<i>Anacamptis sancta</i> (L.)
	<i>Cephalanthera longifolia</i> (L.) Fritsch
	<i>Epipactis veratrifolia</i> Boiss. & Hohen
	<i>Himantoglossum affine</i> (Boiss.) Schltr. i
	<i>Limodorum abortivum</i> (L.) Swartz
	<i>Neotinea maculata</i> (Desf.)
	<i>Neotinea tridentata</i> (Scop.)
	<i>Ophrys apifera</i> Huds
	<i>Ophrys sphegodes</i> Miller, Gard. Dict. ed
	<i>Ophrys transhyrcana</i> Czernjak. in Not. Syst. (Leningrad)
	<i>Ophrys umbilicata</i> Desf. i
	<i>Ophrys vernixia</i> Brot., Fl. Lusit.
	<i>Orchis anatolica</i> Boiss.
	<i>Orchis collina</i> Banks & Solander
	<i>Orchis galilaea</i> (Bornm. & M. Schulze) Schltr.
	<i>Orchis laxiflora</i> Lam.
	<i>Orchis palustris</i> Jacq.
	<i>Orchis papilionacea</i> L.
	<i>Orchis punctulata</i> Steven ex Lindle

	<i>Ophrys apifera</i> Hudson	<i>Orchis sancta</i> L.
	<i>Ophrys fusca</i> Link	<i>Orchis simia</i> Lam.
	<i>Ophrys lutea</i> Icon.	<i>Orchis tridentata</i> Scop.

Table 7: Some Common Irises of Jordan

Species	Common name
<i>Iris atrofusca</i>	Jalad Iris
<i>Iris atropurpurea</i>	Purple iris
<i>Iris bismarckiana</i>	Nazareth Iris
<i>Iris nigricans</i>	Black Iris
<i>Iris petrana</i>	Petra Iris



Figure 10 Orchis and Iris of Jordan

Upper left: A: *Orchis galilaea*. B: *Orchis anatolica*. C: *Orchis tridentata*. D: *Orchis papilionacea*, upper right A: *Ophrys fusca*. B: *Himantoglossum affine*. C: *Limodorum abortivum*. D: *Cephalanthera longifolia*, bottom Irises of Jordan. A: *Iris atrofusca*. B: *Iris bismarckiana*.

c) Trees of Jordan

Sixty-one species of native woody trees are known to occur in Jordan (**Table 8**). Eleven species are considered critically endangered. The forests of Jordan extend from the mountain range in the Yarmouk River in the far north to the Sharah Mountains in the south. Four natural tree species stand out throughout this series: deciduous oak (*Quercus ithaburensis*), evergreen oak (*Quercus coccifera*), Phoenician juniper (*Juniperus phoenicea*), and Aleppo pine (*Pinus halepensis*) but in smaller quantities. In addition to the aforementioned natural species, some important tree species appear in the form of confined assemblies, the most important of which are the two types of acacia (*Acacia tortilis*), radial acacia (*Acacia raddiana*), arak trees (*Salvadora persica*) and tamarisk (*Tamarix* sp.). The cultured tree species is dominated by Aleppo pine (*Pinus halepensis*) and cypress (*Cupressus sempervirens*).

Reactional areas are mostly located within the forested regions of Jordan, making these trees vulnerable to malpractices that may cause damages or harm. Some of these trees are considered historical such as the Phoenician juniper (*Juniperus phoenicea*) and the Atlantic pistacia (*Pistacia atlantica*) in Al Tafilah and Al Shoubak; respectively (**Figure 11**).

Table 8: Trees of Jordan and their Conservation Status*

Scientific name	Arabic name	LC	NT	VU	EN	CR
<i>Acacia gerrardii</i>	السيال					
<i>Acacia laeta</i>	اكاسيا لاطيا					
<i>Acacia raddiana</i>	الاكاسيا الشعاعية					
<i>Acacia tortilis</i>	السمر					
<i>Amygdalus arabica</i>	لوز عربي					
<i>Amygdalus communis</i>	اللوز البري					
<i>Amygdalus korschinskii</i>	اللوز البري					
<i>Arbutus andrachne</i>	القيقب					
<i>Balanites aegyptiaca</i>	الزقوم					
<i>Calotropis procera</i>	العشيرة					
<i>Celtis australis</i>	الميس					
<i>Ceratonia siliqua</i>	الخروب					
<i>Cercis siliquastrum</i>	الزميزيق					
<i>Crataegus aronia</i>	الزعرور					
<i>Crataegus azarolus</i>	الزعرور					
<i>Cupressus sempervirens</i>	السرو الأخضر					
<i>Dalbergia sissoo</i>	الرشاش					
<i>Faidherbia albida</i>	اكاسيا السنط					
<i>Ficus carica</i>	التين البري					
<i>Ficus palmata</i>	التين					
<i>Hyphaene thebaica</i>	نخيل او جهل					
<i>Juniperus phoenicea</i>	العرعر الفينيقي					
<i>Laurus nobilis</i>	الغار					
<i>Maerua crassifolia</i>	السوس، المروا					
<i>Moringa peregrina</i>	الاليسر					
<i>Olea europaea</i>	الزيتون البري					
<i>Phoenix dactylifera</i>	نخيل البلح					
<i>Phyllaria latifolia</i>	البرزة					
<i>Pinus halepensis</i>	الصنوبر الحلبي					
<i>Pistacia atlantica</i>	البطم الاطلسي					
<i>Pistacia khinjuk</i>	بطم الكنجدك					
<i>Pistacia palaestina</i>	البطم الفلسطيني					
<i>Pistacia lentiscus</i>	بطم عديسي					
<i>Platanus orientalis</i>	الدلب الشرقي					
<i>Populus alba</i>	الحور الابيض					
<i>Populus euphratica</i>	الحور الفراتي					

Scientific name	Arabic name	LC	NT	VU	EN	CR
<i>Pyrus syriaca</i>	الاجاص البري					
<i>Quercus coccifera</i>	السنديان دائم الخضرة					
<i>Quercus infectoria</i>	بلوط الفش					
<i>Quercus ithaburensis</i>	الملول					
<i>Salix acmophylla</i>	صفصاف					
<i>Salix acmophylla</i>	صفصاف					
<i>Salix alba</i>	صفصاف					
<i>Salix mucronata</i>	صفصاف					
<i>Salvadora persica</i>	الاراك					
<i>Sambucus nigra</i>	البيلسان					
<i>Styrax officinalis</i>	العبر					
<i>Tamarix amplexicaulis</i>	الطرفا					
<i>Tamarix aphylla</i>	الطرفا					
<i>Tamarix arborea</i>	الطرفا					
<i>Tamarix chinensis</i>	الطرفا					
<i>Tamarix macrocarpa</i>	الطرفا					
<i>Tamarix mannifera</i>	الطرفا					
<i>Tamarix nilotica</i>	الطرفا					
<i>Tamarix palaestina</i>	الطرفا					
<i>Tamarix parviflora</i>	الطرفا					
<i>Tamarix passerinoides</i>	الطرفا					
<i>Tamarix tetragyna</i>	الطرفا					
<i>Ziziphus lotus</i>	سدر					
<i>Ziziphus nummularia</i>	سدر زاحف					
<i>Ziziphus spina-christi</i>	السدر					

*CR: Critically Endangered, EN: Endangered, NT: Near Threatened, VU: Vulnerable, LC: Least Concern



Juniperus phoenicea.



Pistacia atlantica.

Figure 11: Historical Trees in Jordan

5.2.2 Fauna

a) Mammals

So far, a total of 82 species and subspecies of mammals are known to occur in Jordan (Table 9). These species belong to eight orders (Amr, 2012). Bats, carnivores and artiodactyls are the most sensitive species, some with national conservation status (Eid *et al.*, 2021).

According to the Red Data book of mammals in Jordan (Eid et al., 2021), ten are Critically Endangered, 20 are Endangered, and three are Vulnerable. In addition, five (6%) were considered to be Near Threatened, three (3%) are Data Deficient, 38 are Least Concern (45%) (**Table 10**).

Table 9: Diversity of Mammals in Jordan

Order	No. of Families	No. of Species
Soricomorpha	1	2
Erinaceomorpha	1	3
Chiroptera	9	26
Carnivora	5	16
Hyracoidea	1	1
Lagomorpha	1	1
Artiodactyla	2	5
Rodentia	7	28
Total	27	82

Common Species Perhaps rodents are the most common species known to occur in Jordan. More than 17 species are considered common. These namely are, Family Muridae: *Dipodillus dasyurus*, *Gerbillus nanus*, *Gerbillus henleyi*, *Gerbillus gerbillus*, *Meriones tristrami*, *Meriones libycus*, *Meriones crassus*, *Psammomys obesus*, *Microtus guentheri*, *Apodemus mystacinus*, *Rattus rattus*, *Rattus norvegicus*, *Mus musculus*, *Acomys dimidiatus*, *Acomys russatus*, Family Spalacidae: *Spalax ehrenbergi*, and Family Dipodidae: *Jaculus jaculus*.

Other species such as hedgehogs (Family Erinaceidae: *Erinaceus europaeus*, *Hemiechinus auritus*, *Paraechinus aethiopicus* and *Paraechinus aethiopicus*) are still common despite the heavy death tolls especially on highways and small roads. Among the carnivores, the Red Fox (*Vulpes vulpes*) is the only species that is not affected by human activities. This fox seems to be adapted to all types of habitats in Jordan, given its wide range of distribution. In addition, the only common species in the order Artiodactyla is the Wild Boar, *Sus scrofa*, where it is quite commonly found along the River Jordan and Yarmouk River in the Jordan Valley.

The reason these species are common is due to the fact that these animals are not under direct threat by human activities and have a high reproductive potential. Additionally, the natural habitats for these species are away from human settlements and subsequently are not under direct threat from man-made changes. Some species, however, are associated with urban habitats (i.e. *R. rattus*, *R. norvegicus* and *M. musculus*).

Threatened Species From the beginning of this century and continuing to the present day, very rapid changes have occurred in the Middle East and particularly in Jordan. These changes include the introduction of machine guns and vehicles that invaded the deserts and all types of habitats, as well as continuous population growth. These changes had a tremendous impact on the wildlife in many aspects, and land use for agriculture and development took its toll at the expense of wildlife habitats (Quemsiyeh et al., 1994). Additionally, unlawful hunting of some species caused severe decline in their populations. Artiodactyls are the most affected mammals, such as the Nubian Ibex, *Capra nubiana*, and the gazelles, *Gazella dorcas* and *Gazella subgutturosa*. Most species of the order Carnivora were drastically affected, and some were actually extinct. Of those that are considered threatened: Family Canidae: *Canis aureus*, *Canis lupus*, *Vulpes cana*, *Vulpes ruppelli*, Family Mustelidae: *Martes foina*, *Meles meles*, *Mellivora capensis*, *Lutra lutra*, *Vormela peregusna*, Family Viverridae: *Herpestes ichneumon*, Family Hyaenidae: *Hyaena hyaena*, Family Felidae: *Caracal caracal*, *Felis chaus* and *Felis margarita*. **Table 10** provides the National and IUCN Conservation Status of Mammals of Jordan.

Table 10: National and IUCN Conservation Status of Mammals of Jordan (Eid et al., 2021)

Species	Common Name	National Status*	Global Status, 2020*
<i>Rhinolophus mehelyi</i>	Mehely's horseshoe bat	CR	VU
<i>Lutra lutra</i>	Eurasian otter	CR	NT
<i>Gazella dorcas</i>	Dorcas gazelle	CR	VU
<i>Gazella gazella</i> °	Mountain gazelle	CR	EN
<i>Gazella marica</i>	Goitered gazelle	CR	VU
<i>Capreolus capreolus</i>	Roe deer	CR	LC

Species	Common Name	National Status*	Global Status, 2020*
<i>Rhinolophus ferrumequinum</i>	Greater horseshoe bat	EN	LC
<i>Rhinopoma microphyllum</i>	Greater mouse-tailed bat	EN	LC
<i>Taphozous perforatus</i>	Egyptian tomb bat	EN	LC
<i>Taphozous nudiventris</i>	Naked-rumped tomb bat	EN	LC
<i>Nycteris thebaica</i>	Egyptian slit-faced bat	EN	LC
<i>Miniopterus pallidus</i>	Schreibers's long-fingered bat	EN	LC
<i>Myotis blythii</i>	Lesser mouse-eared bat	EN	LC
<i>Myotis emarginatus</i>	Geoffroy's bat	EN	LC
<i>Sciurus anomalus</i>	Persian squirrel	EN	LC
<i>Allactaga euphratica</i>	Euphrates jerboa	EN	LC
<i>Apodemus flavicollis</i>	Yellow-necked mouse	EN	LC
<i>Canis lupus</i>	Arabian wolf	EN	LC
<i>Vulpes cana</i>	Blanford's fox	EN	LC
<i>Herpestes ichneumon</i>	Egyptian mongoose	EN	LC
<i>Hyaena hyaena</i>	Striped hyaena	EN	NT
<i>Martes foina</i>	Stone marten	EN	LC
<i>Lepus capensis</i>	Cape hare	EN	LC
<i>Procavia capensis</i>	Rock hyrax	EN	LC
<i>Capra nubiana</i>	Nubian ibex	EN	VU
<i>Rhinolophus euryale</i>	Mediterranean horseshoe bat	EN	NT
<i>Asellia tridens</i>	Trident leaf-nosed bat	VU	LC
<i>Hystrix indica</i>	Indian crested porcupine	VU	LC
<i>Meles meles</i>	Common badger	VU	LC
<i>Rousettus aegyptiacus</i>	Egyptian fruit bat	NT	LC
<i>Rhinolophus hipposideros</i>	Lesser horseshoe bat	NT	LC
<i>Barbastella leucomelas</i>	Asian barbastelle	NT	LC
<i>Eliomys melanurus</i>	Asian garden dormouse	NT	LC
<i>Vulpes rueppelli</i>	Sand fox	NT	LC

*CR: Critically Endangered, EN: Endangered, NT: Near Threatened, VU: Vulnerable, LC: Least Concern

Two species of the order Rodentia, the Persian Squirrel, *Sciurus anomalus*, and the Indian Crested Porcupine, *Hystrix indica*, are considered as threatened. This is largely based on the consumption of the porcupine flesh for medicinal purposes by the locals and the agricultural expansion and deforestation of pine and oak forests, the perfect habitats for the Persian Squirrel.

The Cape Hare, *Lepus capensis*, is under continuous threat in the Jordanian desert. On the other hand, the Rock Hyrax, *Procavia capensis*, has a restricted distribution in relatively fragile habitats, placing this little known animal under threat.

b) Vertebrates

The freshwater and terrestrial herpetofauna of Jordan consists of 99 species of extant reptiles and three amphibians (Disi et al., 2014). Two amphibian species became extinct within the past thirty years (*Triturus vittatus* and *Pelobates syriacus*). On the other hand, reptiles are diversified and include 17 families and 54 genera with a total of 99 species and subspecies (Table 11).

Table 11: Diversity of Reptiles in Jordan

Family	No. of Genera	No. of Species/Subspecies
Testudinidae	1	1
Bataguridae	1	1
Agamidae	5	11
Chamaeleonidae	1	1
Gekkonidae	8	12
Phyllodactylidae	1	4

Family	No. of Genera	No. of Species/Subspecies
Lacertidae	5	20
Scincidae	7	10
Anguidae	1	1
Varanidae	1	1
Leptotyphlopidae	1	1
Typhlopidae	2	2
Boidae	1	1
Colubridae	12	24
Atractaspididae	2	2
Viperidae	5	6
Elapidae	1	1
Total	54	99

Endemic Species Jordan is part of the greater Levant, and some lizard species are considered endemic to Jordan and the nearby countries, especially Palestine, Syria, and Lebanon. For instance, *Pseudotrapelus aqabensis* and *Ptyodactylus ananjevae* were recently found in Jordan, however, the first species could also be found in southern Palestine and northern Arabia and the second species in northern Arabia. Similarly, *Hemidactylus mindiae* has a distribution confined to Wadi Ramm in southern Jordan and Sinai (Amr et al., 2007), and *Chalcides guentheri* is endemic to Jordan, Lebanon, Palestine, and Syria. On the other hand, some other species are considered endemic to east Jordan and northwest Arabia (*Acanthodactylus hardyi*, *A. scutellatus*, and *A. tilburyi*). Subspecies of *Phoenicolacerta kulzeri* are confined to southern Jordan. *Stellagama stellio picea* is endemic to eastern Jordan and northwest Arabia (Disi, 2011). *Acanthodactylus ahmaddisii* is known to be found in a small area in Jordan. A new lacertid, the Wadi Ramm Wall Lizard, *Phoenicolacerta kulzeri khazaliensis* was recently found in southern Jordan (Modry et al., 2013).

As for snakes, endemism perse is not known, however, seven species are considered endemic to the Levant. For example, Simon's Blind Snake, *Rhinotyphlops simoni* and *Daboia palaestinae*, are confined to Jordan, Palestine, Lebanon and Syria while the Mole Viper, *Atractaspis engaddensis* is so far known to be found in Palestine, Jordan Sinai, and NW Arabia. *Eirenis coronelloides* and *Eirenis lineomaculatus* are known to be found in the Levant.

Two other species that occur only in southern Jordan and Palestine, northern Arabia and Sinai; are *Platycephalus elegantissimus* and *Platycephalus sinai*, and they should be considered as endemics for the region. Lastly, *Telescopus hoogstraali* has a narrow range of distribution from Sinai, Palestine, and southern Jordan, and is certainly endemic to this area (Amr & Disi, 2011).

Table 12 provides a list of the IUCN status of reptiles in Jordan.

Table 12: Reptiles Known in Jordan Listed Under the IUCN Categories

Family	Species	IUCN Status 2020
Agamidae	<i>Uromastix aegyptia</i>	NT
Lacertidae	<i>Acanthodactylus ahmaddisii</i>	EN
	<i>Acanthodactylus pardalis</i>	VU
	<i>Phoenicolacerta kulzeri</i>	EN
Scincidae	<i>Chalcides guentheri</i>	VU
Colubridae	<i>Platycephalus elegantissimus</i>	DD
	<i>Platycephalus sinai</i>	DD
	<i>Telescopus hoogstraali</i>	EN

*EN: Endangered, NT: Near Threatened, VU: Vulnerable, DD: Data Deficient

5.2.3 Avifauna

Jordan is located on the main migration route of birds; where millions of birds pass through Jordan during migration seasons in autumn and spring (**Figure 12**). So far, a total of 436 of birds have been recorded in Jordan; 360 of which are migrant species and 76 are considered resident species. The Sinai Rosefinch is the official national bird of Jordan.

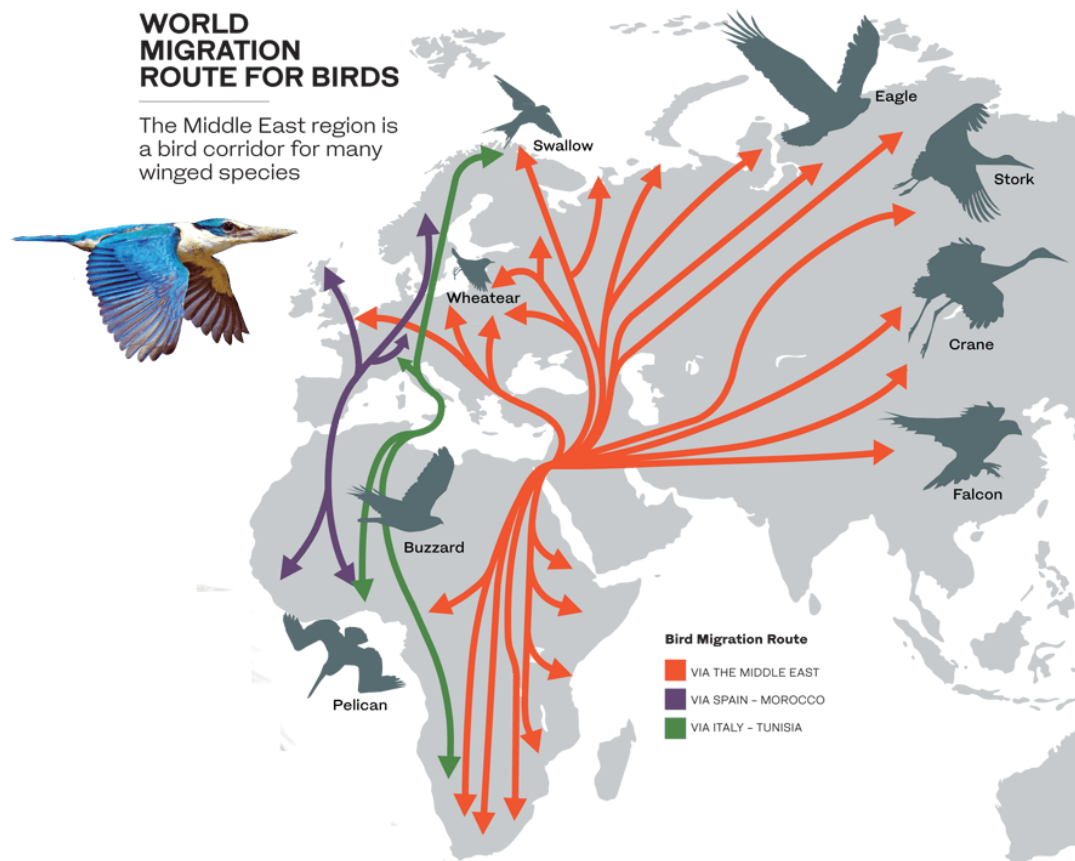


Figure 12: Migration Routes for Birds crossing Jordan

5.2.4 Natural Sensitive Sites

There are 27 key biodiversity areas (KBA's) in Jordan; where they represent variable habitats and harbor a variety of animal and plant communities. These KBA's are used as recreational areas and are frequently visited by local visitors; especially during spring and summer. Some of these KBA's are located close to archaeological sites and are also visited by local and foreign visitors. In addition, many of these KBA's are located close to protected areas (PA's).

PA's in Jordan are managed and operated by the Royal Society for the Conservation of Nature (RSCN) where they represent all types of ecosystems and habitats of Jordan, and are distributed all over the country; desert, mountains, and riparian habitats. **Figure 13** shows the location of protected areas and important bird areas in Jordan.

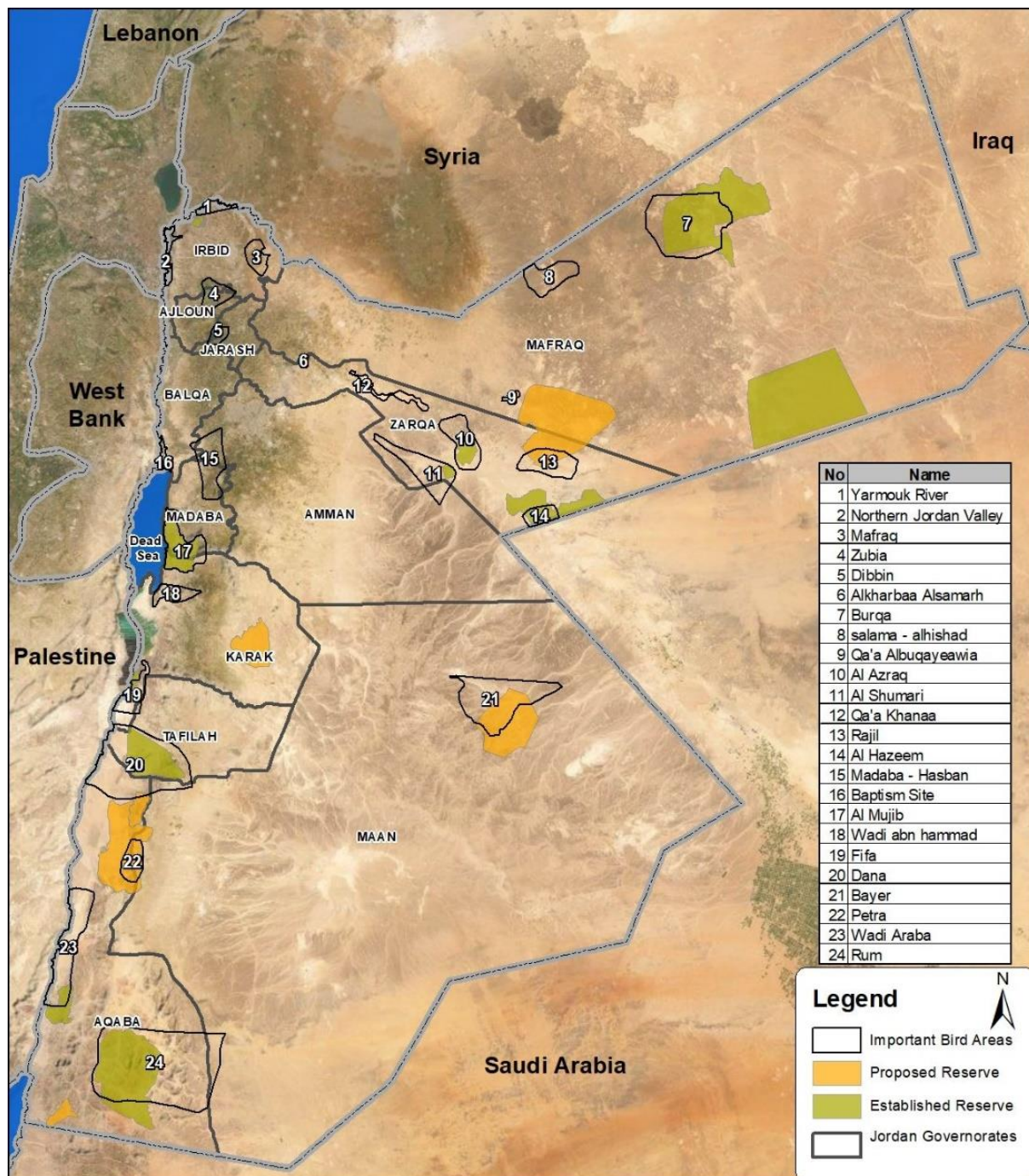


Figure 13: Protected Areas and Important Bird Areas in Jordan (Source: RSCN)

5.3 Water and Wastewater

It is reported that Jordan is the second most water scarce country in the world where the annual renewable water resources are less than 100 m³/person; a value that is well below the severe water scarcity threshold of 500 m³/person (UNICEF, 2022). In 2010, the Ministry of Water and Irrigation (MWI) adopted a policy note regarding the domestic water consumption amounts ranging from 120 L/C/day in Amman, 100 in other cities and 80 L/C/d in rural areas, where the water consumption amounts vary according to the percentage of industrial and commercial subscribers (i.e. non-residential subscribers) (MWI, 2016).

In 2019, groundwater contributed to 54% of the Jordan's water supply with a total water quantity of 601.4 million m³ (MCM) while surface water supplies contributed to 31% of Jordan's water supply with a total water quantity of 340.44

MCM. In addition, treated wastewater contributed to 14% of the Jordan's water supply with a total water quantity of about 159.9 MCM, where 98% of it was reused for irrigation purposes. (MWI, 2019)

As shown in **Table 13**, the agriculture sector has the greatest share of the water supply with a percentage of 51%, followed by municipal and tourism uses, the industrial sector and remote areas and livestock at a percentage of 45%; 3% and 1% respectively (MWI, 2019).

According to the National Water Strategy (2016-2025), the tourism industry consumes about 4 MCM as most touristic activities take place in the cities where water is drawn from the networks, and therefore the consumed quantities are considered part of the Municipal share. In addition, estimates indicate that the economic returns of water consumed for municipal and industrial purposes are respectively 100 times and 70 times more than that consumed for irrigated agriculture.

Table 13: Water Budget (MCM), 2019 (Source: MWI, 2019)

Water Source	Water Use (MCM)				
	Municipal and Tourism	Industrial	Irrigation	Remote Areas and Livestock	Total
Groundwater	355.02	25.41	219	1.97	601.4
Surface Water	140.54	7.66	184.14	8.1	340.44
Treated Wastewater	0	2.5	157.4	0	159.9
Seawater Desalination (Aqaba)	1.81	1.31	0	0	3.12
Total	497.37	36.88	560.54	10.07	1,104.86

5.3.1 Municipal Water Supply

The annual municipal water supply over the years 2008 and 2018 is presented in **Table 14**, where it shows that municipal water consumption has increased by more than 50% over ten years. This can be attributed to population growth, economic activities and influx of refugees.

At the governorate level, Amman is the highest municipal water consumer followed by Zarqa and Irbid, while Madaba, Jerash, Tafilah and Ajloun are among the governorates with the lowest amount of municipal water supply.

Table 14: Municipal Water Supply for Jordan's Governorates over the Years 2008-2018 [MCM] (Source: WAJ-ISSP, 2018)

Governorate	Municipal Water Supply (MCM)										
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Amman	128.7	129.0	134.2	132.2	135.8	151.8	179.2	183.3	189.9	195.8	196.0
Balqa	21.4	23.1	25.6	26.1	29.2	30.1	35.7	35.2	42.4	42.5	42.4
Zarqa	44.8	46.7	48.3	50.1	47.3	54.1	66.6	62.7	62.5	63.5	64.1
Madaba	7.4	7.8	7.5	6.7	7.3	8.9	8.9	8.8	8.7	9.8	10.5
Ma'raq	18.6	20.3	20.5	20.4	21.4	20.1	24.7	25.2	27.3	27.6	28.7
Jerash	4.6	4.6	4.7	5.2	5.9	6.2	6.7	7.2	4.7	8.0	8.4
Irbid	39.2	37.0	37.9	41.0	40.5	42.1	45.2	46.9	47.5	50.3	54.0
Ajloun	3.8	3.9	3.9	3.6	4.4	4.7	4.9	4.9	7.9	5.2	5.7
Tafilah	4.6	4.9	4.9	3.5	4.3	4.2	5.5	5.9	6.1	6.1	6.8
Karak	13.7	14.6	15.4	15.2	15.8	18.9	22.2	21.7	22.6	21.1	25.4
Ma'an	9.3	9.1	10.4	10.5	11.9	11.5	14.1	14.2	14.1	14.4	15.7
Aqaba	14.3	12.4	14.5	15.3	15.7	16.3	22.6	23.7	15.9	22.1	24.5
Total	310.4	313.4	327.8	329.8	339.5	368.9	436.3	439.7	449.6	466.4	482.1 *

*including 5.5 MCM for irrigation through the municipal water supply system

The MWI is the main regulator and ultimately responsible for all the water supply and wastewater management and treatment assets in Jordan. The operational management of the water sector however has been delegated to WAJ whom have created three water service companies that have been gradually taking over this responsibility. 1) Miyahuna serves Amman, Balqa, Zarqa and Madaba. 2) Yarmouk Water Company (YWC) serves the Northern municipalities, and 3) Aqaba Water Company (AWC) serves Aqaba and the Southern municipalities. In addition, Wadi Araba Development Company is responsible for water management in the Jordan Valley in lieu of the Jordan Valley Authority (JVA).

A major issue that impacts potable water supply in Jordan is the non-revenue water (NRW). It is estimated that in 2019 the total volume of extracted, treated and pumped water was 485 MCM where around 48% of it was lost as (NRW), thereby leaving around 249 MCM of water billed to consumers (**Table 15** and **Figure 14**). NRW can be attributed to different factors such as water leakages in the system caused by poor-quality equipment and pipes, inadequate maintenance, non-working meters and unauthorized connections.

Table 15: Water Produced, NRW and Water Supply per Water Supply Company for 2019 (Source: MWI, 2021)

Utility/Water Supply Company	Water Produced (m ³)	Water Billed	NRW (m ³)	NRW %	Water Supply (l/capita/day)
Miyahuna Amman	200,059,000	122,657,143	77,401,857	38.7	72
Miyahuna Zarqa	60,978,011	23,443,466	37,534,545	61.6	41
Miyahuna Ma'daba	10,152,003	5,412,600	4,739,403	46.7	68
YWC ¹	99,164,018	53,008,437	46,155,581	46.5	46
WAJ-Balqa	41,814,100	13,053,706	28,760,394	68.8	63
WAJ-Karak	22,514,996	7,513,267	15,001,729	66.6	56
WAJ-Tafilah	7,883,273	2,841,490	5,041,783	64	70
WAJ-Ma'an	15,551,332	4,221,331	11,330,001	72.9	63
AWC	27,114,087	17,102,992	10,011,095	36.9	215
Total Potable Water	485,230,820	249,254,432	235,976,388	48.6	62
JVA ²	NA	182,420,000	NA	NA	NA

¹ YWC is comprised of several departments, namely, Irbid, Jerash, Ajloun and Ma'raq

² Amount of water billed refers to irrigation water



Figure 14: Water Supply per Governorate for the Year 2019

5.3.2 Water Dams

Water management in Jordan is also performed through 14 dams distributed along the country (Figure 15). Table 16 provides the storage capacity and water storage of the dams.

Table 16: Dams Storage Capacity, Water Storage, Inflow and Outflow, 2019 (Source: MWI, 2019)

Dam	Storage Capacity (MCM)	Inflow (MCM)	Outflow (MCM)	Storage (MCM)
Al Wehdah	110	54.02	60.33	5.3

Dam	Storage Capacity (MCM)	Inflow (MCM)	Outflow (MCM)	Storage (MCM)
Al Arab	16.79	9.91	9.91	2.84
Ziglab	3.96	0.59	0.67	0.56
Kufranja	7.8	11.79	10.26	3.20
King Talal	75	152.70	147.65	47.59
Al Karamah	55	5.10	1.60	20.16
Shueib	1.7	11.10	11.29	1.51
Al Kafrain	8.45	14.62	14.32	3.81
Zarqa Ma'in	2.0	0.78	0.92	0.35
Al Tannour	14.7	4.00	3.49	1.9
Al Wala	8.2	19.30	20.14	5.91
Al Moujib	29.82	20.67	26.04	10.2
Al Lajoun	1.0	0.68	0.67	0.096
Al Karak	2.0	0.55	0.52	0.112
Total	336.4	305.81	307.82	103.6
% Storage compared to design capacity	30.8%			

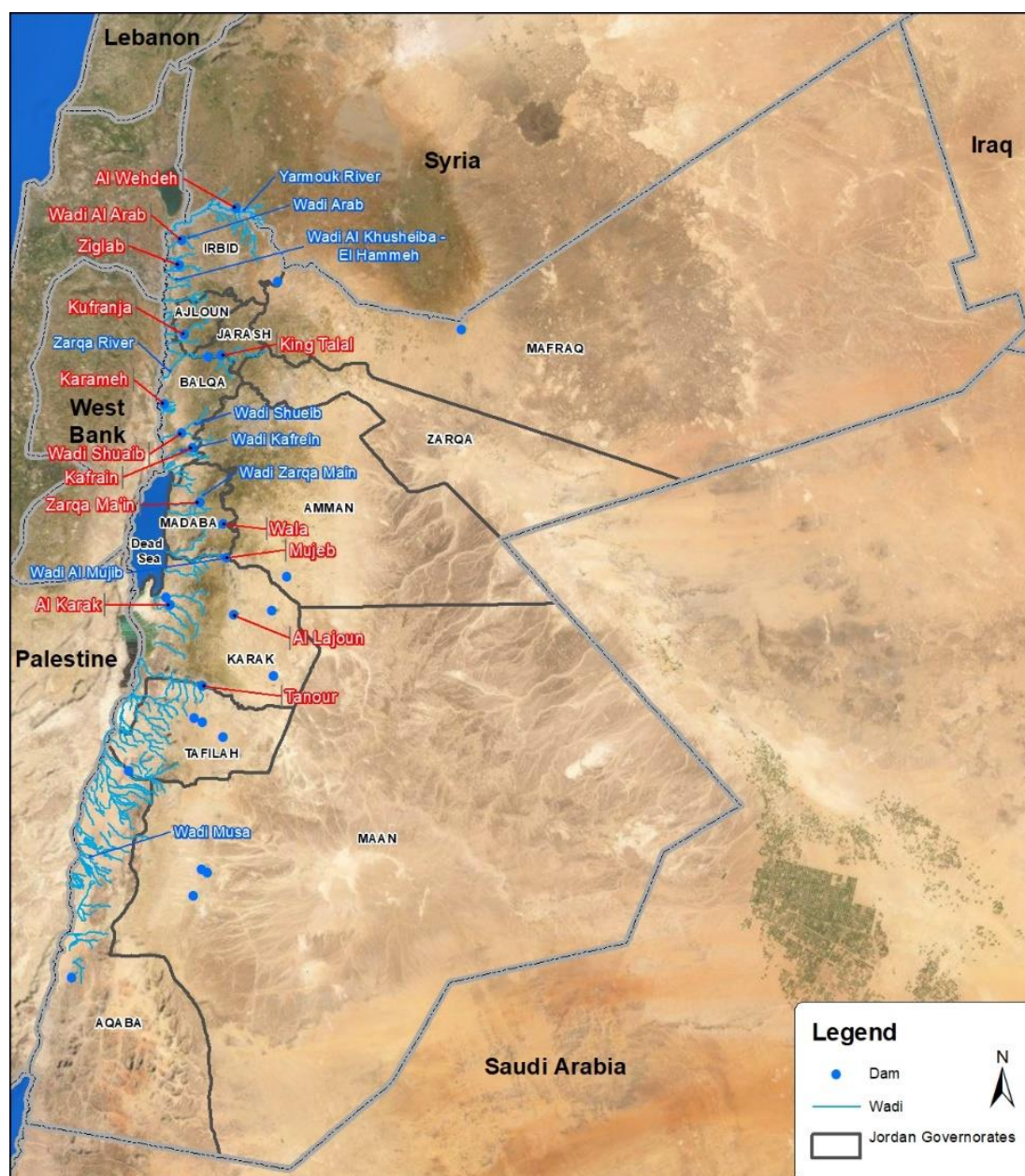


Figure 15: Water Dams in Jordan

5.3.3 Water Supply and Demand

It is estimated that by 2025 a gap of around 130 MCM in water supply compared to demand shall be formed and must be filled from additional water sources (MWI, 2020). In view of that, seawater desalination comes in as the only remaining viable option where the MWI has launched the Aqaba-Amman Water Desalination and Conveyance National Project (AAWDC) and it is designed to generate 300 MCM/year of drinking water for its full capacity and is anticipated to operate by 2028 (MWI, 2021). **Figure 16** provides the projected demands and supplies up to the year 2040.

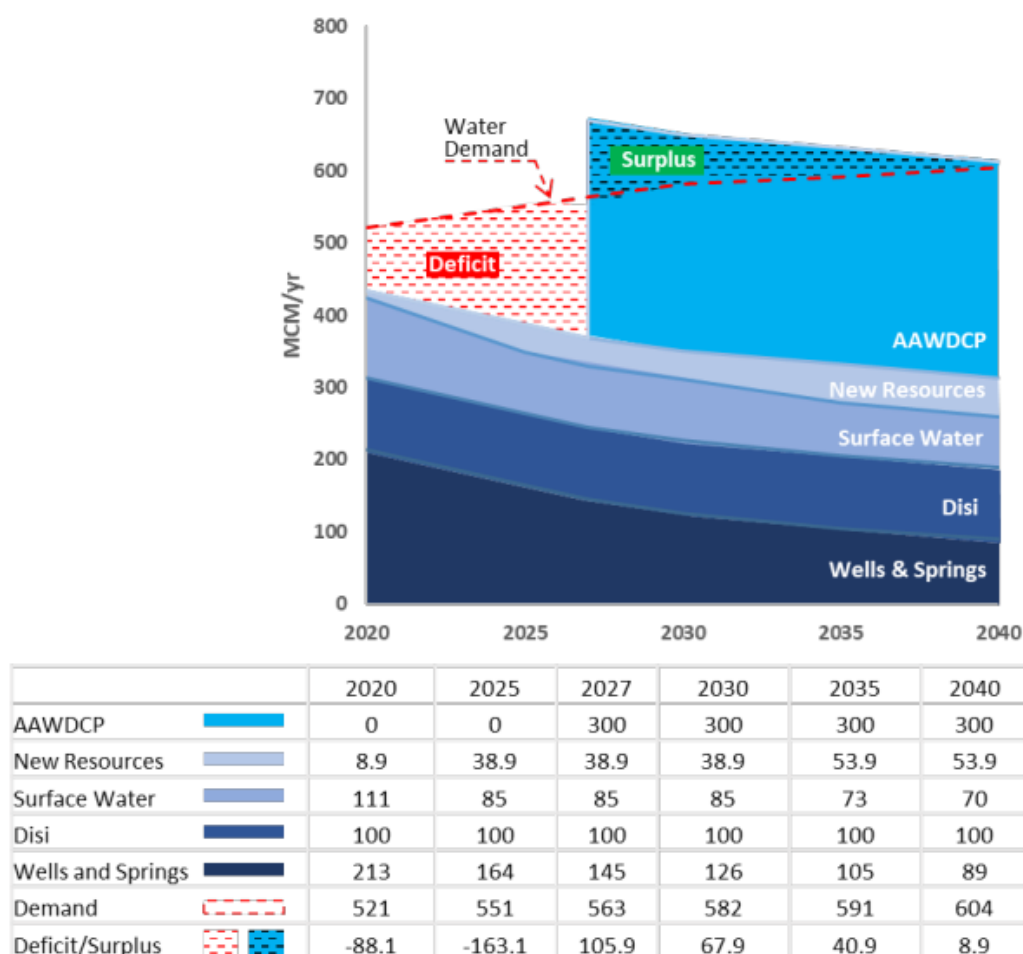


Figure 16: Projected Demands and Supplies up to 2040 (MWI, 2020) with the Latest AAWDCP capacity as announced by the MWI in July 2021 (Source: MWI, 2021)

5.3.4 Wastewater Treatment

Among the national targets related to SDG 6 (Clean Water and Sanitation) is halving the proportion of untreated wastewater which can be measured using the percentage of safely treated wastewater (MWI, 2016). **Figure 17** shows the quantities of treated wastewater from 2007 to 2017 where as reported in 2017, there are 34 wastewater treatment plants in Jordan (**Table 17** and **Figure 18**) (MWI, 2017).

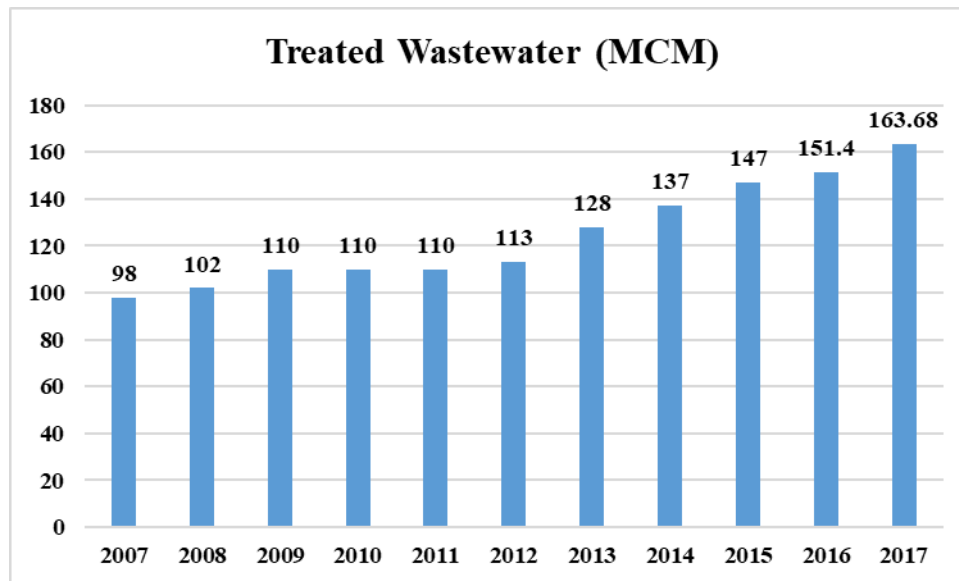


Figure 17: Treated Wastewater Quantities from 2007 to 2017 (Source: MWI, 2019)

Table 17: Wastewater Treatment Plants in Jordan (Source: MWI, 2019)

Region	Wastewater Treatment Plant	Capacity (m ³ /day)	Actual Load (m ³ /day)
North	Wadi Al Arab	20,800	12,683
	Central Irbid	13,350	8,272
	Ekeider	4,000	2,087
	Al Mansoura	50	20
	North Shuna	1,200	655
	Wadi Shallala	13,750	8,421
	Ramtha	5,400	4,268
	Wadi Hassan	1,600	1,262
	Kufranjah	9,000	3,497
	East Jerash	9,500	–
	West Jerash (Merad)	10,000	4,397
	Mafrq	5,500	3,731
Central	Za'atari Refugee Camp	3,500	1,468
	Khirbet As Samra	360,000	344,548.5
	Baq'a/Ain Al Basha	14,900	14,563
	Abu Nseir	4,000	3,385
	As Salt	2,500	8,086
	Fuheis and Mahes	2,400	2,928
	Tal Al Mantah	400	383
	Wadi As Seer	17,000	5,040
	South Amman	52,000	13,517.5
	Al Jiza	4,000	895
	Madaba	7,600	7,388
	Azraq Refugee Camp	1,760	0
South	Aqaba Natural System	9,000	7,066
	Aqaba Mechanical System	12,000	12,719
	New Aqaba Mechanical System	28,000	–
	Ma'an	7,000	2,324
	Wadi Mousa	3,400	2,832

Region	Wastewater Treatment Plant	Capacity (m ³ /day)	Actual Load (m ³ /day)
	Tafilah	1,600	1,945
	Karak	5,500	1,321
	Al Lajoun	1,200	712
	Al Shobak	350	153
	Mouta'a	7,060	1,369

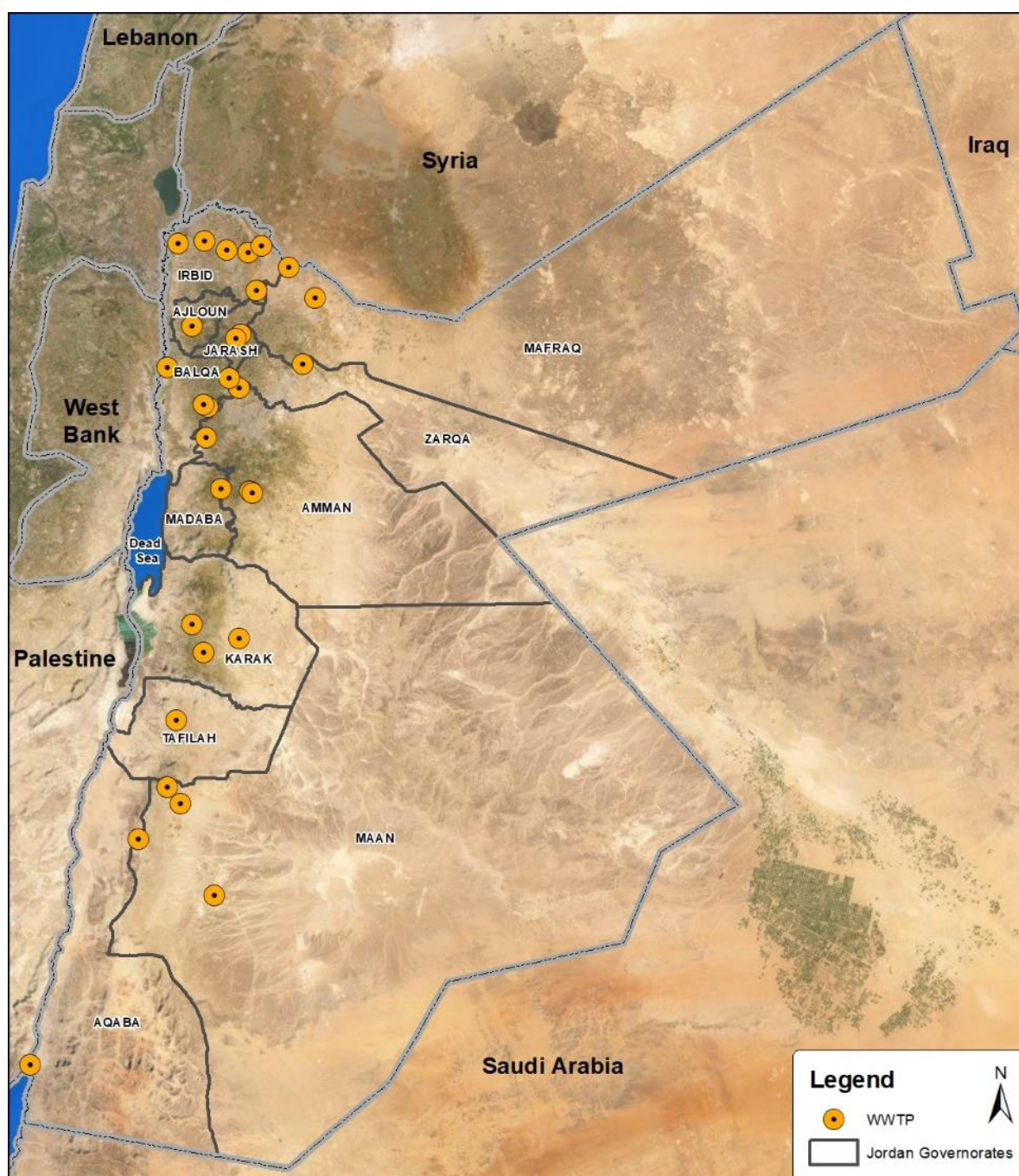


Figure 18: Location of Wastewater Treatment Plants in Jordan

5.3.5 Water Quality

Ministry of Environmental reports on Ground water quality from monitoring activities. Quality of all the groundwater monitored sites for the year 2020 were in compliance with the Jordanian Standard (JS 286:2015 Water – Drinking Water) in relation to the physical and chemical parameters except for the following water resources; where compared to the standard there have been exceedances in the levels of pH, Mn, TH, F, NO₃, TDS & SO₄:

- Qenya spring
- Sarah spring
- Kairouan spring
- Al-Ruwaished well
- Al Muwaqqar well No. (17)
- The conveyance pipeline from Al Bashariyyah well No. (140) to Al Safawi station before treatment
- Grendel water spring
- Al Russaifya well

In relation to microbiological parameters of raw water quality, the water resources have been classified as protected groundwater sources – category I and unprotected groundwater sources – category II; where the former would require disinfection only while the latter would require filtration and disinfection so that it is suitable for drinking purposes. In addition, Um Rummannah was classified as unprotected groundwater sources – category III, which can be used for drinking purposes, provided that it undergoes advanced treatment (MoEnv, 2020).

5.3.6 Vulnerable Water Resources in Jordan

According to the Jordanian Microbiological Guideline for the Quality of Raw Water for Drinking Water; issued by the Higher Committee for Water, hot spots are those areas where groundwater contamination has occurred or is expected to occur due to untreated wastewater through:

- Leakage of domestic wastewater from cesspools, septic tanks, or sewage networks, or
- Inappropriate handling of wastewater.

Therefore, the coliform bacterium concentration of E. coli, measured as the most probable number (MPN/100 mL), is used for the classification of the pollution level. Sixteen water resources have been identified as hot spots (**Table 18** and **Figure 19**) where El-Qantara spring and Tannur & Rasun spring have been ranked the highest in terms of the need for wastewater management solutions (Breulmann M. et al, 2019).

Table 18: Identified Hot Spots in Jordan for the Year 2019 (Source: Breulmann M., 2019)

Governorate	Water Resource		Abstraction Volume m ³ /y ^{&}	Population Served	Groundwater Protection Zone
	Spring	Well/Wellfield			
Irbid	–	Hareema	1,113,375	15,905	n.a.
	–	Pella	3,082,526	44,036	v
	–	Kufr Asad	2,359,280	33,704	n.a.
Ajloun	El-Qantara	–	473,879	6,770	n.a.
	El-Beida	–	944,137	13,488	n.a.
	Tannur; Rasun	–			
Balqa	Shore'a & Hazzir	–	1,295,350	18,505	v
	–	–			v
	Azraq	–	1,389,844	19,855	v
	Baqouriyyeh	–	2,673,537	38,193	v
	–	Baq'a	1,632,283	23,318	n.a.
	–	Yazidyya	392,040	5,600	n.a.
Zarqa	–	Awajan	3,153,600	45,051	n.a.

	–	Ruseifa	2,124,016	30,343	n.a.
Madaba	–	Heedan	11,149,269	159,275	v
Karak	–	Mujib Dam	15,027,780	214,683	v
n.a.: not available; *calculated on a daily water consumption basis of 70 L/inhabitant; & for the year 2018					

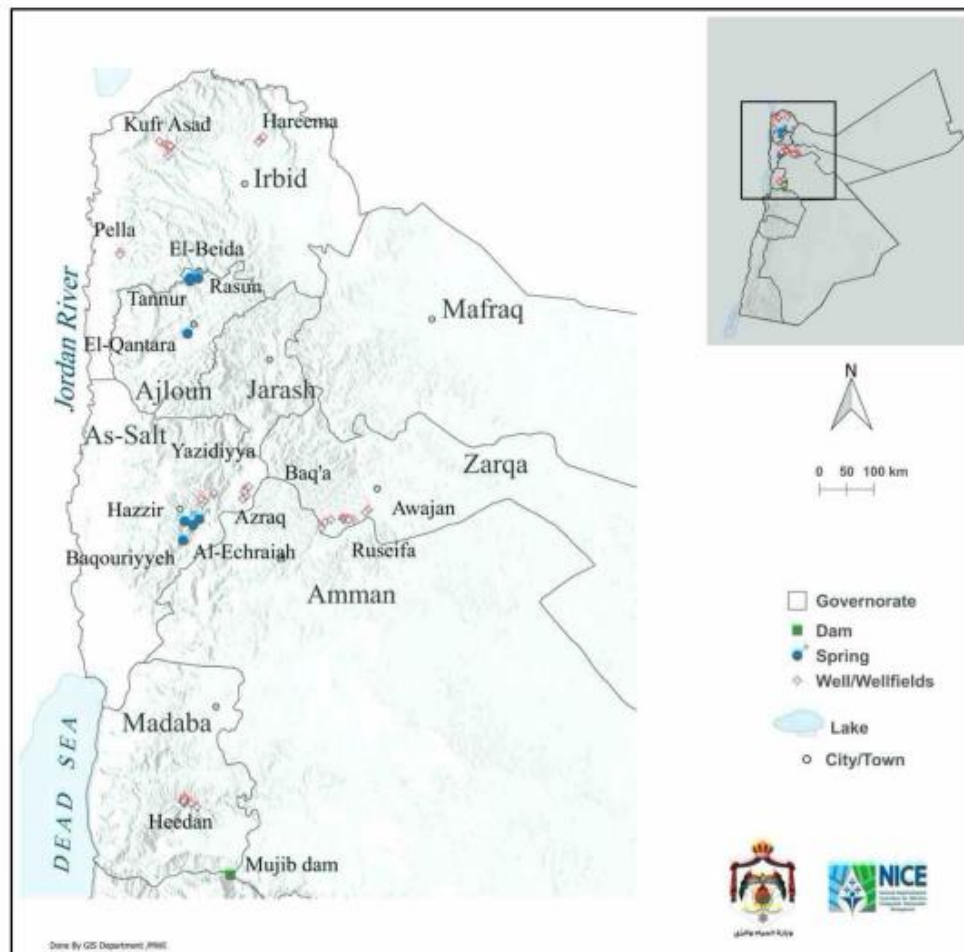


Figure 19: Location of the Sixteen Hot Spots in Jordan (Source: Breulmann M., 2019)

5.4 Transportation

Transportation plays a key role in the tourism sector. In 2020, there was a total of 3,458 km of highways, 2,178 km of secondary roads, and 3,516 km of rural roads in Jordan (MoPWH, 2020). **Table 19** provides the lengths of the various roads by governorate. In addition, **Figure 20** shows the primary and secondary roads in Jordan.

Table 19: Lengths of Road Networks by Type of Road and Governorate, 2020 (km)
(Source: MoPWH, 2020)

Governorate	Highways	Secondary Roads	Rural Roads	Total	%
Amman	306	190	529	1,025	11.2

Governorate	Highways	Secondary Roads	Rural Roads	Total	%
Balqa	277	136	287	700	7.6
Zarqa	351	53	154	558	6.1
Madaba	131	120	188	439	4.8
Irbid	277	390	437	1,104	12.1
Mafrq	520	260	580	1,360	14.9
Jerash	95	108	235	438	4.8
Ajloun	50	142	56	248	2.7
Karak	295	175	207	677	7.4
Tafilah	264	166	165	595	6.5
Ma'an	571	266	627	1,464	16.0
Aqaba	321	172	51	544	5.9
Total	3,458	2,178	3,516	9,152	100

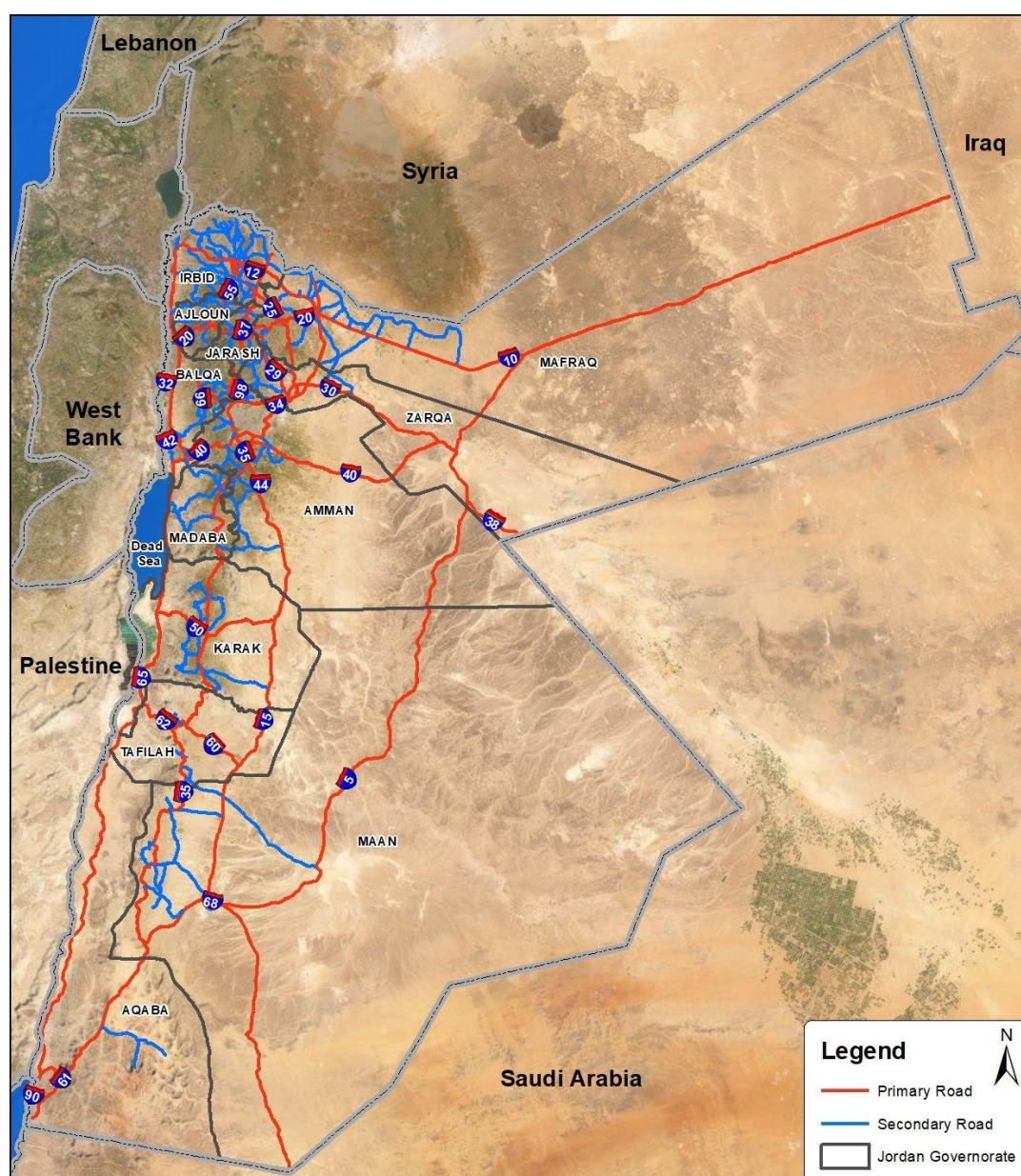


Figure 20: Road Network of Jordan

Modes of public transportation vehicles include small cars, medium-buses and large-buses. In comparison with international indicators, the ratio of public transportation vehicles/1000 people in Jordan is considered low (0.88 compared with 2.66) (Shbeeb, 2018).

Over the years 2009 and 2020, the number of licensed vehicles increased at a rate of 6.7% (The Licensing Department, 2009-2020). In 2020, privately-owned vehicles constituted almost 95% of the total number of licensed vehicles (**Table 10**). As expected, Amman has the highest number of licensed vehicles followed by Irbid and Zarqa while Ajloun, Tafilah and Ma'an have the lowest number of licensed vehicles.

The current condition of low use of public transportation in Jordan has contributed to traffic congestion, air pollution as well as accessibility to employment, education and other activities (MoEnv, 2020).

Table 20: Breakdown of the Number of Selected Licensed Vehicles per Governorate, Type and Ownership, 2020
(Source: The Licensing Department, 2020)

Governorate & Vehicle Ownership	Saloons	Buses	Others ¹	Total
Amman	1,036,391	17,125	39,922	1,093,438
Private	1,018,498	12,618	38,108	1,069,224
Public	17,893	4,507	1,814	24,214
Balqa	26,237	2,029	1,888	30,154
Private	25,322	1,529	1,869	28,720
Public	915	500	19	1,434
Zarqa	38,589	2,226	1,333	42,148
Private	37,060	1,157	1,283	39,500
Public	1,529	1,069	50	2,648
Madaba	6,100	398	854	7,352
Private	5,761	247	849	6,857
Public	339	151	5	495
Irbid	97,339	2,319	5,196	104,854
Private	94,946	1,129	5,148	101,223
Public	2,393	1,190	48	3,631
Ma'raq	12,327	495	1,181	14,003
Private	11,982	145	1,167	13,294
Public	345	350	14	709
Jerash	9,891	445	653	10,989
Private	9,753	280	651	10,684
Public	138	165	2	305
Ajloun	3,267	167	338	3,772
Private	3,154	91	337	3,582
Public	113	76	1	190
Karak	5,201	665	1,146	7,012
Private	5,102	253	1,138	6,493
Public	99	412	8	519
Tafilah	1,467	217	344	2,028
Private	1,366	83	339	1,788
Public	101	134	5	240
Ma'an	2,199	224	710	3,133
Private	1,977	96	707	2,780
Public	222	128	3	353
Aqaba	4,936	402	1,233	6,571
Private	4,311	266	1,166	5,743
Public	625	136	67	828
Total	1,243,944	26,712	54,798	1,325,454
Private	1,219,232	17,894	52,762	1,289,888
Public	24,712	8,818	2,036	35,566

¹Includes motorcycles, agricultural vehicles, construction vehicles, special use vehicles and tourist cars.

In 2021, the first phase of the Bus-Rapid-Transit (BRT) Project was launched by the Greater Amman Municipality (GAM), where it involves the provision of public buses operating on specific tracks and with a capacity of 150 passengers/bus. The future components of the project includes a second phase and a BRT route connecting Amman with Zarqa (BRT study, 2017). This option could promote the utilization of public transportation by some of the citizens and facilitate their movement around the city.

As for aviation, there are three airports in Jordan; two international airports and one domestic airport. **Table 21** lists the air traffic of the three airports in Jordan over the years 2016 and 2020. The aircraft movement at Queen Alia International Airport and Aqaba International Airport has been increasing, however, compared to 2019, aircraft movement in 2020 dropped by 70% and 34% at Queen Alia International Airport and Aqaba International Airport; respectively. On the other hand, air traffic at Amman Airport has been on a decline.

Table 21: Aircraft Movement at Jordanian Airports, 2016 – 2020
(Source: CARC, 2016-2020)

Airport	2016	2017	2018	2019	2020
Queen Alia International Airport	36,897	37,048	38,442	39,880	12,128
Amman Airport	2,990	2,811	1,849	1,551	1,084
Aqaba International Airport	1,920	1,956	2,053	2,361	1,552

5.5 Air Quality

The Ministry of Environment (MoEnv) in Jordan operates a network of ambient air quality monitoring stations in the interest of public health protection. For that reason, the MoEnv established the national ambient air quality monitoring network in 2014 consisting of 12 ambient air quality monitoring stations, where it currently provides real-time hourly readings for 15 air quality monitoring stations (**Figure 21**). Locations of the monitoring stations were chosen based on a scientific study, and cover industrial areas, traffic and residential areas within Amman, Irbid and Zarqa, distributed as follows (MoEnv, 2021):

- 7 stations located in Amman
- 3 stations in Zarqa
- 2 stations in Irbid

The below table (**Table 22**), represents the locations of the monitoring stations in Jordan:

Table 22: Locations of the Air Quality Monitoring Stations in Jordan

Short Name	Name	Type of Station
Amman		
KHG	حدائق الملك حسين King Hussein Gardens	Background
GAM	أمانة عمان الكبرى Greater Amman Municipality	Urban
TAB	مجمع الشمال / طبربور Tabarbour	Traffic
MAH	المحطة / ماركا Marka - Mahata	Urban
UNI	صويلح / شارع الجامعة University street Sweile	Traffic
KAC	مدينة الملك عبدالله الثاني الصناعية / سحاب King Abdullah II Industrial City / Sahab	Industrial
YAR	اليرموك	Industrial

Short Name	Name	Type of Station
	Yarmuk	
Zarqa		
HAI	مركز صحي وادي الحجر Health Center Wadi Hajjar	Traffic
MAS	المسلخ البلدي منطقة المصانع Main Slaughter House – Masane' Zone	Industrial
ABK/HH	القاعة الهاشمية Hashimate Hall	Urban
Irbid		
HSC	مدينة الحسن الرياضية Al Hassan Sport City	Traffic
BAR	شارع البارحة Al Barha Street	Urban

The stations monitor the following pollutants:

- Particulate matter with aerodynamic diameter ≤ 10 microns (PM_{10})
- Carbon monoxide (CO)
- Sulfur dioxide (SO_2)
- Nitrogen dioxide (NO_2)
- Ozone (O_3)

Criteria air quality pollutants (PM , NO_2 , SO_2 , CO, O_3) are monitored continuously and the results are transmitted electronically to a central server where they are audited, analysed and reports issued on a daily, monthly and yearly basis. Once the monitoring results are analysed they are compared to the limits specified in Jordanian Standard No. 1140/2006. Exceedances as stipulated in the standard are reported.



Figure 21: Locations of Air Quality Monitoring Stations in Jordan

Air Quality Index Scale and Color Legend

Air Quality Index (AQI) is an index used by governmental entities to report daily air quality to the public. It is used to communicate on how clean or polluted the air currently is, and how polluted it is forecasted to become, and what potential health effects might be a concern. (US EPA, 2021)

The table below (**Table 23**) provides the Air Quality Index scale as defined by the US-EPA 2016 standard (US EPA, 2021), (MoEnv, 2021):

Table 23: Air Quality Index Scale

AQI <i>When the AQI is in this range:</i>	Air Pollution Level <i>..air quality conditions are:</i>	Colors <i>...as symbolized by this color:</i>	Health Implications <i>.... Possible health effects are:</i>	Cautionary Statement
0 – 50	Good	Green	Air quality is considered satisfactory, and air pollution poses little or no risk	None
51 -100	Moderate	Yellow	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.	Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
101-150	Unhealthy for Sensitive Groups	Orange	Members of sensitive groups may experience health effects. The general public is not likely to be affected.	Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
151-200	Unhealthy	Red	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects	Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit prolonged outdoor exertion
201-300	Very Unhealthy	Purple	Health warnings of emergency conditions. The entire population is more likely to be affected.	Active children and adults, and people with respiratory disease, such as asthma, should avoid all outdoor exertion; everyone else, especially children, should limit outdoor exertion.
300+	Hazardous	Maroon	Health alert: everyone may experience more serious health effects	Everyone should avoid all outdoor exertion

Ambient Air Monitoring Results in 2020

As mentioned above, the stations monitor air quality pollutants (PM, NO₂, SO₂, CO, O₃), consistently where the results are analysed and reported daily. The results of the monitoring for 2020 are summarized in **Table 24**.

Table 24: The Annual Averages of Air Pollutants from 1/1/2020 to 31/12/2020

#	Station	Short Name	PM ₁₀ µg/m ³	NO ₂ ppb	SO ₂ ppb	CO ppb	O ₃ ppb
Average as in Jordanian Limits 1140/2006			70 µg/m ³	50 ppb	40 ppb	N.A	N.A
Amman							
1	King Hussein Gardens	KHG	40.2	4.7	3.9	-	29.9
2	Greater Amman Municipality	GAM	45.6	21.4	15.5	2630	
3	Tabarbour	TAB	51	33.8	-	1756	
4	Marka Mahata	MAH	45	37.7	11.5	-	-
5	University street Sweile	UNI	46.1	23.4	-	-	-
6	King Abdullah II Industrial City / Sahab	KAC	48.8	17.2	7.3	-	20.2
7	Yarmuk	YAR	47.5	26	5.1	-	-
Irbid							
8	Health Center Wadi Hajjar	HAI	63.6	15.3	5.7	1987	-
9	Main Slaughter House – Masane' Zone	MAS	51.6	28.1	4.3	-	-
10	Hashimate Hall	ABK/HH	49.7	19.5	5.4	-	-
Zarqa							
11	Al Hassan Sport City	HSC	30.1	14.3	-	2756	-
12	Al Barha Street	BAR	30.2	18.5	9	-	52.1

The allowable limits for air pollutants are as summarized below:

PM₁₀: The allowable annual average limits for PM₁₀ is 70 µg/m³, while the daily average (24 hours) is 120 (µg/m³), which is not to be exceeded for more than three times in a 12-month period.

Nitrogen dioxide (NO₂): The 24-hour average Jordanian Standard for ambient air quality is 80 ppb while the yearly average is 50 ppb, and it allows three 1-hour average concentrations greater than 210 ppb a 12-month period. Nitrogen dioxide primarily emitted from burning fuel, it is formed from emissions from different vehicles such as cars, trucks and buses, also it is formed from power plants, and off-road equipment. NO₂ can adversely affects the airways in the human respiratory system.

For the **Sulphur dioxide (SO₂)**: The 24-hour average Jordanian Standard for ambient air quality is 140 ppb while the yearly average is 40 ppb. It is allowed for three 1-hour average concentrations greater than 300 ppb in a 12-month period. Sulphur dioxide is emitted by burning of fossil fuels [mainly diesel] or other materials that contain sulfur. It is formed from power plants, metals processing and smelting facilities, diesel vehicles and equipment, and other vehicles. SO₂ irritates the nose, throat and lungs and it could cause bronchitis. It can cause respiratory illness by making breathing more difficult, especially for children, the elderly, and those with pre-existing conditions.

Carbon monoxide (CO) limits is 9 ppm in the 8-hour average guideline, and there is no yearly average in the Jordanian Standard for ambient air quality. The Jordanian Standard allows three 1-hour average concentrations greater than 26 ppm in a 12-month period. CO is monitored only in 4 stations. CO is emitted by burning fuel in cars or trucks, small engines, stoves, lanterns, grills, fireplaces, gas ranges, or furnaces. CO limits the blood's ability to transport oxygen to cells and organs.

Ozone molecule (O₃) The Jordanian Standard guidelines for O₃ are 120 ppb for 1-hour average concentrations and 80 ppb for 8-hour average concentrations and there is no yearly average guideline. When O₃ inhaled, it reacts chemically with many biological molecules in the respiratory tract, leading to a number of adverse health effects.

The below table (Table 25) represents the number of exceedances per each station in 2020.

Table 25: Number of Exceedances per Air Quality Monitoring Station, 2020

#	Station	Short Name	PM10	NO ₂	NO ₂	SO ₂	SO ₂	CO	CO	O ₃	O ₃
Station			24hr AVG	24hr AVG	1hr MAX/24hr	24hr AVG	1hr MAX/24hr	8hr AVG MAX/24hr	1hr MAX/24hr	8hr AV MAX/24hr	1hr MAX/24hr
Limits			120 µg/m3	80 ppb	210 ppb	140 ppb	300 ppb	9000 ppb	26 ppm	80 ppb	120 ppb
Number of allowed exceedances			3	3	3	3	3	3	3	-	-
Amman											
1	King Hussein Gardens	KHG	3	-	-	-	-	-	-	-	-
2	Greater Amman Municipality	GAM	9	-	-	-	-	-	-	-	-
3	Tabarbour	TAB	6	1	-	-	-	-	-	-	-
4	Marka Mahata	MAH	3	11	12	-	-	-	-	-	-
5	University street Sweile	UNI	4	-	-	-	-	-	-	-	-
6	King Abdullah II Industrial City / Sahab	KAC	10	3	-	-	-	-	-	-	-
7	Yarmuk	YAR	18	-	-	-	-	-	-	-	-
Zarqa											
8	Health Center Wadi Hajjar	HAI	29	-	-	-	-	-	-	-	-
9	Main Slaughter House Masane' Zone	MAS	15	-	-	-	-	-	-	-	-

10	Hashimate Hall	ABK/HH	5	-	-	-	-	-	-	-	-
Irbid											
11	Al Hassan Sport City	HSC	3	-	-	-	-	9	-	-	-
12	Al Barha Street	BAR	3	-	-	-	-	-	-	-	-

The results of monitoring the ambient air quality showed that PM10 exceedances in the daily averages were recorded in all stations. These exceedances are probably caused due to natural factors, traffic and industrial activities. However, the results shows that the **hourly averages of SO₂** were within the limits in all monitoring stations, and no excess was observed. The highest hourly average of SO₂ gas reached 190 ppb at the Hashemite Hall Station, Zarqa. Furthermore, the results of monitoring the ambient air quality showed that the hourly averages of SO₂ are within the allowable limit, and no excess was observed since the beginning of the monitoring process until now. Regarding **the daily rates of SO₂** were within the allowable limit as well and no excess has been monitored since the beginning of the monitoring process until now. The **annual averages of SO₂** were within the limits allowed in all monitoring stations as well, where no excess was observed as show, The highest annual average of SO₂ was recorded at Greater Amman Municipality Station in Amman with the average of 15.5 ppb.

The **hourly averages of NO₂** gas in 2020 were within the limits in most of the monitoring stations, but exceedance was detected in Mahatta Station in Amman 12 times above the limit. Furthermore, **daily averages** were exceeded 11 times above the daily limit at Marka/Mahatta station, and one exceedance at Tabarbour station in Amman.

The **hourly averages of CO** in 2020 were within the limits allowed in the Jordanian standard (1140/2006) in all monitoring stations where no excess was observed. The highest hourly average of CO gas reached 16519 ppb at Wadi Al Hajjar station in Zarqa. And the **daily averages of CO** were within the limits as well where no excess was observed, and the highest daily average was 7634 ppb at Wadi Al Hajjar station in Zarqa'. There were no exceedances in **the hourly and daily averages of O₃** were reported.

Based on AQI, the results of monitoring the ambient air quality in the three governorates showed that the average percentage of days in which the air quality was **good [green]** was 75.1%, and it was **moderate [yellow]** for 24% of the year. The average percentage of days when the air was unhealthy for sensitive **groups [Orange]** was 0.7%, and the percentage of days when the air was **unhealthy [red]** was 0.14%. which shows that the air quality is good to moderate most of the year.

Air Quality during the Outbreak of COVID-19.

In March 2020, the government took strict measures to limit the spread of COVID-19. 0, Including the imposition of a comprehensive or partial ban, the disruption of government and private institutions, the closure of borders, and the prohibition of vehicle movement in some periods or the work of the double and single system for the movement of vehicles and other measures taken according to the epidemiological situation.

Air quality analysis was done for the period 15-3-2020 – 15.4.2020. 9. The data was compared with the same period last year and also with a month before Crisis (14/2/2020 to 3/14/2020). Results are presented in the below table (**Table 26**).

Table 26: Percentage Change in Pollutant Concentration Averages in Three Major Cities
Percentage change in pollutant concentration averages in the three major cities

City	The percentage of decrease in daily averages for the period 15/3- 15/4/2020 compared to that in the period 14/2-14/3/2020	The percentage of decrease in the daily averages for the period 15/3-15/4/2020 compared to that in the same period of the year 2019	Average
PM₁₀ (with calculating dust storm)			
Amman	43.3%	32.7%	38%
Irbid	16.2%	13.5%	14.8%
Zarqa	30.7%	29.5%	30.1%
All stations	30.1%	25.2%	27.6%
Nitrogen dioxide (NO₂)			
Amman	51.8%	48%	49.9%
Irbid	66.7%	75.8%	71.2%
Zarqa	43.6%	68.4%	56%
All stations	54%	64.1%	59%
Sulfur dioxide (SO₂)			
Amman	24.4%	11.6%	18%
Irbid	34.6%	60.2%	47.4%
Zarqa	28.5%	59.5%	44%
All stations	29.2%	43.8%	36.5%
Carbon monoxide (CO)			
Amman	26%	9%	17.5%
Irbid	8%	55-%	-
Zarqa	48%	35-%	-
All stations	27.3%	-	-
Ozone (O₃)			
Amman	41%	6%	23.5%
Irbid	17%	25%	21%
All stations	29%	15.5%	22.3%

Despite the negative impact of COVID-19 on the health care system and the economic, it has positive impact on the environment, noticeable air pollution drop was measured during the lockdown. The daily averages of PM₁₀ concentrations was decrease by 28% overall, and when subtracting the effect of dust storms, the percentage decreases by 38%. The daily rates of nitrogen dioxide was reduced by 59% in the three governorates. In addition to that, reports showed a 37% decrease in sulphur dioxide daily rates. The decrease in the daily rates of these pollutants occurred due to the suspension of most human activities such as transportation, industry and services.

5.6 Climatic Change and Energy

The electrical generation and distribution sector structure in Jordan is outlined in **Figure 22** below; where it shows the companies responsible for electric energy generation, transmission and distribution. Jordan currently imports about 93% of its total energy, comprising almost 8% of Jordan's gross domestic product (GDP) thus straining its economy (MEMR, 2019).

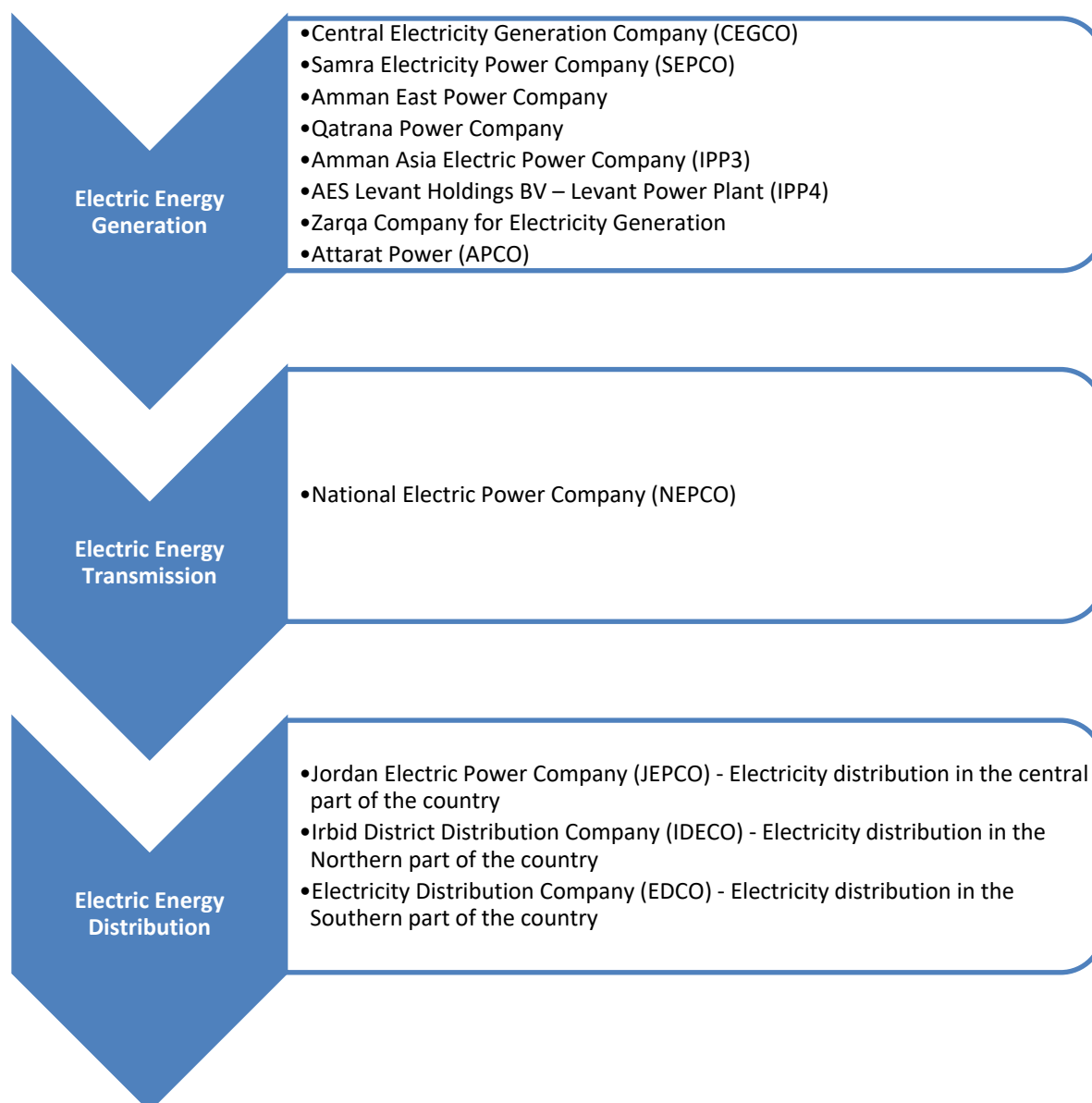


Figure 22: Electricity Sector Structure (Source: MEMR, 2020)

Sustainable Development Goal (SDG) no. 7 focuses on access to affordable, reliable, sustainable and modern energy. Investing in renewable energy and reducing the reliance on fossil fuels plays an important role in achieving this goal¹.

According to the new National Energy Sector Strategy for 2020-2030; renewable energy shall contribute to 31% of electricity generation by 2030.

¹ <https://www.jo.undp.org/content/jordan/en/home/sustainable-development-goals/goal-7-affordable-and-clean-energy.html>

In 2020, electricity was generated in Jordan using natural gas at a rate of (80%) and renewable energy at a rate of (20%). Moreover, **Figure 23** shows the renewable energy capacity for the year 2020 while **Table 27** and **Figure 24** show energy generation sources for the year 2019 (IRENA, 2021).

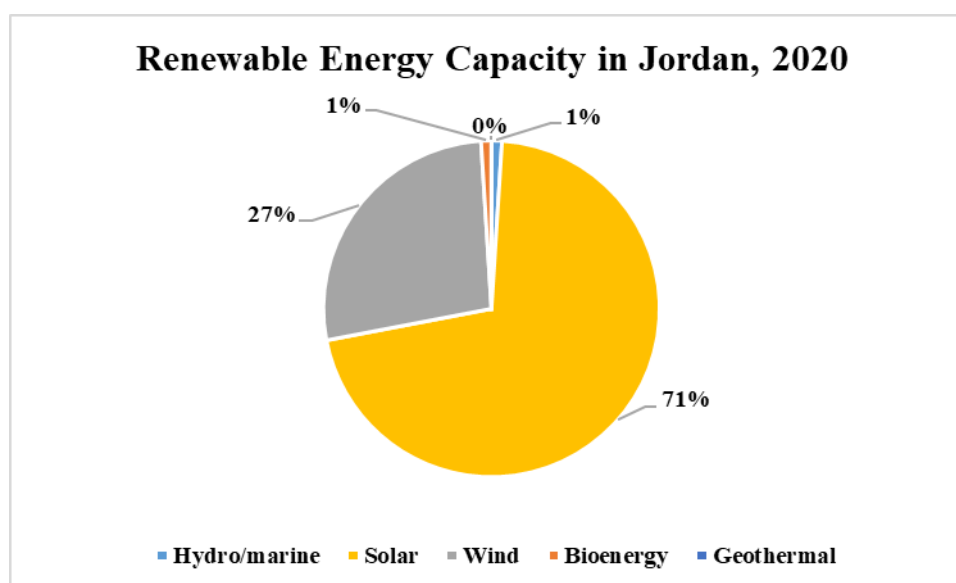


Figure 23: Renewable Energy Capacity in Jordan, 2020 (Source: IRENA, 2021)

Table 27: Energy Generation in Jordan by Source, 2019
(Source: IRENA, 2021)

Energy Generation	GWh	%
Non-renewable	17,995	85.71%
Renewable	3,001	14.29%
Hydro and marine	18	0.09%
Solar	2,087	9.94%
Wind	892	4.25%
Bioenergy	4	0.02%
Geothermal	0	0.00%
Total	20,996	100%

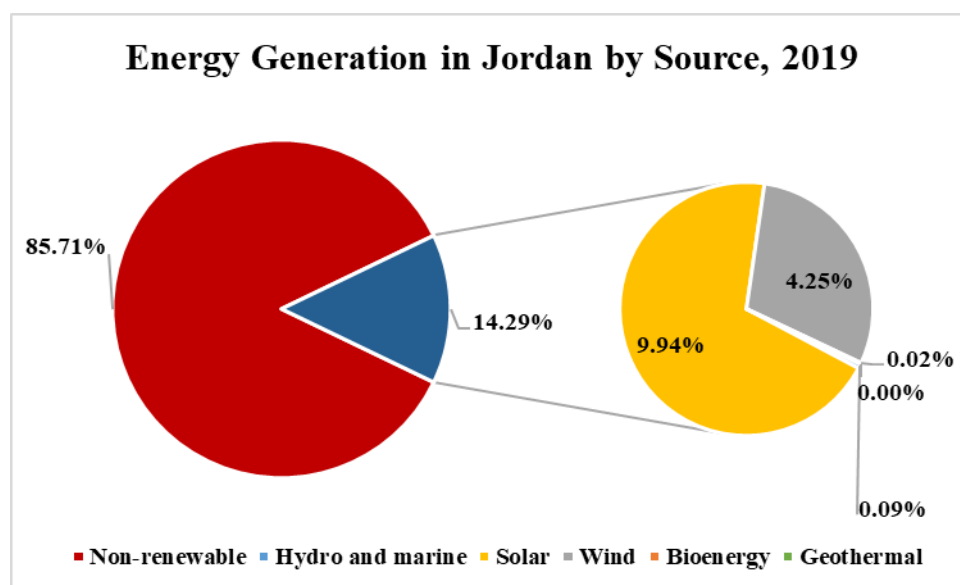


Figure 24: Energy Generation in Jordan by Source, 2019 (Source: IRENA, 2021)

Table 28 below shows the sectoral distribution of electric energy consumption during the period (2016-2020), where the total energy consumption has increased by about 11%. As shown in **Figure 25**, the distribution of electric energy consumption over the years is relatively constant across the sectors, where the residential and public buildings consume the greatest share of electric energy followed by the industrial sector. More specifically, in 2020, the largest energy consumer was residential and public buildings with a percentage of 49%, followed by the industrial sector, agricultural sector, commercial sector and hotels and street lighting with a percentage of 19%, 16%, 14% and 2%; respectively.

On the other hand, compared to 2019, the share of the residential and public buildings in 2020 has increased by 3% while that of the commercial sector and hotels has dropped by 2%. This may be linked to COVID-19, which has had an impact on consumer behaviour and the tourism sector itself.

Table 28: Sectoral Distribution of Electric Energy Consumption during the Period (2016-2020) (GWh)
(Source: MEMR, 2020)

Sector	Year	2016	2017	2018	2019	2020
Residential and Public Buildings		7,642	8,097	7,929	8,260	9,100
Industrial Sector		3,625	3,782	3,822	3,622	3,489
Commercial Sector & Hotels		2,435	2,562	2,650	2,870	2,584
Agricultural Sector/Water Pumping		2,553	2,684	2,696	2,747	2,866
Street Lighting		378	402	407	411	387
Total		16,633	17,527	17,504	17,910	18,426

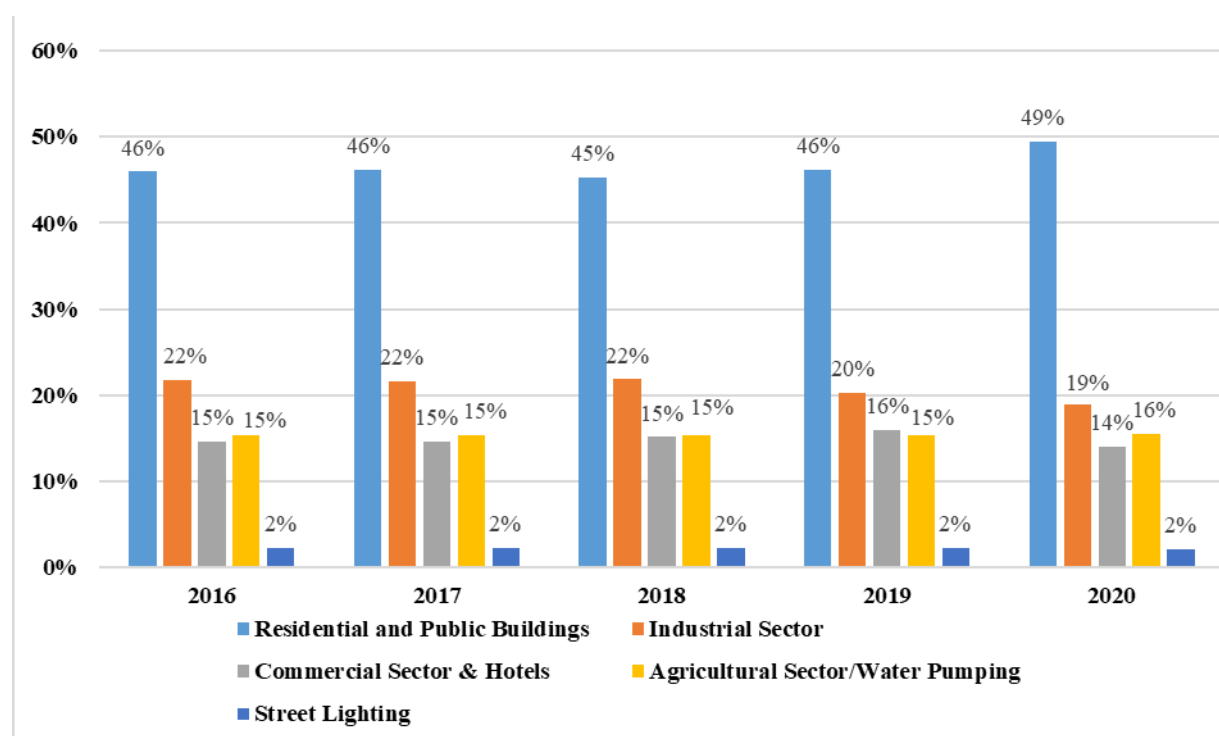


Figure 25: Percentage Distribution of Electric Energy Consumption during the Period (2016-2020)
(Source: MEMR, 2020)

As shown in **Figure 26**, Jordan's greenhouse gas (GHG) profile in 2018 was dominated by emissions from electricity and heat (25.71%), followed by transport (24.31%), industry (15.05%), waste (15.03%), buildings (5.45%), manufacturing and construction (4.37%), aviation and shipping (3.37%), other fuel combustion (3.21%) and fugitive combustion (0.07%) (CAIT, 2022). Emissions from land use change and forestry were zero, indicating that activities in this sector emitted as much as they absorbed (WRI CAIT, 2016).

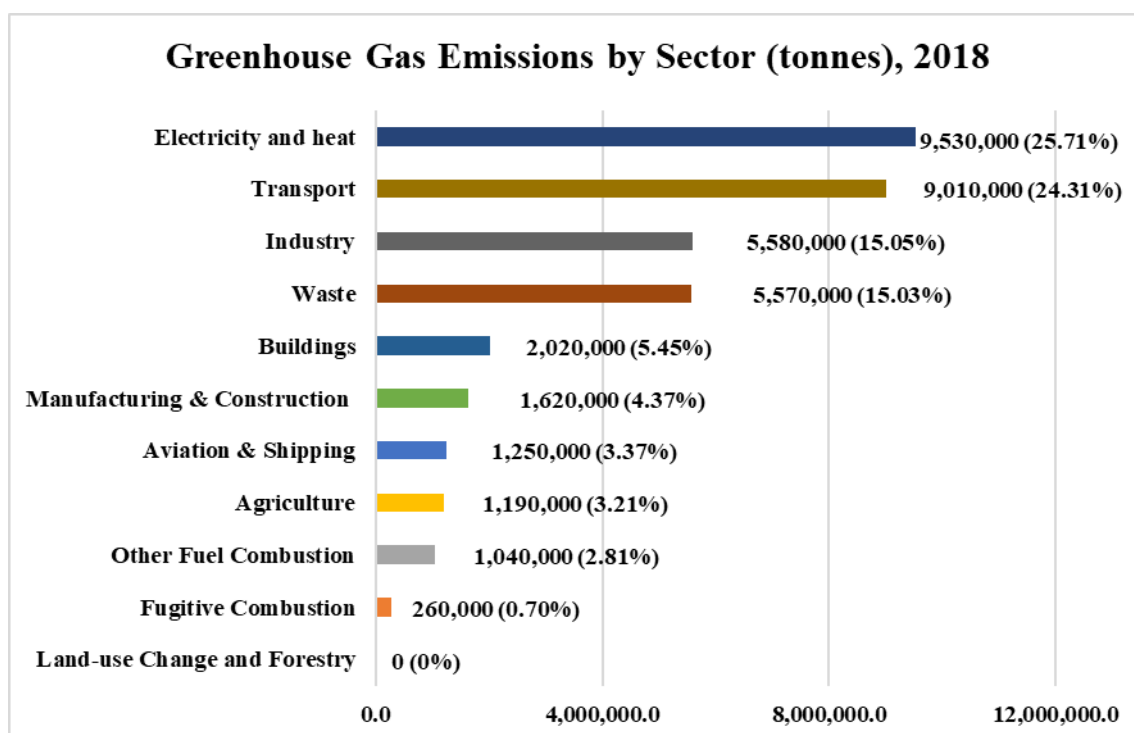


Figure 26: Greenhouse Gas Emissions by Sector, 2018 (Source: CAIT, 2022)

On the other hand, Jordan continues to enhance its climate change mitigation efforts by increasing the country's macroeconomic GHG emission reduction target from 14% in the 1st nationally determined contribution (NDC) to 31% by 2030 in the updated NDC, compared to the Business as Usual (BAU) scenario in 2012 (MoEnv, 2021). The reduction target is quantified to be 11269 Gg CO₂ eq.

Moreover, the reduction target (31%) consists of conditional and unconditional reduction targets divided as follows (MoEnv, 2021):

- Unconditional target: 5%
- Conditional target: 26% (i.e. if the resources and means of implementation are available)

5.7 Waste Management

Several types of wastes should be considered in relation to the development and enhancement of the tourism sector as elaborated in the JNTS including mainly municipal solid waste (MSW), agricultural waste, medical waste, and construction and demolition waste with the main category being MSW.

At the national level, Ministry of environment is the regulatory body for all waste types as per the Solid Waste Management Framework Law No. (16) of 2020. Waste management implementation, however, is mainly done by GAM in Amman and the Ministry of Local Administration (MoLA) in Jordanian governorates country wide. MoLA coordinates with competent authorities to implement the applicable laws, regulations, and supervises municipalities and joint services councils who have important duties related to waste management. Municipalities are typically in charge of street cleaning and waste collection activities including distribution of waste collection containers all over their areas of service in addition to maintaining a waste collection fleet to transport waste to the nearest transfer station or landfill that are usually operated by the Joint service councils.

However, in special zones, local authorities contract private companies for street cleaning and waste collection, such as ASEZA and PDTRA:

1. AQABA SPECIAL ECONOMIC ZONE AUTHORITY (ASEZA) is a duty-free economic development zone for tourism, recreational services, professional services, multi-modal transportation, and value-added industries. It covers approximately 375 km² and includes the land borders of Saudi Arabia and Palestine, extending to the territorial waters of Egypt. In terms of MSWM, the ASEZA is mainly responsible to serve the City of Aqaba through the so-called “Aqaba City Services Center”, where street cleaning, MSW collection and MSW transportation to the Al Aqaba dumpsite are being carried out. Those activities are regularly done through private companies, which sign PPP service contracts with ASEZA.

2. PETRA DEVELOPMENT AND TOURISM REGIONAL AUTHORITY (PDTRA) is a legally, financially and administratively independent Authority, founded in 2009 and aiming to develop Petra region as a touristic destination and to support the local community economically, socially and culturally. It aims to diversify investments in the tourism sector and other active sectors in the region by providing a variety of contributions that focus on the needs of tourists as well as of the local community. The Petra Authority is mainly responsible for the management of the touristic Petra and Wadi Mosa areas. Such mission includes the street cleaning, collection and transportation of produced MSW to Ayl dumpsite.

5.7.1 Waste Generation

In 2015, Ministry of Local Administration (MoLA) developed the National Municipal Solid Waste Management Strategy (NMSWMS), with the aim to improving the SWM sector Kingdom wide, which has become the reference for improvement of SWM in the country. Based on the national figures and data in the NSWMS, MSW generation rate in 2021 was 1.14 kg/cap/day in urban areas, and 0.93 in rural areas, and is expected to reach to 1.24 kg/cap/day in urban areas and 0.97 in rural areas by 2025.

There is lack of accurate data regarding waste generation in the country and amount of waste disposed yearly, due to the absence of information management system and weighbridge at the dumpsite level. According to the NMSWMS, Jordan disposed approximately 2.1 million tons of municipal solid waste (MSW) in 17 official landfills across the Kingdom in 2014. Considering the population and tourism growth, it was estimated that 3.4 million tons were generated in 2021, reaching to 3.9 million tons in 2025. **Table 29** represents the estimated waste generation by tourists from 2021 – 2025, in each governorate.

Table 29: Estimated Waste Generation by Tourists from 2021 – 2025

Administrative Division (Governorate)	2021 (tn/year)	2022 (tn/year)	2023 (tn/year)	2024 (tn/year)	2025 (tn/year)
NORTHERN REGION					
Irbid	33	34	36	38	39
Ma'ra	0	0	0	0	0
Ajloun	1	1	1	1	1
Jerash	8	9	9	10	10
SUM OF NORTHERN REGION	42	42	46	49	50
CENTRAL REGION					
Amman	5,035	5,313	5,607	5,916	6,095
Madaba	283	299	315	333	343
Balqa	113	119	126	133	137
Zarqa	2	2	2	2	2
SUM OF CENTRAL REGION	5,433	5,733	6,050	6,384	6,576
SOUTHERN REGION					
Aqaba	1,154	1,218	1,285	1,356	1,397
Ma'an	592	625	659	696	717
Karak	229	242	255	269	277

Administrative Division (Governorate)	2021 (tn/year)	2022 (tn/year)	2023 (tn/year)	2024 (tn/year)	2025 (tn/year)
Tafilah	10	11	12	12	13
SUM OF SOUTHERN REGION	1,958	2,095	2,211	2,333	2,403
SUM OF JORDAN	7,560	7,872	8,307	8,766	9,030

5.7.2 Waste Collection Treatment and Disposal

MSW collection coverage in Jordan is estimated at about 90% in urban areas and 70% in rural areas. The waste characterization is generally 50% organic waste, 16% plastic waste, 15% paper and cardboard, 2% glass, 1.5% metal and 15.5% other waste. Most of MSW ends up at dumpsites and landfills, whereas only 7% are currently recovered informally in the Kingdom through unofficial waste pickers spread throughout the neighbourhoods and several landfills.

There are 18 operative dumpsites in Jordan (MoLA, 2014), where only 2 locations are considered engineered sanitary landfills; Al Ghabawi landfill and Al Ekaider landfill. In terms of JNTS targeted areas, Irbid, Ajloun and Jarash are served by Al Ekaider landfill, which is located in the North of Jordan, with daily capacity to receive about 1,600 tons of waste a day (MoLA, 2021). Amman is served by the largest landfill in the Kingdom, Al Ghabawi landfill which serves Al Zarqa area as well. Deir Alla dumpsite; located in Al Balqa governorate, receives around of 200 tons of waste daily, where 20 tons are received from Dead Sea hotels area (MoLA, 2021).

Al Humra dumpsite; located 12 Km from Al Salt city, serves Al Salt area and receives approximately 560 tons of waste a day, while Madaba dumpsite is located approximately 2 km from Madaba city in Governorate of Madaba and it serves Madaba area and some cities located in the southern part of Amman governorate. Madaba dumpsite receives around 480 tons of waste a day (MoLA, 2014). Most of the towns and villages of Al Karak governorate are served by the Al Lajoun dumpsite that receives approximately 600 tons of waste a day (MoLA, 2014). Waste generated by Aqaba city (ASEZA) is disposed in Al Aqaba dumpsite, which is located about 10 km north-east Aqaba city, it also receives waste of the Aqaba city and other towns in Aqaba governorate (MoLA, 2014). PDTRA waste is received at Ayl dumpsite located in Ma'an governorate.

Several Transfer Stations have been established by Municipalities or JSCs in many places of Jordan in order to minimise the transportation cost through reduced labour and operating costs, when MSW needs to be transported to a distant receptor. They also reduce the total number of vehicular trips traveling to and from the receptor. There are a total of 14 TS in Jordan (MoLA, 2014).

As mentioned in the previous section, municipalities are responsible for waste collection, except in certain locations such as the ASEZA and the PDTA. In term of waste treatment, there are a total of nine sorting facilities, and three composting facilities that are operated by the JSC and funded by international organizations. In addition to that, there are 3 sorting stations at refugee camps. Furthermore, there are two waste to energy projects in the country, both owned by GAM. The first one is "Amman Ghabawi Landfill Gas to Energy Project" with 6 MW LFG recovery and power generation system at the Al Ghabawi landfill; and the second one is "The Jordan Biogas plant", which is a pilot LFG recovery plant in the old Al-Russeifeh dumpsite with the capacity of 1 MW/h (MoLA, 2014).

Several Transfer Stations have been established by Municipalities or JSCs in many places of Jordan in order to minimise the transportation cost through reduced labour and operating costs, when MSW needs to be transported to a distant receptor. They also reduce the total number of vehicular trips traveling to and from the receptor. There are a total of 14 TS in Jordan.

Figure 27 illustrates the locations of the municipal solid waste management facilities in Jordan.

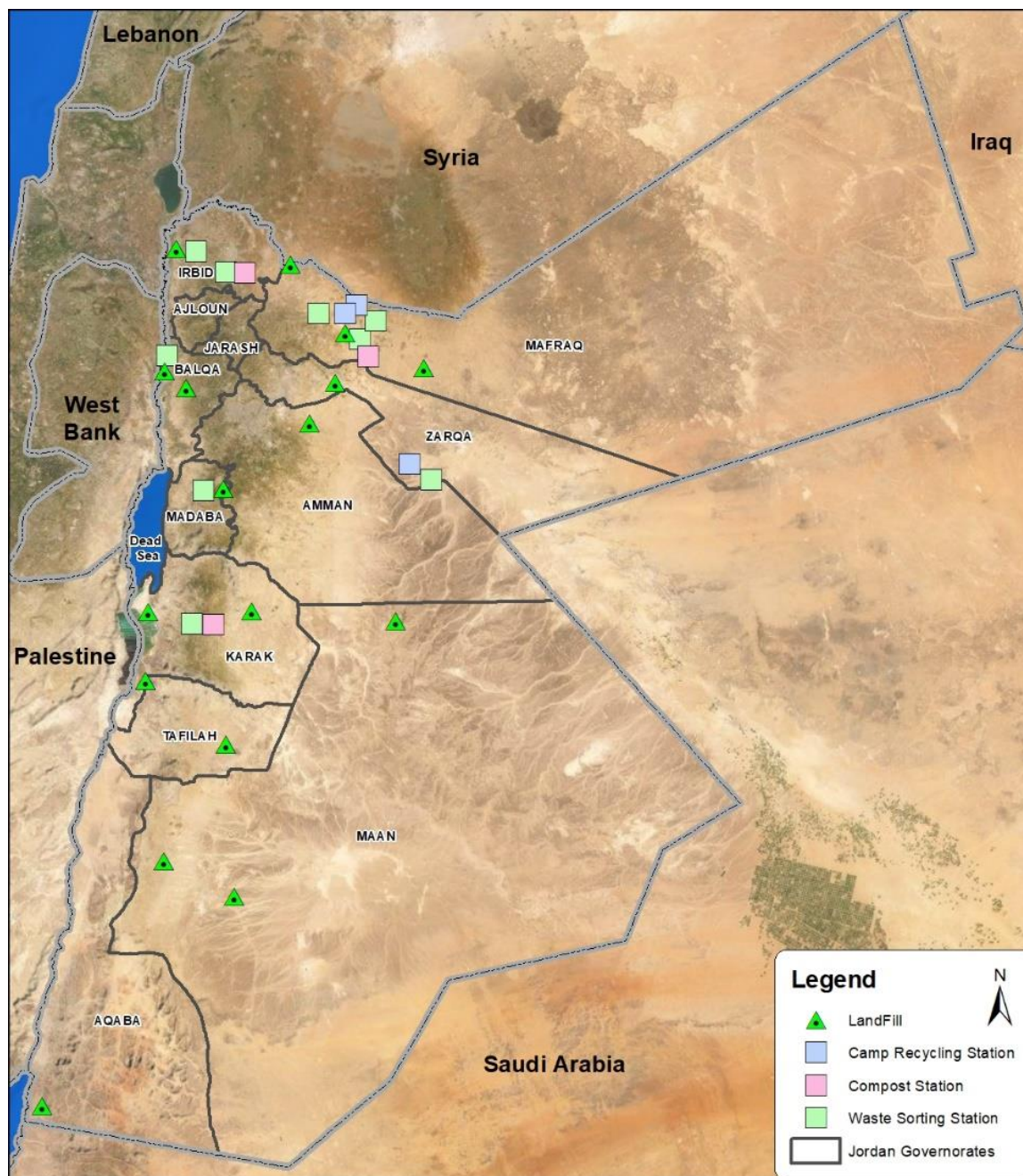


Figure 27: Municipal Solid Waste Management Facilities in Jordan

5.8 Cultural Heritage

Jordan has ratified the United Nations Educational, Scientific and Cultural Organization's (UNESCO) World Heritage Convention in 1975. The Convention includes the concepts of both nature conservation and cultural heritage preservation. Additionally, it also highlights the necessity of preserving the balance between people and their interaction with nature². Currently, there are six heritage sites in Jordan distributed as follows (**Table 30**):

Table 30: Jordan's World Heritage Sites³

Heritage Site	Site Inscription	Date of Inscription
As-Salt - The Place of Tolerance and Urban Hospitality	Cultural Site	2021
Baptism Site "Bethany Beyond the Jordan" (Al-Maghtas)	Cultural Site	2015
Wadi Rum Protected Area	Mixed natural and cultural site	2011
Um Er-Rasas (Kastrom Mefa'a)	Cultural Site	2004
Petra	Cultural Site	1985
Quseir Amra	Cultural Site	1985

Below is a brief description of the heritage sites as per the UNESCO's licenses.

As-Salt - The Place of Tolerance and Urban Hospitality

Built on three closely-spaced hills in the Balqa highland of west-central Jordan, the city of As-Salt, was an important trading link between the eastern desert and the west. During the last 60 years of the Ottoman period, the region prospered from the arrival and settlement of merchants from Nablus, Syria, and Lebanon who made their fortunes in trade, banking, and farming. This prosperity attracted skilled craftsmen from different parts of the region who worked on transforming the modest rural settlement into a thriving town with a distinctive layout and an architecture characterized by large public buildings and family residences constructed of local yellow limestone. The site's urban core includes approximately 650 significant historic buildings exhibiting a blend of European Art Nouveau and Neo-Colonial styles combined with local traditions. The city's non-segregated development expresses tolerance between Muslims and Christians who developed traditions of hospitality evidenced in Madafas (guest houses, known as Dawaween) and the social welfare system known as Takaful Ijtimai'. These tangible and intangible aspects emerged through a melding of rural traditions and bourgeois merchants' and tradespeople's practices during the Golden Age of As-Salt's development between the 1860s to the 1920s.

Baptism Site "Bethany Beyond the Jordan" (Al-Maghtas)

Situated on the eastern bank of the River Jordan, nine kilometres north of the Dead Sea, the archaeological site consists of two distinct areas: Tell Al-Kharrar, also known as Jabal Mar-Elias (Elijah's Hill) and the area of the churches of Saint John the Baptist near the river. Situated in a pristine natural environment the site is believed to be the location where Jesus of Nazareth was baptized by John the Baptist. It features Roman and Byzantine remains including churches and chapels, a monastery, caves that have been used by hermits and pools in which baptisms were celebrated, testifying to the religious character of the place. The site is a Christian place of pilgrimage.

Wadi Rum Protected Area

The 74,000-hectare property, inscribed as a mixed natural and cultural site, is situated in southern Jordan, near the border with Saudi Arabia. It features a varied desert landscape consisting of a range of narrow gorges, natural arches, towering cliffs, ramps, massive landslides and caverns. Petroglyphs, inscriptions and archaeological remains in the site testify to 12,000 years of human occupation and interaction with the natural environment. The combination of 25,000 rock carvings with 20,000 inscriptions trace the evolution of human thought and the early development of the alphabet. The site illustrates the evolution of pastoral, agricultural and urban activity in the region.

² <https://whc.unesco.org/en/convention/>

³ UNESCO, <https://whc.unesco.org/en/list/1377>

Um Er-Rasas (Kastrom Mefa'a)

Most of this archaeological site, which started as a Roman military camp and grew to become a town from the 5th century, has not been excavated. It contains remains from the Roman, Byzantine and Early Muslim periods (end of 3rd to 9th centuries AD) and a fortified Roman military camp. The site also has 16 churches, some with well-preserved mosaic floors. Particularly noteworthy is the mosaic floor of the Church of Saint Stephen with its representation of towns in the region. Two square towers are probably the only remains of the practice, well known in this part of the world, of the stylites (ascetic monks who spent time in isolation atop a column or tower). Um er-Rasas is surrounded by, and dotted with, remains of ancient agricultural cultivation in an arid area.

Petra

Inhabited since prehistoric times, this Nabataean caravan-city, situated between the Red Sea and the Dead Sea, was an important crossroads between Arabia, Egypt and Syria-Phoenicia. Petra is half-built, half-carved into the rock, and is surrounded by mountains riddled with passages and gorges. It is one of the world's most famous archaeological sites, where ancient Eastern traditions blend with Hellenistic architecture.

Quseir Amra

Built in the early 8th century, this exceptionally well-preserved desert castle was both a fortress with a garrison and a residence of the Umayyad caliphs. The most outstanding features of this small pleasure palace are the reception hall and the hammam, both richly decorated with figurative murals that reflect the secular art of the time.

Other main archaeological and touristic sites in Jordan include:

Amman Citadel

The site dates back to several historical periods, including: Ammonite, Hellenistic, Roman, Byzantine, and Islamic, and includes: the Temple of Hercules, the Umayyad Palace, the Baraka, the Jordanian Archaeological Museum, and Byzantine churches, in addition to fortifications, towers, fences, burials, and Roman Corinthian columns with a scenic view.⁴

Roman Amphitheatre

The Roman amphitheatre dates back to the era of Marcus Aurelius, as indicated by an inscription in Greek found on the back wall. The amphitheatre was a center for sport and artistic activities, such as wrestling using swords or freestyle wrestling where a fence was erected between the wrestlers and the spectators to protect them from danger and a statue would be sculpted for the winner to commemorate his heroism⁵.

Jerash

Jerash flourished at the end of the Hellenistic era and the Roman era, where it witnessed its golden age in the second century AD. During the first century AD, the importance of Jerash as one of the cities of the Decapolis was strengthened where it became a commercial, political and military center. The most important monuments are Hadrian's Gate, Hippodrome, Temple of Zeus, Southern Theatre, Oval Square, Nymphs Path, Temple of Artemis, Byzantine churches and the Cathedral⁶.

Um Qais

Umm Qais is located 30 km Northwest of Irbid in the Bani Kinana district, overlooking the Yarmouk Valley, Lake Tiberias and Baysan. Because of its location, it has become an attraction point for residents and stability. In the Roman period, it became one of the cities of the Ten Cities Alliance (the Decapolis), and a number of trade routes that linked Syria and

⁴ Department of Antiquities, Archaeological Sites, available online at: <http://doa.gov.jo/Archeological-sites-Preview.aspx?Id=1>

⁵ Department of Antiquities, Archaeological Sites, available online at: <http://doa.gov.jo/Archeological-sites-Preview.aspx?Id=1>

⁶ Department of Antiquities, Archaeological Sites, available online at: <http://doa.gov.jo/Archeological-sites-Preview.aspx?Id=3>

Palestine passed through it. It included Roman and Byzantine buildings and facilities, theaters, a huge bath, many rock-hewn tombs, paved streets, shops, markets, churches and the Synod. During the Islamic conquest, no major changes occurred, and the residents continued their daily lives as usual⁷.

Mount Nebo

The summit of the Siyagha, 700 m above the Jordan Valley overlooking the Northeast part of the Dead Sea, is believed to be Mount Nebo, the place where Moses - the prophet revered by the three monotheistic religions - has been shown the Promised Land, and where he died.

Today, Mount Nebo is an active Memorial, Franciscan monastery, and archaeological site that attracts visitors from the whole world, not only because of its historical and religious significance, but also because of the outstanding artistic value of the architectural remains and Byzantine mosaics that it preserves and displays⁸.

Madaba Mosaic Map

The mosaic map of Madaba dates back to the second half of the 6th century and it is one of the most important archaeological finds in Western Asia and one of the oldest evidence of ancient cartography. It was discovered at the end of the 19th century during the construction of St George's Church on the foundations of a Byzantine church⁹.

Al Rabad Castle

Al Rabad Castle is located on the top of a high mountain to the west of the city of Ajloun. It was built by the Commander Izz al-Din Osama, one of the leaders of Salah al-Din's army in 1184 AD. It is one of the Ayyubid castles. The castle has a square shape and it is surrounded by a deep moat and towers at its corners, where there are also large water tanks and stone stairs. Ajloun Castle is a good example of military architecture in Islamic times¹⁰.

Mar Elias

Mar Elias is a small hill that is about (900) meters above sea level and is located 9 km Northwest of Ajloun. A big church dating back to the beginning of the 6th AD was discovered, where its floor was paved with colored mosaics where a smaller church was also found. This site has been adopted as one of the Christian pilgrimage sites¹¹.

Pella

Pella (Tabaqat Fahl) is located in the Northern Jordan Valley, to the east of the town of Al Mashare', and about 50 km to the West of the city of Irbid. Settlements began since the ancient Stone Age and continued to the present time, and the reason for this is the presence of permanent water sources. The name Pella is linked to the city in which Alexander the Great was born, and it flourished in the Roman period and joined the alliance of the ten cities (the Decapolis). Most of the facilities and buildings in it date back to the Roman, Byzantine and Islamic periods. It includes the theatre (the Odeon), churches and a number of houses built in the Umayyad era, and the most important events in which the Battle of Fahl took place between Muslims and the Romans, in which Muslims achieved a historic victory. In the year 749 AD, the site was hit by an earthquake, which led to the demolition and destruction of most of the buildings and facilities¹².

Desert Castles

Scattered throughout the black basalt desert, east of Amman, the Desert Castles stand as a testament to the flourishing beginnings of Islamic-Arab civilization. These seemingly isolated pavilions, caravan stations, secluded baths, and hunting

⁷ Department of Antiquities, Archaeological Sites, available online at: <http://doa.gov.jo/Archeological-sites-Preview.aspx?Id=4>

⁸ Universes in Universe, Art Destinations Jordan, available online at: <https://universes.art/en/art-destinations/jordan/mount-nebo#:~:text=Today%2C%20Mount%20Nebo%20is%20an,mosaics%20that%20it%20preserves%20and>

⁹ Universes in Universe, Art Destinations Jordan, available online at: <https://universes.art/en/art-destinations/jordan/madaba/madaba-map>

¹⁰ Department of Antiquities, Archaeological Sites, available online at: <http://www.doa.gov.jo/Archeological-sites-Preview.aspx?Id=5>

¹¹ Department of Antiquities, Archaeological Sites, available online at: <http://www.doa.gov.jo/Archeological-sites-Preview.aspx?Id=5>

¹² Department of Antiquities, Archaeological Sites, available online at: <http://doa.gov.jo/Archeological-sites-Preview.aspx?Id=4>

lodges, were at one time integrated agricultural or trading complexes, built mostly under the Umayyads (661-750 AD), when Muslim Arabs had succeeded in transforming the fringes of the desert into well-watered settlements.

Aside from being widely considered as the most spectacular and original monuments of early Islamic art, these complexes also served practical purposes: namely, as residences, caravanserais, and baths.

In the year 661, the capital of the newly founded Arab Muslim Empire moved from Medina and Kufa in the Hejaz and Iraq respectively, to Damascus, the seat of the Umayyad Dynasty. The years which immediately followed the death of the founder of the dynasty, Mu'awiya bin Abi Sufyan, were spent in overcoming rival claimants to the Caliphate¹³.

Um Al Jmal

Ancient Umm al-Jimal is in the Southern Hauran plain, the semi-arid Badia region of north Jordan, a basalt plain created by prehistoric volcanic eruptions from the slopes of the Jabal al-Arab, whose peaks are visible on clear winter days fifty km to the north-east in southern Syria. The site is 675 m above sea level and receives 150 mm average annual rainfall. The great Roman highway, the Via Nova Traiana constructed AD 112-14 during Trajan's rule, passes Umm al-Jimal 6 km to the west on its way from Bostra to Philadelphia (Amman).

Umm al-Jimal was occupied and built for 7-800 years from the mid-1st Century AD to the 8th Century. From the 9th to the 20th century it was reused by nomads and sporadically resettled until formal possession as a protected archaeological site by the Government of Jordan in 1972. In its first 750 years Umm al-Jimal had three quite distinct personae; the Nabataean- Early Roman period, *Late Roman* military station and the Byzantine-Umayyad¹⁴.

Mkawer

Machaerus ancient fortress of Herod the Great is located in Mkawer; located about 40 kilometers southwest of Madaba. The site also has a panoramic view of the surrounding countryside, the Dead Sea, and Palestine¹⁵.

Al Hallabat Castle

On the site of Qasr al-Hallabat there was originally a Roman fort, built up from the beginning of the 2nd century AD on a former Nabatean outpost, as part of the Limes Arabicus (the Arabian frontier). Extended in 4th century AD, the fort was abandoned and then heavily damaged by the earthquake of 551 AD. Afterwards it was transformed into a monastery and a palace by the Ghassanids, using older black basaltic rock blocks to expand the Roman remains.

The Umayyad caliph Hisham (ruled 724-743) ordered to demolish the existing structure to transform the site into one of the largest of all Umayyad desert complexes. The main palace is constructed of black basalt and limestone and has a square floorplan (42 x 43 m) with towers at each corner. The principal structures were further enhanced with decorative mosaics depicting an assortment of animals, detailed frescoes and highly crafted stucco carvings. The Umayyad extension included a mosque, a water system with five cisterns and a large water reservoir, and a bathhouse. Situated to the west of the palace remains an enclosed structure probably used for agricultural purposes. In 749 AD the site was destructed and abandoned¹⁶.

Iraq Al Amir

Iraq Al Amir is a village located 24 km to the west of Amman, where a valley runs through it and it is planted with olives, fig and pomegranate trees, while cypress and oleander trees grow on both sides of the valley. Eighteen caves can be seen to the right of the paved road on the way to the Hellenistic building (the palace), which is locally known as Qasr al-Abed. The Aramaic name Tobias is inscribed on the entrance of two of these caves. The palace was built in the first century BC,

¹³ Atlas Tours, available at: <https://atlastours.net/jordan/desert-castles/>

¹⁴ UNESCO, Tentative Lists, available at: <https://whc.unesco.org/en/tentativelists/6335/>

¹⁵ <http://www.kinghussein.gov.jo/tourism6b.html>

¹⁶ Universes in Universe, Art Destinations Jordan, available online at: <https://universes.art/en/art-destinations/jordan/desert-castles/qasr-al-hallabat>

and it consists of two floors (38 m long x 18 width) decorated with statues of lions and huge lionesses in the form of a frieze, surrounded by an artificial moat where it was filled with water to protect the palace from threats¹⁷.

Mai'n Hot Springs

Ma'in Hot Springs; or Hammamat Ma'in, are the thermal mineral hot springs and waterfalls located 74 km south of Amman and 264 meters below sea level, where people have come for thermal treatments since the days of Rome¹⁸.

Dead Sea

Deep in the Jordan Valley and 55 km southeast of Amman, is the Dead Sea, one of the most spectacular natural and spiritual landscapes in the whole World. It is the lowest point on Earth located at 430.5 metres below sea level and the World's richest source of natural salts, hiding wonderful treasures that accumulated throughout thousands of years¹⁹.

Al Karak Castle

The famous Crusader stronghold Karak (or Kerak), later a Mamluk fortress, is an impressive example of military architecture, built on top of a ridge, separated from the old fortified town by a deep moat. The place was one of the main settlements of the ancient Kingdom of Moab around the 9th century B.C. Al Karak Castle was built by the Crusaders in the mid-12 century A.D.²⁰.

Al Shobak

Just off the King's Highway 190 km (118 miles) south of Amman and less than an hour north of Petra stands Al Shobak castle dating back to the same period as Al Karak Castle, crowning a cone of rock, which rises above a wild and rugged landscape dotted with a grand sweep of fruit trees below²¹.

Moreover, **Table 31** shows the number of visitors to museums and archaeological sites in Jordan by location and nationality. As expected, the total number of visitors has dropped in 2020 by 80% where the number of non-Jordanian tourists has decreased by 84% while the number of Jordanian visitors has decreased by about 54%.

Table 31: Number of Visitors to Museums and Archaeological Sites in the Kingdom by Location and Nationality, 2019- 2020 (Source: MoTA, 2019, 2020)

Location	2019			2020		
	Jordanian	Non-Jordanian	Total	Jordanian	Non-Jordanian	Total
Petra	97,638	1,037,662	1,135,300	25,297	169,146	194,443
Jerash	67,231	408,295	475,526	23,050	58,698	81,748
Um Qais	29,898	48,620	78,518	19,061	7,275	26,336
Mount Nebo	40,916	628,665	669,581	17,180	98,239	115,419
Ajloun	93,170	120,652	213,822	38,905	17,053	55,958
Madaba (map)	9,362	457,638	467,000	5,019	64,945	69,964
Wadi Rum	37,634	326,596	364,230	62,826	45,126	107,952
Karak	2,300	46,638	48,938	10,717	6,046	16,763
Al Maghtas	10,174	173,307	183,481	2,500	6,046	34,543
Dead Sea	7,181	14,300	21,481	8,216	6,358	14,574
Um Al Rasas	641	24,938	25,579	2,213	3,82	6,036
Afra	23,807	1,175	24,982	6,946	217	7,163

¹⁷ Department of Antiquities, Archaeological Sites, available online at: <http://www.doa.gov.jo/Archeological-sites-Preview.aspx?Id=1>

¹⁸ Atlas Tours, available at: <https://atlastours.net/jordan/main-hot-springs/>

¹⁹ Atlas Tours, available at: <https://atlastours.net/jordan/dead-sea/>

²⁰ <https://universes.art/en/art-destinations/jordan/karak>

²¹ Atlas Tours, available at: <https://atlastours.net/jordan/shobak/>

Location	2019			2020		
	Jordanian	Non-Jordanian	Total	Jordanian	Non-Jordanian	Total
Pella	2,416	8,001	10,417	1,240	1,361	2,601
Desert Castle	150	37,800	37,950	1,295	5,400	6,695
Um Al Jmal	1,848	1,434	3,282	540	335	875
Shobak	1,465	1,434	3,282	640	5,692	6,332
Mkawer	120	52,068	53,533	0	809	809
Folklore Museum	200,900	90,600	291,500	74,900	16,450	91,350
Jordan's Museum	103,750	235,300	339,050	40,250	39,500	79,750
Madaba Museum	4,850	12,902	17,752	1,950	2,050	4,000
Salt Museum	1,426	461	1,887	967	153	1,120
Mar Elias	2,850	850	3,700	2,390	450	2,840
Al Hallabat Castle	1,637	20,849	22,486	1,462	1,974	3,436
Iraq Al Amir	310	2,450	2,760	0	800	800
Mai'n Falls	36,321	15,094	51,415	10,642	6,211	16,853
Total	777,995	3,774,041	4,552,036	358,206	590,154	948,360

5.9 Local Community and Socio-economic Conditions

5.9.1 Demographic Distribution

According to the latest population estimation in 2021, the overall population of Jordan is 11,057,000 (DoS, 2021). About 42% of the total population lives in the capital, Amman, making it the most populated governorate. Irbid and Zarqa constitute about 18.54% of the population, 18.54% and 14.32% respectively. The remaining 25% of the population are dispersed in the remaining 9 governorates (Table 32).

Table 32: Population Distribution By Governorate (Source: DOS, 2021)

Governorate	Population	Female	Male	Percentage
Amman	4,642,000	2,149,800	2,492,200	41.98%
Balqa	569,500	263,700	305,800	5.15%
Zarqa	1,581,000	745,200	835,800	14.30%
Madaba	219,100	103,300	115,800	1.98%
Irbid	2,050,300	990,900	1,059,400	18.54%
Ma'raq	637,000	308,600	328,400	5.76%
Jerash	274,500	131,800	142,700	2.48%
Ajloun	204,000	99,000	105,000	1.84%
Karak	366,700	175,200	191,500	3.32%
Tafleh	111,500	53,200	58,300	1.01%
Ma'an	183,500	87,700	95,800	1.66%
Aqaba	217,900	94,600	123,300	1.97%

Jordan has a young population compared to many other parts of the world, with nearly a third of the country's population aged between 16 and 30 years (UNICEF, 2021). With this large population of youth grows older and begins to enter the workforce, the demographic transition presents a unique opportunity for Jordan but it is not without its challenges and high competitiveness. The below table (Table 33) shows population segregation by age group, for the year 2020 and 2019.

Table 33: Population Age Groups (Source: DOS, 2021)

Year	Unit	Age Group			
		0-14	15-24	25-64	+65
2020	Number	3,711,810	2,146,970	4,548,530	398,690
	Per cent	34.35%	19.9%	42.08%	3.69%
2019	Number	3,625,230	2,096,910	4,442,460	389,400
	Per cent	34.35%	19.9%	42.08%	3.69%

5.9.2 Education

The below table (**Table 34**) represents the educational level for Jordanian Population (Age 15+ Years) segregated by gender and & Age Groups for 2020. As indicated in the below table (**Table 34**), illiteracy rate within females is 7.5%, which is higher comparing to males with the rate of 2.7. On the other hand, more than 90% of Jordanian women have received some form of education. Females with secondary educational level or holding diploma, is higher than male as presented in the below table.

Table 34: Education Level for Jordanian Population (Age 15+ Years) (Source: DoS, 2020)

Educational Level / Grand Total									
	Illiterate	Read & Write	Elementary	Preparatory	Basic Education	Vocational Apprenticeship	Secondary	Diploma Intermediate	Bachelor & Above
Total	5.1	2.7	7.5	15.8	27.4	0.4	14.9	7.6	18.6
15-19	0.7	0.5	5.6	18.8	57.8	0.4	16.4	0	0
20-24	1	0.7	3.7	3.1	36.8	0.7	37.1	2.8	14.2
25-29	1.2	1	4	3.6	32.8	0.4	10	6.4	40.7
30-39	1.8	1.4	5.4	5	36.3	0.4	10.1	8.8	30.7
40-49	2.3	2.4	8.3	19.2	25.5	0.4	11.6	11.3	19
50-59	5.1	3.6	10.3	37.9	0	0.3	12.2	15.8	14.8
60+	23.3	9.3	14.4	22.8	0	0.1	8	8	14.1
Male									
Total	2.7	2.5	7.8	16.8	31.1	0.7	14.2	5.9	18.4
15-19	0.9	0.5	6.2	18.8	60	0.6	13.1	0	0
20-24	1	0.9	4.4	3.5	44.6	1.2	32.7	2.3	9.5
25-29	1.1	1.3	4.4	3.8	36.9	0.7	11.2	5	35.6
30-39	1.9	1.8	6.4	5.2	41.6	0.8	9.7	6.4	26.4
40-49	1.8	2.5	8.9	20.9	26.8	0.9	11.1	7.7	19.5
50-59	2.2	3.1	9.2	41.1	0	0.5	12.1	12.8	19
60+	10	8	14.8	26.8	0	0.2	8.7	8.5	23
Female									
Total	7.5	2.9	7.2	14.8	23.7	0.1	15.6	9.4	18.9
15-19	0.5	0.5	4.9	18.7	55.2	0.1	20.2	0	0
20-24	0.9	0.4	2.8	2.5	27.2	0.2	42.6	3.4	20
25-29	1.3	0.6	3.4	3.5	27.8	0	8.5	8.1	46.8
30-39	1.8	1.1	4.6	4.7	31.6	0	10.5	10.9	34.6
40-49	2.8	2.4	7.7	17.6	24.3	0	12.2	14.6	18.5
50-59	7.8	4	11.3	35.1	0	0	12.2	18.5	11.1
60+	36.2	10.5	14.1	18.9	0	0	7.2	7.6	5.6

5.9.3 Employment in the Tourism Sector

Unemployment is considered relatively high in Jordan, with unemployment rate of 19.05% in 2019 and reached 23.19% in 2020 (DoS, 2020). As represented in **Table 35**, unemployment rate within females is higher than males. The inconsistency between presentation of women's education and economic participation has been frequently studied. This gap is due to the restriction on civil, economic rights and limitation to access resources and opportunities. In Jordan, almost 100,000 young people enter the workforce market and start looking for work every year. Thirty-two per cent of youth aged 15-30 years are unemployed. The situation for is even more challenging for women, as Jordan has the third lowest female labour force participation rate in the world (UNICEF).

Table 35: Employed and Unemployed Percentage Segregated by Gender (2019 and 2020)

Employment status	Gender	2019	2020
Employed	Male	82.94%	78.76%
	Female	73.04%	69.34%
Unemployed	Male	17.06%	21.24%
	Female	26.96%	30.66%

Majority of women's employment is concentrated in the education and health sectors in addition to other administrative and service professions (MoTA, 2021). As indicated in the below table (**Table 36**), almost half of women work in public sector and the other half in private sector, with small portions working with international organizations and/or at home (DoS 2019, DoS 2020).

Table 36: Distribution of Working Women by Sector

Work Sector	2019	2020
Public Sector	48.9%	50.6%
Private Sector	48.3%	47.3%
International Organizations	2.1%	1.6%
Work at home	0.7%	0.5%

Data obtained from the DoS shows that the percentage and number of unemployment has increased in 2020, mainly due to the COVID-19 pandemic (**Table 37**).

Table 37: Employment and Unemployment Rates Segregated by Governorate and Gender (15 years +)

Governorate	Gender	Employed 2019		Employed 2020		Unemployed 2019		Unemployed 2020	
		Number of Persons	%	Number of Persons	%	Number of Persons	%	Number of Persons	%
Amman	Male	425,055	37.68	409,401	37.62	90,871	39.15	126,014	42.93
	Female	96,182	38.52	107,176	42.84	30,631	33.23	44,839	40.54
Balqa	Male	60,875	5.40	58,799	5.40	14,739	6.35	16,867	5.75
	Female	15,995	6.41	14,375	5.75	5,502	5.97	6,477	5.86
Zarqa	Male	148,079	13.13	146,529	13.47	37,976	16.36	43,937	14.97
	Female	21,135	8.46	21,658	8.66	8,053	8.74	6,833	6.18
Madaba	Male	22,349	1.98	23,014	2.11	6,654	2.87	6,703	2.28
	Female	7,227	2.89	6,671	2.67	2,101	2.28	2,342	2.12
Irbid	Male	236,171	20.93	224,499	20.63	40,634	17.51	50,845	17.32
	Female	47,277	18.93	40,672	16.26	23,994	26.03	23,601	21.34
Mafrq	Male	55,451	4.91	53,501	4.92	10,857	4.68	13,592	4.63

	Female	13,893	5.56	13,045	5.21	4,266	4.63	5,033	4.55
Jarash	Male	31,402	2.78	30,948	2.84	5,091	2.19	6,396	2.18
	Female	7,132	2.86	6,450	2.58	3,344	3.63	3,589	3.24
Ajloun	Male	27,534	2.44	25,990	2.39	4,449	1.92	4,721	1.61
	Female	6,995	2.80	7,387	2.95	3,898	4.23	3,537	3.20
Karak	Male	52,389	4.64	50,376	4.63	7,081	3.05	7,934	2.70
	Female	16,871	6.76	16,079	6.43	4,119	4.47	5,186	4.69
Tafiela	Male	17,513	1.55	17,784	1.63	3,542	1.53	4,784	1.63
	Female	6,137	2.46	5,305	2.12	2,711	2.94	3,562	3.22
Ma'an	Male	25,788	2.29	23,080	2.12	5,627	2.42	6,320	2.15
	Female	6,215	2.49	6,505	2.60	2,016	2.19	3,297	2.98
Aqaba	Male	25,598	2.27	24,234	2.23	4,592	1.98	5,398	1.84
	Female	4,642	1.86	4,831	1.93	1,536	1.67	2,298	2.08

The Jordanian tourism industry recorded 5.3 million visitors in 2019, and JD 4.1 billion revenues, representing approximately 13% of GDP. Furthermore, the total employees in the tourism sector in 2019 reached 53,488. However, with the spread of COVID-19 in 2020, the number of employees decreased to 41,108, and slightly increased in 2021 to reach 49,038. **Table 38** represents the number of employees in each year segregated by female and male. In addition, **Figure 28** shows the distribution of employment per economic activity for the years 2021, 2020 and 2019.

Table 38: Number of Employees in the Tourism Sector in 2021, 2020, 2019 (Source: MoTA, 2019-2020)

Economic Activity	Number of Employees (2021)			Number of Employees (2020)			Number of Employees (2019)		
	Total	Female	Male	Total	Female	Male	Total	Female	Male
Hotels	20,333	1,850	18,483	16,944	1,816	15,128	20,918	1,670	19,248
Travel Agencies	4,338	1,186	3,152	4,098	1,288	2,912	4,793	1,323	3,470
Tourism Restaurants	17,217	1,295	15,922	13,057	1,186	11,769	20,701	1,430	19,271
Rent a Car Offices	1,902	0	1,902	1,902	0	1,902	1,902	0	1,902
Tourist Shops	862	420	442	741	420	321	862	181	681
Tourist Guides	1,303	77	1,226	1,283	0	1,283	1,229	69	1,160
Horses Guides	528	0	528	528	0	528	528	0	528
Tourist Transportation Companies	2,050	50	2,000	2,050	50	1,00	2,050	50	2,000
Diving Center	150	0	150	150	0	150	150	0	150
Water Sports	255	0	255	255	0	255	255	0	255
Glass boats	100	0	100	100	0	100	100	0	100
Total	49,038	4,878	44,160	41,108	4,760	34,348	53,488	4,723	48,765



Figure 28: Employment in the Tourism Sector (Source: MoTA, 2019-2021)

The analysis shows that the percentage of women working in the different tourism economic activities over the last three years ranges between 9 and 12 percent. According to MoTA's Gender and Inclusion Project Plan [2021 -2025], women in the tourism sector usually face discrimination, gender inequality, and many other challenges, and due to the challenging nature of jobs in the tourism sector, such as extensive job rotation, seasonality, precarious contracts, delay in payments, unstable working hours, along with cultural constraints act as factors for limiting women effective participation in the sector.

Due to COVID-19 pandemic which hit the world economy very hard since the year 2020, many tourism businesses shut down, and certain communities and vulnerable groups were affected severely due to their dependence on the tourism sector for their living. The most vulnerable groups were the unskilled and women. The recent finding from a rapid assessment on the impact of COVID-19 on enterprises in Jordan performed by the Global Market Research and Public Opinion Specialist (IPSOS) stated a negative outlook about the future of businesses, as 49 per cent are not confident to survive the current crisis. This was even higher (68 per cent) amongst companies in the tourism and hospitality sector and service sector (54 per cent). Most small businesses (63 per cent) and roughly half of medium businesses (42 percent) confirmed that they would be unable to financially sustain themselves beyond April 2020, so the easing of lockdown restrictions was very timely (MoTA, 2021).

Table 39: Number of Employees Segregated by Nationality in the Tourism Sector in 2021, 2020, 2019
(Source: MoTA, 2019-2021)

Economic Activity	Number of Employees (2021)			Number of Employees (2020)			Number of Employees (2019)		
	Total	Jordanian	Non-Jordanian	Total	Jordanian	Non-Jordanian	Total	Jordanian	Non-Jordanian
Hotels	20,333	18,449	1,884	16,944	15,060	1,884	20,918	18,484	2,434
Travel Agencies	4,338	4,199	139	4,098	3,959	139	20,701	15,300	5,401
Tourism Restaurants	17,217	14,416	2,801	13,057	2,801	10,256	4,793	4,706	87
Rent a Car Offices	1,902	1,867	35	1,902	1,867	35	1,902	1,867	35
Tourist Shops	862	572	290	741	451	290	862	832	30
Tourist Guides	1,303	1,303	0	1,283	1,283	0	1,229	1,229	0
Horses Guides	528	528	0	528	528	0	528	528	0
Tourist Transportation Companies	2,050	2,000	50	2,050	2,000	50	2,050	2,000	50
Diving Centre	150	110	40	150	110	40	150	110	40
Water Sports	255	204	51	255	204	51	255	204	51
Glass boats	100	100	0	100	100	0	100	100	0
Total	49,038	43,748	5,290	41,108	28,363	12,745	53,488	45,360	8,128

5.9.4 Expenditure and Revenue

A total of 5,360,587 tourists visited Jordan in 2019, 1,239,910 tourists in 2020, and a total of 2,358,676 tourists in 2021. The below graph (Figure 29) represents the total number of tourists for 2019, 2020, 2021 segregated by borders (Air, Land, Sea).

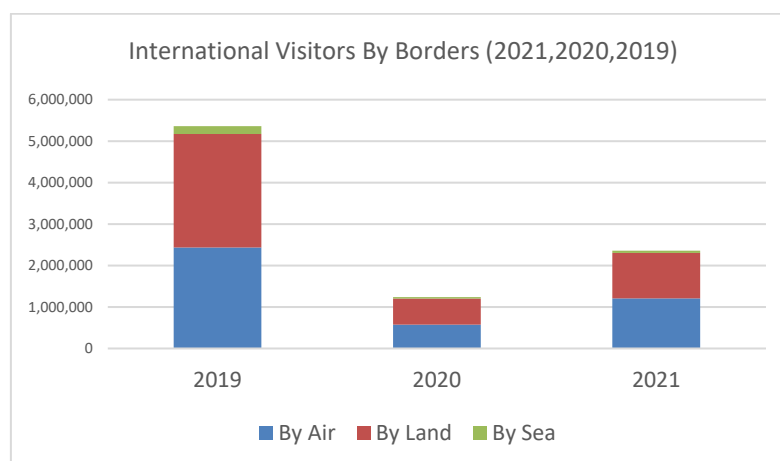


Figure 29: Number of International Visitors by Borders (Source: MoTA, 2019-2021)

In 2019, tourism receipts reached 4108.2 Million JoD, while expenditures reached 1037.7 Million JoD. However in 2020, and due to Coronavirus breakout, the tourism receipts was reduced to 1000.3 Million JoD with expenditures with 270.8 Million JoDs. In 2021, the tourism receipts was increased to 1899.6 Million JoD, with relative change of +89.9% comparing to 2020. The tourism expenditures was increased with 131.6% comparing to 2020 reaching 627.0 Million JoD (**Table 40** and **Figure 30**).

Table 40 : Tourism Receipts and Expenditures for the Years 2019, 2020 and 2021 (Source: MoTA, 2019-2021)

Month	Receipts JD Million			% Relative Change	Expenditures JD Million			% Relative Change
	2019	2020	2021		2019	2020	2021	
January	324.7	361.8	59.6	-83.5%	76.0	80.8	21.9	-72.9%
February	249.2	290.0	51.0	-82.4%	75.4	79.4	20.6	-74.1%
March	304.1	132.2	64.7	-51.0%	77.8	30.9	23.2	-24.9%
Total	878.0	784.00	175.29	-77.6%	229.2	191.1	65.7	-65.6%
April	358.0	0.0	62.0	-	85.4	0.0	22.7	-
May	268.0	0.0	79.4	-	74.5	0.0	39.2	-
June	350.5	15.1	124.7	723.1%	106.9	6.9	62.4	817.6%
2nd Qtr	976.5	15.1	266.1	1656.5%	266.8	6.9	124.3	1727.9%
July	402.3	19.2	207.3	977.9%	126.7	6.8	93.8	1279.4%
August	543.2	20.7	310.1	1398.9%	129.6	5.8	77.7	1239.7%
September	345.2	26.5	248.7	840.2%	75.0	9.7	71.3	635.1%
3rd Qtr	1290.7	66.4	766.1	1054.3%	331.3	22.3	242.8	988.8%
October	325.0	38.7	249.8	546.0%	71.4	14.8	76.1	414.2%
November	328.2	43.9	235.0	435.3%	65.4	16.4	64.0	290.2%
December	309.8	52.2	207.3	297.1%	73.6	19.3	54.1	180.3%
4th Qtr	963.0	134.8	692.1	413.5%	210.4	50.5	194.2	284.6%
Total	4108.2	1000.3	1899.6	89.9%	1037.7	270.8	627.0	131.6%

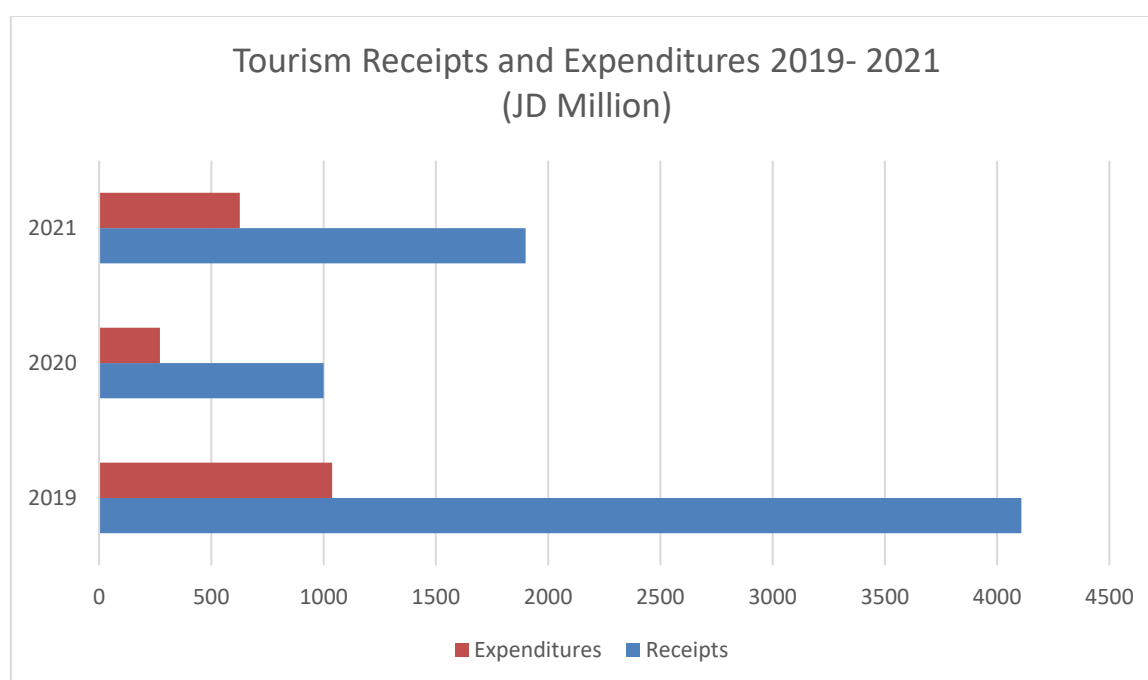


Figure 30: Tourism Receipts and Expenditures 2019- 2021 (Source: MoTA, 2019-2021)

6 DESCRIPTION OF THE ALTERNATIVES

The SEA aims to identify the likely significant impacts on the environment of the JNTS, covering effects that are positive and negative; direct and indirect; temporary and permanent; short, medium and long-term; and cumulative effects, based on feedback from the JNTS Preparation Team on the JNTS goals and targets as well as proposed actions and activities. Two scenarios shall be considered:

Alternative 1: Implementation of the JNTS and SEA Recommendations – This scenario shall be the main scenario of the analysis: implementing the newly devised national tourism strategy in parallel with the SEA recommendations. Under this scenario, the tourist strategy and all associated activities are carried out while the proposed mitigation and adaptation recommendations are implemented. Mitigation and adaptation measures shall be strategic actions to be integrated in the JNTS implementation process.

Alternative 2: Implementation of the JNTS without SEA – Under this scenario the JNTS is implemented while the recommendations proposed by the SEA are not. Therefore, environmental considerations will not be taken for activities related to the JNTS

7 STRATEGIC ENVIRONMENTAL OBJECTIVES

To start the SEA assessment process, Strategic Environmental Objectives (SEOs) are proposed (**Table 41**). These are measures developed from environmental and sustainability objectives of the ministry of tourism. Relevant policies that generally govern environmental protection and sustainability objectives are also considered at the local and international levels as well. For example in this SEA, UN sustainable development goals, the World Bank Environmental and Social Standards were considered in addition to several other local policies relevant to all environmental aspects.

These SEOs are set out under a range of environmental topics and are used as standards against which the provisions of the JNTS and the alternatives are evaluated in order to help identify which provisions would be likely to result in significant environmental effects and where such effects would be likely to occur, if – in the case of adverse effects – unmitigated. SEOs shall also guide the JNTS towards positive environmental and social aspects to be further emphasised through JNTS implementation.

Table 41: MoTA Strategic Environmental Objectives

Environmental Component	MoTA Strategic Environmental Objectives	Relevant UNSDGs	Relevant WB ESS	Relevance to Jordanian Policies
Visual and landscape	To contribute towards avoidance or, where infeasible, minimisation of significant adverse visual impacts within and adjacent to the cultural and natural sites (V1).	NA	ESS1 Assessment and Management of Environmental and Social Risks and Impacts.	Environmental Protection Law (No 06) 2017.
Biodiversity, Flora and Fauna	To ensure compliance and mainstreaming Biodiversity conservation into tourism projects and actions including protection of the identified key biodiversity areas (B1).	GOAL 14: LIFE BELOW WATER Careful management of this essential global resource is a key feature of a sustainable future. GOAL 15: LIFE ON LAND Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss.	ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.	Environmental Protection Law (No 06) 2017.
Water and Wastewater	Ensure that water bodies and Ground water near tourism projects are protected, maintained and improved (W1). Ensure that water resources are sustainably managed to deliver tourism growth targets in the context of existing and projected water supply and wastewater capacity constraints (W2). Avoid inappropriate development in areas at risk of flooding and implement flood warning	GOAL 6: CLEAN WATER AND SANITATION Clean, accessible water for all is an essential part of the world we want to live in.	ESS3 Resource Efficiency and Pollution Prevention and Management. ESS4: Community Health and Safety.	Environmental Protection Law (No 06) 2017. Environmental Classification & Licensing Regulation (No 69) 2020. Water Authority Law (No 19) 1988. Flood water management plans and early warning system. National water strategy 2016 – 2025.

Environmental Component	MoTA Strategic Environmental Objectives	Relevant UNSDGs	Relevant WB ESS	Relevance to Jordanian Policies
	systems in areas prone to flooding (W3).			
Air Quality	To avoid, prevent or reduce harmful effects on human health and the environment as a whole resulting from emissions to air from all tourism activities with particular reference to emissions from transport, heating and cooling of hotels and other buildings (A1)	GOAL 3: GOOD HEALTH AND WELL-BEING Ensuring healthy lives and promoting the well-being for all at all ages is essential to sustainable development.	ESS3 Resource Efficiency and Pollution Prevention and Management. ESS4: Community Health and Safety.	Air Protection Bylaw (No 28) 2005.
Climatic Change and Energy	Integrate sustainable design solutions into tourism projects (e.g. energy efficient buildings; green infrastructure) (C1). Contribute towards the reduction of greenhouse gas emissions in line with national targets (C2). Promote the use of renewable energy, energy efficient development (C3). Increased use of public transport (C4).	GOAL 7: AFFORDABLE AND CLEAN ENERGY Energy is central to nearly every major challenge and opportunity. GOAL 11: SUSTAINABLE CITIES AND COMMUNITIES There needs to be a future in which cities provide opportunities for all, with access to basic services, energy, housing, transportation and more. GOAL 13: CLIMATE ACTION Climate change is a global challenge that affects everyone, everywhere.	ESS3 Resource Efficiency and Pollution Prevention and Management.	Energy Strategy 2020 -2030. The national climate change policy of the Hashemite kingdom of Jordan 2013-2020.
Waste Management	Promote circular economy principles, reduce waste, and increase recycling (WM1). Adopt a policy to minimize the use of Single Use Plastics (SUPs) in touristic sites (WM2).	GOAL 14: LIFE BELOW WATER Careful management of this essential global resource is a key feature of a sustainable future. GOAL 15: LIFE ON LAND Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss.	ESS1 Assessment and Management of Environmental and Social Risks and Impacts. ESS3 Resource Efficiency and Pollution Prevention and Management.	Solid Waste Management Framework law (No 16) 2020. National Solid Waste Management Strategy.
Cultural Heritage	Protect places, features, buildings and landscapes of cultural, archaeological or architectural heritage (CH1).		ESS8: Cultural Heritage.	Protection of Urban and Cultural Heritage Law (No 05) 2005.

Environmental Component	MoTA Strategic Environmental Objectives	Relevant UNSDGs	Relevant WB ESS	Relevance to Jordanian Policies
				Antiquities Law (No 55) 2008.
Socio-Economic	<p>Promote economic growth to encourage creation and retention of good jobs for local communities near to tourist attractions (S1).</p> <p>Restrict land acquisition and compensate for any involuntary resettlement (S2).</p> <p>Gender equality and empowerment of women (S3).</p>	<p>GOAL 1: NO POVERTY Economic growth must be inclusive to provide sustainable jobs and promote equality.</p> <p>GOAL 5: GENDER EQUALITY Gender equality is not only a fundamental human right, but a necessary foundation for a peaceful, prosperous and sustainable world.</p> <p>GOAL 8: DECENT WORK AND ECONOMIC GROWTH Sustainable economic growth will require societies to create the conditions that allow people to have quality jobs.</p> <p>GOAL 10: REDUCED INEQUALITIES To reduce inequalities, policies should be universal in principle, paying attention to the needs of disadvantaged and marginalized populations</p>	<p>ESS2: Labor and Working Conditions.</p> <p>ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement.</p>	<p>Poverty reduction strategy.</p> <p>National Green Growth Plan for Jordan.</p> <p>Empowerment of women participation in the labor market.</p>

Furthermore, the SEA recognises the importance of Ministry of Tourism and Antiquities access to financial institutions for funding the JNTS projects and therefore has incorporated the World Bank Environmental and Social Standards (ESS) in the SEA. **Table 42** below elaborates the World Bank ESS and the SEA approach to incorporate these standards.

Table 42: The World Bank's Environmental and Social Standards and Strategic Environmental Assessment

World Bank ESS	Description	SEA Approach
ESS1 Assessment and Management of Environmental and Social Risks and Impacts	Sets out the Borrower's responsibilities for assessing, managing and monitoring environmental and social risks and impacts associated with each stage of a project in order to achieve environmental and social outcomes consistent with the Environmental and Social Standards (ESSs)	The SEA sets strategic environmental and social objectives, assesses environment and social risks, in addition to setting out environmental management framework for each stage of the JNTS implementation
ESS2 Labor and Working Conditions	Recognizes the importance of employment creation and income	The SEA shall promote sound worker-management relationships and enhance the development benefits of tourism

World Bank ESS	Description	SEA Approach
	generation in the pursuit of poverty reduction and inclusive economic growth	projects by encouraging creation of good jobs that provide safe and healthy working conditions especially for local communities near tourist attractions sites
ESS3 Resource Efficiency and Pollution Prevention and Management	Recognizes that economic activity and urbanization often generate pollution to air, water, and land, and consume finite resources that may threaten people, ecosystem services and the environment at the local, regional, and global levels	The SEA sets strategic objectives for resource efficiency, in addition to setting out environmental management framework for each stage of the JNTS implementation
ESS4: Community Health and Safety	Addresses the health, safety, and security risks and impacts on project-affected communities and the corresponding responsibility of Borrowers to avoid or minimize such risks and impacts, with particular attention to people who, because of their particular circumstances, may be vulnerable	The SEA sets strategic objectives for socio economic aspects, in addition to setting out social management framework for each stage of the JNTS implementation
ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement -	Involuntary resettlement should be avoided. Where involuntary resettlement is unavoidable, it will be minimized and appropriate measures to mitigate adverse impacts on displaced persons (and on host communities receiving displaced persons) will be carefully planned and implemented	The SEA sets strategic objectives for land acquisition and involuntary resettlement aspects, in addition to setting out management framework for each stage of the JNTS implementation
ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	Recognizes that protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development and it recognizes the importance of maintaining core ecological functions of habitats, including forests, and the biodiversity they support. ESS6 also addresses sustainable management of primary production and harvesting of living natural resources, and recognizes the need to consider the livelihood of project-affected parties, including Indigenous Peoples, whose access to, or use of, biodiversity or living natural resources may be affected by a project	The SEA sets strategic objectives for biodiversity conservation in addition to setting out environmental and social management framework for each stage of the JNTS implementation
ESS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Ensures that the development process fosters full respect for the human rights, dignity, aspirations, identity, culture, and natural resource-based livelihoods of Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities. ESS7 is also meant to avoid adverse impacts of projects on Indigenous Peoples/Sub-Saharan African	This might not be fully relevant but the nearest relevance could be to respect the culture of the bedwin tribes that live in some of the tourist areas such as Wadi rum and Petra and the other desert locations

World Bank ESS	Description	SEA Approach
	Historically Underserved Traditional Local Communities, or when avoidance is not possible, to minimize, mitigate and/or compensate for such impacts	
ESS8: Cultural Heritage	Recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present and future. ESS8 sets out measures designed to protect cultural heritage throughout the project life-cycle	The SEA sets strategic objectives for cultural heritage protection aspects, in addition to setting out environmental and social management framework for each stage of the JNTS implementation
ESS9: Financial Intermediaries (FIs)	Recognizes that strong domestic capital and financial markets and access to finance are important for economic development, growth and poverty reduction. FIs are required to monitor and manage the environmental and social risks and impacts of their portfolio and FI subprojects, and monitor portfolio risk, as appropriate to the nature of intermediated financing. The way in which the FI will manage its portfolio will take various forms, depending on a number of considerations, including the capacity of the FI and the nature and scope of the funding to be provided by the FI	The SEA recognises the responsibility of FIs and shall incorporate as much as possible World bank ESS in order to facilitate FIS monitoring and management of environmental and social risks
ESS10: Stakeholder Engagement and Information Disclosure	Recognizes the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice. Effective stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation	The SEA utilises stakeholder consultations at the scoping stage, during SEA preparation, and after SEA is completed. There is one official consultation session for scoping and one official session for disclosure in addition to several unofficial consultations with stakeholders during SEA preparation

8 KEY ENVIRONMENTAL AND SOCIAL POSSIBLE IMPACTS AND PROPOSED MITIGATIONS

The anticipated E&S impacts from the JNTS throughout its various objectives and proposed actions are investigated based on the following:

- The SEA team's extensive experience in conducting environmental assessments.
- Detailed understanding of the JNTS objectives and proposed actions and how they relate to potential impacts on certain environmental attributes throughout the planning, design, construction, and operation phases;
- Outcomes of the scoping session meeting and issues raised by the stakeholders.

Implementation of the JNTS may cause several potential positive and negative impacts on certain environmental and social attributes all of which will be investigated in more depth throughout the SEA.

There are definitely important benefits at the national level from implementation of the JNTS, hence, it is important to highlight the national level potential positive impacts on the social, and economic attributes of the Country.

The anticipated impacts are summarised below alongside the proposed options to eliminate or minimise the impacts. The following analysis identifies first the list of possible impacts with recommended mitigation measures then the Impact analysis and identification of significance are presented.

8.1 Impacts on Visual and Landscape

Landscape and tourism are interlinked where both urban and natural landscapes play a vital role in attracting domestic and international tourists. However, although tourism development poses an opportunity for environmental and cultural heritage conservation, it could also lead to undesirable impacts depending on the activities undertaken.

For instance, MICE Tourism (Meetings, Incentives, Conferences, Events) can be directed in a way to raise awareness regarding the environmental value of natural landscapes and promoting sustainable behaviour. On the other hand, touristic activities; if not properly managed, could adversely contribute to pollution of land and waterways due to littering as well as the creation of wildfires. Consequently, the aesthetic value of touristic landscapes; especially protected areas and cultural heritage sites, could be impacted negatively.

In addition, inappropriate development of cultural heritage sites may result in unattractive sites where damage to cultural heritage sites may also be caused by uncontrolled access.

Tourism-led development projects may also alter the character of the landscape through reducing urban green spaces and the appearance of modern architectural structures (Albert., Y.P. et al, 2020). Moreover, touristic and recreational facilities could disturb the harmony of the natural and cultural heritage environment if they are not designed and constructed in a manner that is sensitive to the characteristics of the local environment.

Nonetheless, active touristic destinations may promote land-purchase investments while simultaneously encouraging informal and formal utilization of land by local residents for establishing small business entities.

Additionally, overcrowding resulting from seasonal tourism could affect people's perceptions of touristic destinations, their experience of the place and level of satisfaction.

It should be highlighted that any adverse impact on the urban and natural landscapes would in turn affect tourism activities and attraction of tourists.

8.1.1 Recommendations

- Develop a plan for steering MICE tourism towards sustainable tourism
- Provision of suitable Water, Sanitation and Hygiene (WASH) facilities within the touristic destinations
- Protect Jordan's natural environment through enforcing the relevant laws and regulations especially through the Royal Rangers and the RSCN
- Provision of clear signage in touristic destinations regarding sanitation, hygiene and sustainable environmental behaviour
- Prohibit littering and impose penalties as per the National Waste Framework Law No. (16) of 2020

- Preserve cultural heritage sites against uncontrolled access through implementing necessary measures (e.g. provision of a proper entrance gate, hiring security men, installing security cameras)
- Implement building codes in relation to the recreational facilities
- Development of cultural heritage sites shall be checked and approved by a specialized team to ensure that the development adds value to the cultural heritage and has no negative impacts.

8.2 Impacts on Biodiversity

Human risks are defined as those risks resulting from human interventions and activities, whether intentional or unintentional, which harm the biodiversity communities from all its vital components. The impact of these risks is much more than the effect of natural hazards, causing the natural ecosystem to be out of balance and to be replaced by a new system based on invasive species.

The main problems related to human impact can be summarized as follows:

- Fires in forested areas, whether intentionally or unintentionally, by hikers, or other visitors.
- Encroachments on trees and shrubs and their illegal cutting down for use as fuel or for selling timber and firewood or making charcoal. This type of encroachment has increased with the rise in fuel prices and in light of the spread of unemployment.
- Visitor pressure and random tourism.
- Overlapping of public and private property.

Several examples of ecotourism on biodiversity have been documented in Jordan. Some are affecting the natural fauna, especially n species that at risk and have national or international conservation status.

8.2.1 Impact of Ecotourism on Bats

Tourism and outdoor activities in wild habitats (e.g. Dibbin Forests, Wadi Ram and Zubiya) have a direct impact on the roosting populations of bat species living in such habitats. For example, large colonies of *Rh. ferrumequinum* that were common in Dibbin Forests, a national park visited frequently during vacations, disappeared due to outdoor activities in this park. By now, only few individuals were observed in small caves and shafts. Hiking and caves exploration in Wadi Ram may contribute in declining populations of *E. bottae* and *Rh. hipposideros* (Amr et al., 2006b, 2021).

The Egyptian Fruit Bat populations declined or disappeared from several sites where it used to be in abundance. Al Hemma cave is a classic example, where it used to harbor thousands of bats. By now only few hundreds of the fruit bats were present and continued to decline. Also, a population of the Egyptian Fruit Bat in Wadi ben Hammad, is declining due to extensive tourism activities within the vicinity of this site. The Zubiya cave, one of the largest karstic caves in Jordan, whereas seven bat species were previously recorded (*Rh. blasii*, *Rh. euryale*, *Rh. ferrumequinum*, *Rh. hipposideros*, *M. emarginatus* and *M. nattereri*), was washed with high-pressure water and was closed by a gate preventing bats to gain entrance (**Figure 31**).

Recently, many cave were turned into restaurant and coffee shops. This was observed in Asef cave where it was remodeled as recreation site, and all bats were exterminated (**Figure 31**).



Figure 31: Cave Destruction in Jordan

A. Asef cave renovated as recreation site. B. Arjan cave with evidence of fire to be used as animal barn. C. Al Wardeh cave before mining activities in 2017. D. Al Wardeh cave after mining activities in 2020.

8.2.2 Impact of Ecotourism on Squirrels and Medium Sized Mammals

The effect of human impact in the form of vacationing and tourism is nevertheless confusing. It seems that the Persian squirrel, *Sciurus anomalus*, population in Dibben Nature Reserve became adapted to the presence of people and vehicles that are continuously passing through the different parts of the reserve (Amr et al., 2006a). However, growing disturbance is shifting the distribution of this species into other areas that makes it exposed more to other forms of threats.

Medium-sized mammals are very much disturbed by human activities as a result of ecotourism in a wide range of their natural habitats, including natural forests or key biodiversity areas all over the country. **Table 43** lists some mammals species that are sensitive to human activities in natural areas.

Table 43: Mammals Impacted by Ecotourism and their Habitats

Species	Common name	Area of occurrence
<i>Martes foina</i>	Stone Marten	Dibben Forests
<i>Vulpes cana</i>	Blanford's fox	Dead sea area, Wadi Ram, Petra
<i>Procavia capensis</i>	Rock hyrax	North Shounah, Zarqa Ma'ain, Wadi Ram
<i>Hystrix indica</i>	Indian crested porcupine	Dead Sea area, Yarmouk River Basin
<i>Meles meles</i>	Eurasian badger	Dibben Forests, Yarmouk River Basin
<i>Erinaceus concolor</i>	Southern white-breasted hedgehog	All over the Mediterranean mountains
<i>Vormela peregusna</i>	Marbled polecat	Yarmouk Forest Reserve, and Mujib Biosphere Reserve.

8.2.3 Impact of Ecotourism on Reptiles

Jordan is witnessing a high increase in the tourism industry on the local and international scale. This development is associated with establishing hotels all over the country, especially in Aqaba, Dead Sea area and Petra. Tourism causes disturbance to fragile sensitive ecosystem, especially in places where relict or endangered species exist. The Petra area represents the most southern limit of distribution for some Palaearctic species such as *T. graeca* and *Phoenicolacerta*

kulzeri petraea. In Petra area, *M. macrorhynchus* is becoming rare, perhaps due to extensive use of this site by tourists and massive changes in the habitats. In desert habitats, populations of the Spiny-tailed Lizard, *Uromastix aegyptia*, are diminishing in the eastern desert due to extensive capturing to meet the demand by citizens of neighboring countries (Disi et al., 2014).

Stubbs and Swingland (1986) reported that the main causes of decline of tortoise populations in France are attributed to forests fires, habitat loss from agricultural and tourist development and increasing human pressure on formerly remote areas due to improved road access.

Also, off-road driving can be considered as one of the major disturbances affecting desert dwelling species in the Jordanian deserts. Several species of sand inhabiting lizards are killed or their burrows are destroyed because of off-road driving. Other species such the threatened Spiny tailed lizard, *Uromastix aegyptia*, are disturbed or crushed.

8.2.4 Impact of Ecotourism on Birds

Birds are disturbed by tourists especially in forested areas. Many of these birds are ground-nesting species. Owls and raptors are also disturbed in their natural habitat causing their abandon of their nests, thus leaving behind their hatchlings. Mountains can cause extensive disturbance to nesting areas for many wild species especially in Wadi Ram area.

Wadi Rum has been a tourist destination for wilderness trekking and rock-climbing since the mid 1970s at least, and the number of visitors to the area of the proposed wildlife reserve has been increasing steadily since then, especially with the advent of the peace treaty with Israel in 1994. Mass tourism by coach has reached the most popular sites (Rum village and its environs), where up to 250 or more tourists per day currently visit at peak times, outside the hot summer months. Smaller, more specialized tours and many individual visitors go climbing with Bedouin guides in the mountains of the proposed reserve, or go on desert safaris in off-road vehicles within the proposed reserve, for trips of a few hours to several days in length. Specialized rock-climbing expeditions also visit regularly (Evans et al., 2005).

8.2.5 Impact of Ecotourism on Flora

Many flowering plants are picked during local tourism activities, especially among school children when joining schools trips to forested areas. Large amount of wild flowers are harvested each year during their blooming season. This includes orchids and irises.

The forested forests are exposed to waves of random tourism, especially in the spring months and weekends, as thousands of citizens flock to these areas for the purpose of picnics. As a result of the lack of services in it and the misuse of picnic spots, large amounts of garbage are generated that distort the general landscape of the forests. Also, setting fires for the purpose of cooking and not extinguishing them causes fires that devour large areas of forests. In addition, the activities of logging, picking flowering plants and digging on trees cause a threat to the biodiversity in the forests. The amount of leftovers and plastic bags, bottles and other disposals are filling the natural forests of Jordan (**Figure 32**). This will cause decline in the vegetation cover as well as hamper the growth of some rare species.

Forest fires are among the most important threats facing the world's forest sector. These fires have negative effects on the economy and the environment. It destroys environments containing different types of plants and animals and sources of income for many societies that depend on forests as a main source of livelihood, as well as leading to a significant change in the ecological succession that leads to a comprehensive change in these systems.

In Jordan, forest fires pose the greatest risk that could lead to the destruction of the remaining forests and contribute to the reduction of their areas by a large percentage, especially in the forests of northern Jordan. Many of these fires were caused by local tourists while vesting forests for vacationing.



Figure 32: Littering in forests in Northern Jordan

Human risks are defined as those risks resulting from human interventions and activities, whether intentional or unintentional, which harm the biodiversity communities from all its vital components. The impact of these risks is much more than the effect of natural hazards, causing the natural ecosystem to be out of balance and to be replaced by a new system based on invasive species.

The main problems related to human impact can be summarized as follows:

- Fires in forested areas, whether intentionally or unintentionally, by hikers, or other visitors.
- Encroachments on trees and shrubs and their illegal cutting down for use as fuel or for selling timber and firewood or making charcoal. This type of encroachment has increased with the rise in fuel prices and in light of the spread of unemployment.
- Visitor pressure and random tourism.
- Overlapping of public and private property.

Several examples of ecotourism on biodiversity have been documented in Jordan. Some are affecting the natural fauna, especially n species that at risk and have national or international conservation status.

8.2.6 Recommendations

In order to limit the impact of building hospitality services on sensitive ecosystems, building in areas rich with biodiversity should be adequately planned and organized. Alternative location should always be considered. A full environmental impact assessment study that considers potential impacts on biodiversity through an environmental management plan should be undertaken and implemented for all development projects near sensitive areas. This in fact is required by the EIA Bylaw and should therefore be strictly enforced.

Code of Conduct for Natural Sites. Each natural site needs to be complemented with a code of conduct. This code should provide guidelines of the activities that are not permitted within the designated area. Raising awareness among the visitors on this code of conduct is essential to ensure that tourists appreciate the value of natural resources as well as understand the consequence of committing violations. Adequate resources to ensure proper communication and enforcement are also essential.

Planning and Managing Events. Any event that will take place in a sensitive area needs to get approval from the proper authorities. The organizer for the events should develop plans that will manage various aspects of the event (such as waste management and water consumption).

Planning Developments Any development planning for touristic purposes should take into consideration the existing and planned protected areas network, and species diversity in Jordan. In addition, mitigation measures for significant adverse impact shall be highlighted and considered. This could be achieved through:

- The use of development plans, policies and restrictive conditions to amend plans and working methods or exclude areas important for biodiversity;
- Use conditions or agreements on design, methods, and timing;
- Obtain information from surveys, SEA and other available mechanisms.

Managing Protected Areas and SCAs. Protected areas are considered sites with high biodiversity and should:

- Have important seasonal uses or are critical for migration;
- Support habitats, species populations, ecosystems that are vulnerable, threatened throughout their range and slow to recover;
- Support particularly large or continuous areas of semi-natural habitat;
- Support semi-natural habitats that take a long time to develop characteristic biodiversity;
- Support biodiversity for which mitigation is difficult or its effectiveness unproven.

SCAs are considered sites with biodiversity importance and it is therefore important that they be managed as:

- Protected areas that act as a corridor, link-habitat or 'stepping stone';
- An important buffer for maintaining environmental quality or critical ecosystem processes.

Adherence to Environmental Regulations. The strict adherence to all environmental and other regulations is needed to avoid the haphazard development of the tourist sector that encroaches on the ecosystem and landscape. The consumption of resources need to be taken into consideration in every tourist facility to ensure no area gets completely depleted. All EIAs need to present the required resources during the construction and operation of any facility in order to have a better understanding on the possible future impacts, including cumulative impacts of existing facilities.

8.3 Impacts on Water and Wastewater

As presented in the baseline chapter, Jordan is characterized as a highly water stressed country. Because of increasing water demand as well as the negative effects of climate change on water supply, the situation will likely become worse in the future. Main anticipated impacts of tourism on the water sector are:

8.3.1 Increasing Water Demand

Tourism activities are known to consume large amounts of water per capita as tourist typically enjoy from water features of hotels and resorts much more than regular people do. The overall additional water and wastewater over the coming 5 years are presented in the following table (**Table 44**).

Table 44: Projection of Additional Water Demand and Wastewater Generation over the Coming 5 Years

Year	Total Arrivals (visitors/year)	Additional Planned Arrivals (visitors/year)	Additional Water Demand (MCM)	Additional Wastewater Generation (MCM)
2021	1,900,000	0	0	0
2022	3,400,000	1,500,000	2.1	1.68
2023	4,500,000	2,600,000	3.64	2.912
2024	5,000,000	3,100,000	4.34	3.472
2025	5,500,000	3,600,000	5.04	4.032

Assumed Duration of stay (4 d)

Assumed Water Demand of (350 liter/visitor/day)

Assumed Wastewater Generation of (0.8 Water Demand)

The total increase over the coming five years is about 5 MCM which is about 1% of the total annual water supply in Jordan (500 MCM as presented in the baseline section). Although, this 1% may seem insignificant but it is characterized by significant variability in water demand, temporal and special variability with significant peaks during the summer period when water availability is at its lowest; and spatial variability with the tourism industry being concentrated in small towns, which are already experiencing significant water shortages. The tourism sector is very diverse in terms of the level and components of water use. There are, for example, very large differences in water use depending on where tourists are staying (e.g. hotels, camp sites, etc.) and the type of activities they perform (e.g. hiking, swimming, etc.).

Tourism demand for freshwater is either direct or indirect. Direct tourists and tourism industry water consumption especially in the dry season can increase many folds. This increase, in some areas, during the peak tourism months can be higher than the demand of the local population in a whole year. Tourists activity typically consume much more water than typical water use (e.g. swimming pools, water parks, extensive landscaping).

8.3.2 Impacts on Water Resources

Over-exploitation and degradation of groundwater

In many Jordanian tourist areas, the main source of fresh water is groundwater, some of which are being overexploited. That means that the volume of abstracted groundwater cannot be renewed and without a change of this trend the groundwater will disappear. Additionally, over-exploitation of groundwater provokes saline water intrusion that has negative impacts on the quality of drinking water.

Pollution of surface and groundwater in tourist areas can be caused by urbanization, solid waste, agricultural and other economic activities or by insufficient or non-existent wastewater treatment. In other cases, the increase of wastewater during the tourist season may not be absorbed by the public treatment systems because of limited capacity or may reduce the effectiveness of treatment.

Impacts on Wastewater Facilities

Tourism is responsible for a small share of wastewater generation within Jordan; however, this share is characterized by a high variation of wastewater flow and load due to variable tourism seasons. If the wastewater treatment process is not flexible, then treatment will not be optimal. **Table 44** presents the additional wastewater generated as a result of increase in number of visitors should the JNTS implementation be successful.

8.3.3 Recommendations

In order to cope with upcoming challenges, Jordan needs to implement measures on both the water demand and supply side. Water saving measures in sectors like agriculture and industry are essential to improving the situation. However, and despite the fact that the tourism sector does not belong to the high water consumers, due to its importance in some tourist regions and seasonality of its demand, it needs to be included in the water saving activities.

There are many different water saving measures to consider for the tourism sector, depending on the water demand component considered. These include a more rational use of water in toilets and showers, in addition to recycling of pool water.

Applying existing technology to save water in hotels and households in tourist areas could bring about a significant reduction in water demand and could possibly accommodate a further increase in tourism without additional supply measures. Water saving devices can save up to 50% of water. Many effective water-saving devices can be purchased at a reasonable price with some of the devices not requiring any significant modifications.

Significant efforts can also be made to promote rainwater harvesting in hotels. Furthermore, larger hotels close to the sea in Aqaba could be encouraged to invest in their own desalination plants (e.g. reverse osmosis). Newly constructed hotels and tourism facilities may be encouraged to use treated wastewater supplied from a treatment plants in toilet flushing systems if feasible. In some cases, eco-tourism labels and certification systems can be effective in ensuring the implementation of water saving measures in the tourism industry.

Tourist awareness of water scarcity and motivation of the tourists to reduce water consumption could be important in reducing water consumption. However, this is a difficult task as it requires changing consumption habits of visitors who are not normally aware of the country's challenges and the impact of their water consumption.

Information and awareness raising to reduce the frequency of towel and bed sheet laundering, or in drastic cases reducing showering, are the type of actions most frequently put in place by the hotel industry to reduce water demand directly.

The installation of individual water meters for tourist infrastructure composed of a series of individual lodges/flats rented for longer periods can also be considered as a mean for reducing water demand.

In case wastewater cannot be discharged to a sewer to be treated in a municipal effluent treatment plant, decentralized wastewater treatment plants are a recommended option. Sequencing batch reactors have been proven to be a satisfactory option to fulfil these requirements. However, other types of biological treatment may also be appropriate as long as they achieve high removal efficiencies. Environmental factors should be considered when selecting this option.

8.4 Impacts on Air Quality

The tourism sector does not have direct impacts on air quality but rather have indirect impacts through the transportation sector and the building sectors. Basically more people would be traveling by air, sea and land and more nights are spent at hotels and other touristic residences where tourists consume electricity for heating, cooling, and lighting. Therefore air pollution shall be covered under the climate change and energy section and the transportation section.

8.5 Impacts on Climatic Change and Energy Use

Tourism contributes to energy use and GHG emissions from three main categories which are transportation, accommodation, and tourism support activities.

8.5.1 Increased energy and emissions related to tourist transport

Tourist transportation is by far the largest emitter of GHG in comparison to other tourism activities. Growing tourism activities will result in higher demand on transportation sector, including air, sea, and land. However, air transport is considered the main tourism contributor to GHG followed by car transport. Transportation impacts are discussed in more detail in a dedicated Section.

8.5.2 Increased energy and emissions related to tourist accommodation

Tourist accommodation is considered as the second highest GHG emission source among tourism activities. The increase in the tourist numbers will increase the consumption of energy usage in accommodations; this involves heating and cooling; i.e., hot water supply, central heating, cooling for fridges and freezers, air conditioning, and lighting which all emit GHG and contribute to climate change.

8.5.3 Increased energy and emissions related to tourism support activities

Solid waste production is directly related to the number of tourists, as the amount generated increases accordingly. GHG from solid waste is produced during collection of the waste via trucks and compactors and during biodegradation of the waste in landfills. Waste that biodegrades in anaerobic conditions produce landfill gas that has around 45% CO₂ and 45% CH₄ with CH₄ having a warming potential of 28. Although the solid waste sector is the second highest producer of GHG emissions in Jordan, the tourism component is not considered significant. However, as mentioned earlier, it can have other harmful impacts as improper disposal and littering can cause major problems in natural environment forests, scenic areas, and roadsides.

GHG is produced during drinking water treatment and pumping and during wastewater treatment operations. Tourists consume water and produce wastewater during their visits, especially at accommodation, restaurants, recreational areas, and tourist sites. Clearly, the increase in tourists should lead to an increase in water demand and wastewater production which contribute to an increase in the GHG emissions. As with the solid waste, this is considered a minor component in relation to GHG emissions as the major concern is water scarcity and increased seasonal demands in touristic areas.

8.5.4 Recommendations

There are many technological, behavioural, managerial, and policy initiatives that can bring tourism to a more sustainable emissions pathway. Tourism initiatives have the responsibility of not only reducing its GHG emissions but also to be an example for other initiatives and sectors. A collaborative effort is needed for the energy and GHG mitigation as no sector can be successful on its own and the best approach for tourist activities is to get involved in existing GHG reduction efforts and sustainable development practices.

The tourism sector should support national initiatives in Jordan that aim at reducing GHG emissions, energy efficiency initiatives, and use of alternative energy. The main initiative in Jordan includes the Intended Nationally Determined Contribution (INDC) document, which is a commitment to reduce greenhouse gas emissions by 14% until 2030 in Jordan.

In addition to support of INDC, the tourism sector should support the national energy strategy, the Jordan national green growth plan, and the biodiversity-friendly tourism charter in. The main proposed solutions include:

- Encourage implementation of green building codes and eco-tourism labelling in hotels, camps, and other tourist accommodation locations such as green key, travel life, blue flag, Leadership in Energy & Environmental Design (LEED), etc.;
- Encourage the use of renewable energy such as solar and wind power by direct use and by carting approach;
- Raise awareness among tourists and the community about the renewable energy and energy conservation activities;
- Expand the use of solar water heating and cooling in commercial and industrial facilities.
- Encourage the use of sustainable transportation solutions
- Develop a system for sorting, re-using and recycling of solid waste and enhancing the waste collection and disposal practices;
- Improve energy use efficiency in water utilities, and implement a number of projects based on renewable energy sources (solar, wind), as well as biogas and energy production from sludge.

8.6 Impacts on Transportation

The bulk of transportation in Jordan occurs on the road network with no rail or other transportation infrastructure but with big plans and big ideas for large scale infrastructure projects being proposed and talked about. Increased amounts of tourists due to the JNTS could have an impact on the international transport hubs and the local transport network.

8.6.1 Impacts on International Airports and Seaport

From the air, Jordan is accessible to international tourism mainly via Queen Alia International Airport in Amman and King Hussain Airport in Aqaba, although the majority arrive via Amman. The JNTS proposes measures to increase travellers to those two airports which could have the following main impacts:

- Delays and inconvenience at the airport due to congestions at airports especially at peak hours.
- Traffic congestion at the roads connecting the airport to the city. Although the Queen Alia International Airport road to Amman was recently rehabilitated, it is important to note that this road serves more than the airport as it has become a recreational destination with many parks and tourist attractions established on this road in addition to several new residential areas. It is also used to travel South of the country to various tourist destinations.

From the sea, Jordan is accessible to international tourism through Aqaba port which is also one of the selected locations in the JNTS that should see additional traffic. The port could see congestions in addition to the road connecting Aqaba to the rest of the country. It is important to note that Aqaba serves as a multiple function destination. It serves as an industrial hub, a trade hub, and tourist attraction hub. A large amount of goods is trucked from and to Aqaba port to the rest of the country. Pressure on the port has increased in recent years due to the conflict in Syria, which has affected land travel and movement of goods. The road to Aqaba serves all these objectives and carries goods and passengers together. Therefore, as Aqaba grows, the road is in need to be maintained and expanded.

8.6.2 Impacts on local road networks

By land Jordan is accessible from all the surrounding countries including Syria, Iraq, Saudi Arabia, Palestine, and Israel, with most of the tourism traffic currently coming from the Saudi borders due to the conflict in Syria. Tourists arriving from Saudi Arabia mostly arrive in their own vehicles and continue to use these vehicles inside the Jordanian cities causing congestions in areas of touristic attractions.

8.6.3 Recommendations

Reduce and facilitate proceeding and handling time at airports and the seaport in order to get more travellers in and out of the country fast without any delays and frustrations.

Tourism initiatives should support the governmental policies related to green and sustainable growth for Jordan, an approach for achieving a number of simultaneous objectives that bring Jordan closer to its sustainable development ambition by promoting green economy initiatives. The transportation proposed solutions include:

- Safe and fuel-efficient driver training programs;
- New vehicle fuel economy standards;

- Pedestrianized or emissions-linked vehicle restricted zones;
- Quality and reliability of public transport should be guaranteed by standards;
- Intelligent traffic management systems;
- Concessions on vehicle road tax for electric or low emission vehicles, including subsidized electricity at charge stations;
- Favourable trade arrangements for key components that Jordan will not pursue manufacturing, such as EV batteries;
- Affordable and competitive BRT ticket prices, when operational, comparable with driving own vehicle.
- Encourage the use of public transport;
- Encourage the use of Zero Emission Vehicles (ZEV) in Jordan;
- Encourage the use of the national BRT system once operational;
- Encourage the use of the railway system once operational;
- Ensure the inclusion of energy efficiency considerations when buying transport vehicles.
- Maintain clean air quality and identify areas where air quality must be monitored and formulated actions in this regard;
- Maintain suitable noise and light levels and identify all noises and lights to insure it is not disturbing the surrounding areas;
- Design a sustainable transport system for the tourism sector.

8.7 Impacts on Waste Management

The possible impacts of the current tourism strategy related to waste include various issues as described in the following sections.

8.7.1 Increased Littering

This is of particular importance in natural protected and unprotected areas. Showing more of Jordan and enhancing ecotourism can create waste littering issues which remain after tourists and visitors leave. This issue is considered one of the most important impacts of tourism in natural areas in Jordan and one of paramount importance.

8.7.2 Increase the Burden of MSW Collection and Disposal

Waste collection is currently being carried out by poorly funded operations in the different municipalities, especially in rural areas. This burden is one of the most exhausting elements the municipalities have to deal with on daily basis and is one of increasing challenges.

With the exception of Ghabawi, which is a sanitary landfill that serves Amman, all solid waste disposal facilities in Jordan are unlined dump sites that pose a threat to the environment. These facilities are currently struggling with the high costs of operation and maintenance, in addition to issues of reaching full capacities and having no additional space to dispose of the waste.

The total amount of waste expected from the additional tourism in 2020 is expected to be around 2,687 tons of waste, which is around 0.13% of the total annual amount of waste produced in the country (Table 45).

Table 45: Projection of Municipal Solid Waste Generation over the Coming 5 Years

Year	Total Arrivals	Additional Planned Arrivals Compared to 2021	Average Duration of Stay (day) ^a	Waste generated (ton/year) ^b	Additional Waste (Ton/year)
2021	1,900,000	0	4	1,900	0
2022	3,400,000	1,500,000	4	3,400	1,500
2023	4,500,000	2,600,000	4	4,500	2,600
2024	5,000,000	3,100,000	4	5,000	3,100
2025	5,500,000	3,600,000	4	5,500	3,600

a: Obtained from the JNTS; b: Assuming 1 Kg of waste per tourist per day

8.7.3 Increased Medical Waste

Medical waste is a specialty waste produced from hospitals and medical centers. This type of waste is considered hazardous and must be dealt with separately and in a specific manner to prevent contamination. The appropriate method of treatment is either by incineration or autoclaving which are methods that kill dangerous infections elements of the waste. Such waste is more expensive to treat and manage and can be a direct result of medical tourism as promoted by the JNTS as well.

8.7.4 Increased Construction and Demolition Wastes

In the process of constructing new tourism infrastructure and facilities, a certain amount of construction and demolition waste will be produced. This amount should be managed carefully so that it does not end up illegally disposed on a neighbouring empty land.

8.7.5 Increased Amount of Agricultural Waste

This type of waste is produced during farming activities and is anticipated to be increased with agro-tourism and other tourism related to farms and farming. This waste is normally not hazardous and could be beneficially reused if kept separate from other wastes and free of contamination.

8.7.6 Recommendations

There should be designated areas for construction waste. Once these areas are full, they should be loaded onto a truck and transferred to a facility that handles this type of waste. The landfills that the waste is transferred to need to be agreed beforehand with the municipality and included in the Solid Waste Management Plan.

A plan for hazardous waste needs to be developed for any type of hazardous waste that is generated in the construction site. The waste should be disposed in sealed leak proof containers and disposed in a site that can handle the waste.

Increased littering. As one of the most visible and significant impacts of tourism in natural areas, strict specifications and conditions must be enforced in any newly developed project related to tourism in natural areas. These specifications must be result-oriented and be practical and implementable with clear and measurable key performance indicators that assure prevention of littering and cleaning of the already littered natural areas.

Increased burden of MSW collection and disposal. Waste minimization and recycling activities should be integrated and mainstreamed in the tourism sector with the objective of reducing the produced waste amounts that must be disposed in landfills.

Waste treatment and proper waste disposal must be insured. Any tourism activity must utilize a cradle to grave approach of following waste produced to ensure it is collected, treated, transported, and disposed appropriately. Although the task of waste collection and disposal can be transferred to subcontractors and other entities, the responsibility of proper waste management is on the producer as a tourism facility and cannot be transferred to anybody.

The tourism sector should also support the national solid waste strategy in Jordan which promotes closure of unlined facilities and establishment of lined landfills in addition to development of recycling programs and facilities and transfer stations.

Increased medical waste. Medical waste as a specialty waste and has a specific way of management which includes careful labelling, separation, care in handling, treatment, and disposal in order to ensure safe management and disposal of the waste. This is done by specialized and certified teams. The responsibility of the tourism sector is to ensure specialized teams are engaged in such activity and that they are always compliant with the local regulations.

Increased construction and demolition waste. This element can give a tourism project a bad reputation from day one if not dealt with carefully. During construction of new facilities and rehabilitation of existing sites, construction and demolition waste must be collected and disposed in the dedicated disposal locations for this type of waste. Again the task of waste management can be transferred to other entities but the responsibility remains with the tourism site.

Increased amount of agricultural waste. This type of waste if kept free of contamination from other wastes can be reused in a beneficial way. Tourism projects that can potentially produce such wastes should utilize existing reuse schemes for these wastes in the local areas or encourage development of new recycling plants. Examples of recycling of this waste include composting to produce soil additives and anaerobic digestion to produce energy.

8.8 Impacts on Cultural Heritage

8.8.1 Inappropriate site development

In many tourism sites in Jordan, the main attraction in the site is a historical or other heritage value location. However, some sites require some renovation and development to become suitable to receive tourists. If the renovation and development do not match the architecture, colour, and material of the original construction and environment, then the cultural heritage of the site is impacted.

8.8.2 Overuse and misuse of cultural heritage sites

The impact of increasing the number of visitors at these sites could damage or impact the site through littering and vandalism. Some sites may not have proper protection and are exposed to outside visitors without control which make the sites susceptible to misuse and damage. Even with proper management, if the number of visitors is above the carrying capacity of the site, some damage can be sustained despite proper visitor behaviour and control.

8.8.3 Alteration of intangible cultural heritage

Intangible cultural heritage such as traditions, arts, and rituals can be tourism resource and attractions as many tourists would like to experience such cultural heritage. Over exposing this cultural heritage to tourism threatens to alter these traditions by adding a strong commercial element and could cause the original cultural rituals to disappear.

8.8.4 Recommendations

Develop standards for site development. Detailed rehabilitation and restoration standards should be developed and implemented that insures all developed projects enhance the cultural heritage value. These standards could be developed for general cultural heritage sites development but also to be developed specifically for major sites. These standards should be introduced, enforced, and monitored with the assistance of the local communities. These construction standards should preferably include heritage protection standards, Biodiversity protection standards, in addition to environmental protection standards.

Develop site operation and management plans. Each site has its own specific requirements related to optimizing its use for the benefit of tourism, the local community and its protection from vandalism and littering., An operation and management plan at the site provides much needed instructions and guidance for operators on how to manage the site. The principles upon which this plan should be developed include:

- Focus on creating new jobs and economic prosperity to the local community;
- Protection of the natural and cultural heritage at the site from littering and vandalism is a priority;
- Determined the site's carrying capacity and ensure it is not exceeded;
- Utilization of the services of the local community to participate in its growth;
- Reduce environmental impacts of the operations;
- Provide a satisfying and pleasant experience to all visitors;
- Ensure site maintenance activities are performed when needed.

Protection plan of intangible cultural heritage. Participate in and support efforts to protect cultural heritage within communities that are planned to be exposed to increasing amounts of visitors. The main function of this plan is to ensure the preservation of the culture and to ensure it is not reduced to a commercial commodity only used to attract tourists. This plan must be developed, approved and adopted with the support of the local community at the important sites, with focus on the Badia region.

8.9 Impacts on Socio-Economic

Tourism is a major contributor to employment creation particularly for women, youth, migrant workers, rural communities and indigenous peoples and has numerous linkages with other sectors. As a consequence, tourism can lead to the reduction of poverty and to the promotion of socio-economic development and decent work. However, if tourism does not respect local cultures and is uncontrolled, unsustainable or not socially accountable, it can also have a negative impact on local communities, their heritage and environment, exacerbating inequalities.

National revenue in Jordan is expected to increase as a result of boosting the tourism sector. The JNTS plans to increase tourism revenue from 1.5 billion JOD in 2021 to 4.6 billion JOD in 2025, a 600% increase in 4 years. This will likely have a

significant impact on the local economy by stimulating business activities which will also result in more long-term jobs. In addition, the JNTS aims at increasing direct employment opportunities in tourism from 50,000 in 2021 to 70,000 in 2025. This growth would be much needed in the tourism sector after the hit it took from the COVID -19 pandemic.

In addition, and as demand for some tourism facilities as well as relevant infrastructure increases due to the increase in number of visitors to Jordan, construction and operation of these facilities will provide income for a wide range of people, including engineers, designers, laborers, and many other professions. It will also have a knock-on effect on other markets as it will increase demand for goods and services. Spinoff effects, resulting from spending of the income generated by these activities, will also have positive economic effects on the overall economy.

The improved economic situation resulting from additional workers could also lead to an improvement in education, which in turn will also fuel the economy. The improvement in roads, communication, sanitation and other infrastructure and utilities needed for supporting tourism according to the JNTS will also benefit the local community through providing needed services that may not have been available otherwise.

On the other hand, the local community may have to deal with an increasing pressure on local infrastructure and utilities that will also be used by tourists. In the long run, local communities, cultural values, and traditional practices may also change as a result of an influx of tourists. In addition, and while tourism will generally increase jobs, it could also facilitate child labor, especially in informal sectors. Some employees will be seasonal workers and therefore vulnerable to sudden stops in income.

8.9.1 Recommendations

When hiring, contractors and hospitality facility operators should give priority to local qualified residents. Locally manufactured equipment and supplies should also be given priority. In order to avoid any illegal practices, all labour and construction regulations need to be abided by.

Policies that support local employment in the tourism sector, particularly in rural areas, need to be put in place to allow residents with little experience in the tourism sector to reap potential economic benefits. This can be done through a local community training program. In addition, government support should be given to the development of tourism-related micro and small enterprises (MSEs) in rural areas.

Private sector investment in the rural tourism sector may need to be regulated to ensure that the local residents benefit from collectively owned heritage resources. Otherwise, there is a risk that the private sector will benefit disproportionately.

According to the recommendations of the International Labour Organization (ILO), the promotion of decent work and sustainable employment in the tourism sector requires the following:

- Strengthening the sector's linkages with related sectors in its supply chain (e.g. agriculture, handicrafts, transports, infrastructure, construction) while supporting and promoting an integrated approach and local sourcing.
- Reinforcing initiatives to promote employment creation at local level, including in rural areas, contributing to social and economic development and poverty reduction through social inclusion, regional integration and expansion of local incomes.
- Investing into skills development and vocational education and training, and improving working conditions to enhance the sector's image and service quality, bearing in mind that the skills level, professionalism, commitment, loyalty and soft skills of workers are key for competitiveness.
- Strengthening social dialogue mechanisms and collective bargaining. These can enhance working conditions, career prospects and job security to the benefit of the workers, and make it easier for companies to better respond to the needs and demands of the labour market.

8.10 Proposed Mitigation and Enhancement Measures

The following tables summarize the proposed impacts, significance, and mitigations measures in addition to positive opportunities and its proposed enhancement Measures

Table 46: Proposed Mitigation and Enhancement Measures Related to Visual Impacts and Landscape

JNTS 2021 to 2025 Objectives	Possible Negative Impacts	Magnitude (L,M,H)	Sensitivity (L,M,H)	Significance (N.S, Mi, Mo, Ma)	Proposed Mitigation	Positive Opportunity	Proposed Enhancement Measures
Objective-1: Product Development. The Jordan National Tourism Strategy will focus on the following products: Culture and Heritage Tourism, Well-being Tourism (Wellness, Medical, Faith, Adventure Tourism), MICE Tourism (Meetings, Incentives, Conferences, Events), and Domestic Tourism	<ul style="list-style-type: none"> Pollution of land and waterways due to littering Creation of wildfires. Affecting the aesthetic value of touristic landscapes due to unsustainable environmental behaviour Alter the character of the landscape through reducing urban green spaces and the appearance of modern architectural structures. Disturbing the harmony of the natural and cultural heritage environment if touristic and recreational facilities are not designed and constructed in a manner that is sensitive to the characteristics of the local environment. Overcrowding resulting from seasonal tourism could affect people's perceptions of touristic destinations, their experience of the place and level of satisfaction. 	Medium	High	Moderate	<ul style="list-style-type: none"> Develop a plan for steering MICE tourism towards sustainable tourism Provision of suitable Water, Sanitation and Hygiene (WASH) facilities within the touristic destinations Protect Jordan's natural environment through enforcing the relevant laws and regulations especially through the Royal Rangers and the RSCN Provision of clear signage in touristic destinations regarding sanitation, hygiene and sustainable environmental behaviour. Prohibit littering and impose penalties as per the National Waste Framework Law No. (16) of 2020 Implement green building codes in relation to the recreational facilities 	Raise awareness about sustainable and green tourism	Direct MICE tourism in a way that would raise awareness regarding the environmental value of natural landscapes and promoting sustainable behaviour.
Objective-2: Human Resources Development: Education and training of qualified human resources for tourism sector employment, Increasing employment of Jordanians, Engaging women and people with disabilities in tourism careers and jobs , Involvement of local communities in tourism activities and businesses throughout Jordan, Training programme for MoTA/DoA/JTB/ Sector staff.	NA	NA	NA	NA	NA	NA	NA
Objective 3 Marketing: Enhancement and effectiveness of marketing, branding and positioning, Minimising the impact of seasonal tourism through the disbursement of regional and international visitors, Enhancing digital marketing, Building resilience and the ability to bounce back after adverse events, Enhancing travel to Jordan via Low-Cost Carriers	NA	NA	NA	NA	NA	NA	NA
Objective 4 Heritage Protection: Site Preservation, Conservation, Consolidation, Restoration, Rehabilitation – this activity is within the remit of the DoA, Site Improvement – this activity is undertaken by MoTA	<ul style="list-style-type: none"> Inappropriate development of cultural heritage sites may result in unattractive sites disturbing the harmony of the cultural heritage environment instead of protecting it Damage to cultural heritage sites may be caused by uncontrolled access. 	Medium	High	Moderate	<ul style="list-style-type: none"> Preserve cultural heritage sites against uncontrolled access through implementing necessary measures (e.g. provision of a proper entrance gate, hiring security men, installing security cameras) Development of cultural heritage sites shall be checked and approved by a specialized team to ensure that the development adds value to the cultural heritage and has no negative impacts. 	Ensure cultural heritage sites are developed in a manner that protects its identity and enhances its value	Proper design should be prepared for cultural sites devolvement taking into consideration the cultural heritage type and demographic and geological environment
Objective 5 Reforms: Reforms have been identified as a key Enabler/Strategic Objective to	NA	NA	NA	NA	NA	NA	NA

Table 47: Proposed Mitigation and Enhancement Measures Related to Biodiversity

JNTS 2021 to 2025 Objectives	Possible Negative Impacts	Magnitude (L,M,H)	Sensitivity (L,M,H)	Significance (N.S, Mi, Mo, Ma)	Proposed Mitigation	Positive Opportunity	Proposed Enhancement Measures
Objective-1: Product Development. The Jordan National Tourism Strategy will focus on the following products: Culture and Heritage Tourism, Well-being Tourism (Wellness, Medical, Faith, Adventure Tourism), MICE Tourism (Meetings, Incentives, Conferences, Events), and Domestic Tourism	Developing tourism products within natural locations could have detrimental effects on the biodiversity there, especially since the carrying capacity in Jordan is typically not respected.	Medium	Hight	Moderate	<ul style="list-style-type: none"> Ensure environmental management and monitoring of sensitive tourism products and put in place operational procedures to control their impacts. Sensitive tourism products include: Tourism in natural areas where a small group can cause large pollution and biodiversity damage. High volume tourism such as MICE which can produce large amounts of pollution within short period of time. Specialty tourism that can produce hazardous waste such as medical tourism. Domestic tourism has been known to have high polluting impacts and must be carefully monitored and controlled Integrating biodiversity protection in the development of all tourism products to ensure no harm occurs during projects construction and operation 	Utilize ecotourism to promote Jordan's biodiversity and mainstream biodiversity conservation into tourism plans and projects	<ul style="list-style-type: none"> Develop Biodiversity training programs for tourism guides Adopt awareness campaigns for Jordan biodiversity for local and international tourists Support development of strict regulations to protect endangered species from
Objective-2: Human Resources Development: Education and training of qualified human resources for tourism sector employment, Increasing employment of Jordanians, Engaging women and people with disabilities in tourism careers and jobs , Involvement of local communities in tourism activities and businesses throughout Jordan, Training programme for MoTA/DoA/JTB/ Sector staff.	NA	NA	NA	NA	NA	Integrate Biodiversity training into all tourism sector curricula	Ensure all courses for tourism jobs includes mandatory material about Jordan Biodiversity conservation
Objective 3 Marketing: Enhancement and effectiveness of marketing, branding and positioning, Minimising the impact of seasonal tourism through the disbursement of regional and international visitors, Enhancing digital marketing, Building resilience and the ability to bounce back after adverse events, Enhancing travel to Jordan via Low-Cost Carriers	NA	NA	NA	NA	NA	Include Biodiversity in Jordan's tourism marketing strategies	Ensure marketing material have been checked to add biodiversity conservation related marketing material
Objective 4 Heritage Protection: Site Preservation, Conservation, Consolidation, Restoration, Rehabilitation which is within the remit of the DoA, while Site Improvement is undertaken by MoTA	Site improvements near ecologically sensitive areas could disturb flora and fauna and, in some cases, destroy habitats	Medium	Hight	Moderate	Biodiversity protection should be integrated into the development of all site restoration projects	NA	NA
Objective 5 Reforms: Reforms have been identified as a key Enabler/Strategic	NA	NA	NA	NA	NA	NA	NA

Table 48: Proposed Mitigation and Enhancement Measures Related to Water and Wastewater

JNTS 2021 to 2025 Objectives	Possible Negative Impacts	Magnitude (L,M,H)	Sensitivity (L,M,H)	Significance (N.S, Mi, Mo, Ma)	Proposed Mitigation	Positive Opportunity	Proposed Enhancement Measures
Objective-1: Product Development. The Jordan National Tourism Strategy will focus on the following products: Culture and Heritage Tourism, Well-being Tourism (Wellness, Medical, Faith, Adventure Tourism), MICE Tourism (Meetings, Incentives, Conferences, Events), and Domestic Tourism	Tourism activities typically consume higher water per capita each day than regular activities which adds pressure to water demands in Jordan Wastewater will also be generated in large quantities in tourism sites	Medium	Hight	Moderate	Tourism activities and sites must take every precaution they can to reduce water consumption and treat and reuse wastewater	Raise awareness to the water issues in Jordan and to the activities being implemented to save water within tourism sites	Encourage the implementation of water saving devices and environmental management systems and certificates in addition to wastewater treatment and reuse in tourism sites
Objective-2: Human Resources Development: Education and training of qualified human resources for tourism sector employment, Increasing employment of Jordanians, Engaging women and people with disabilities in tourism careers and jobs , Involvement of local communities in tourism activities and businesses throughout Jordan, Training programme for MoTA/DoA/JTB/ Sector staff.	NA	NA	NA	NA	NA	Integrate water saving and wastewater reuse training into all tourism sector curricula	Ensure all courses for tourism jobs include mandatory material about water conservation and wastewater reuse
Objective 3 Marketing: Enhancement and effectiveness of marketing, branding and positioning, Minimising the impact of seasonal tourism through the disbursement of regional and international visitors, Enhancing digital marketing, Building resilience and the ability to bounce back after adverse events, Enhancing travel to Jordan via Low-Cost Carriers	NA	NA	NA	NA	NA	NA	NA
Objective 4 Heritage Protection: Site Preservation, Conservation, Consolidation, Restoration, Rehabilitation which is within the remit of the DoA, while Site Improvement is undertaken by MoTA	NA	NA	NA	NA	NA	Ensure site development strategies include water conservation elements	Building codes used for developing cultural heritage site should take into consideration water conservation Water efficiency during construction and operation must be incorporated into the tender documents of site development and operations
Objective 5 Reforms: Reforms have been identified as a key Enabler/Strategic	NA	NA	NA	NA	NA	NA	NA

Table 49: Proposed Mitigation and Enhancement Measures Related to Climate Change and Energy Use

JNTS 2021 to 2025 Objectives	Possible Negative Impacts	Magnitude (L,M,H)	Sensitivity (L,M,H)	Significance (N.S, Mi, Mo, Ma)	Proposed Mitigation	Positive Opportunity	Proposed Enhancement Measures
Objective-1: Product Development. The Jordan National Tourism Strategy will focus on the following products: Culture and Heritage Tourism, Well-being Tourism (Wellness, Medical, Faith, Adventure Tourism), MICE Tourism (Meetings, Incentives, Conferences, Events), and Domestic Tourism	The main impact of tourism on climate factors are related to increase of emissions from transportation (air, sea, and land) in addition to energy consumption in tourism sites and buildings	Medium	Medium	Minor	Tourism sector should try to play an active role in the shift towards energy efficiency and clean energy in transportation on land, in sea and air in addition to renewable energy in tourism sites and buildings.	Develop public transportation to tourism attraction to reduce emissions from using individual vehicles Raise awareness to energy efficiency within tourism sites	Encourage the implementation of green building codes and other certifications related to energy conservation Subsidise public transportation to tourism sites as it may need some support at the beginning
Objective-2: Human Resources Development: Education and training of qualified human resources for tourism sector employment, Increasing employment of Jordanians, Engaging women and people with disabilities in tourism careers and jobs , Involvement of local communities in tourism activities and businesses throughout Jordan, Training programme for MoTA/DoA/JTB/ Sector staff.	NA	NA	NA	NA	NA	Integrate water saving and wastewater reuse training into all tourism sector curricula	Ensure all courses for tourism jobs include mandatory material about water conservation and wastewater reuse
Objective 3 Marketing: Enhancement and effectiveness of marketing, branding and positioning, Minimising the impact of seasonal tourism through the disbursement of regional and international visitors, Enhancing digital marketing, Building resilience and the ability to bounce back after adverse events, Enhancing travel to Jordan via Low-Cost Carriers	NA	NA	NA	NA	NA	NA	NA
Objective 4 Heritage Protection: Site Preservation, Conservation, Consolidation, Restoration, Rehabilitation which is within the remit of the DoA, while Site Improvement is undertaken by MoTA	NA	NA	NA	NA	NA	Ensure site development strategies include water conservation elements	Building codes used for developing cultural heritage site should take into consideration water conservation
Objective 5 Reforms: Reforms have been identified as a key Enabler/Strategic	NA	NA	NA	NA	NA	NA	NA

Table 50: Proposed Mitigation and Enhancement Measures Related to Waste Management

JNTS 2021 to 2025 Objectives	Possible Negative Impacts	Magnitude (L,M,H)	Sensitivity (L,M,H)	Significance (N.S, Mi, Mo, Ma)	Proposed Mitigation	Positive Opportunity	Proposed Enhancement Measures
Objective-1: Product Development. The Jordan National Tourism Strategy will focus on the following products: Culture and Heritage Tourism, Well-being Tourism (Wellness, Medical, Faith, Adventure Tourism), MICE Tourism (Meetings, Incentives, Conferences, Events), and Domestic Tourism	<ul style="list-style-type: none"> Increase in littering especially in natural and cultural sites due to uncontrolled touristic activities Increase waste management burden due to extra waste quantities in touristic sites Increase in specialty waste items such as medical waste due to medical tourism 	Hight	Hight	Major	<ul style="list-style-type: none"> A Waste management plan for tourism sites should be developed in order to ensure proper waste collection, transport and disposal Proper waste collection bins and facilities should be utilized at tourism site that allow for waste recycling 	<ul style="list-style-type: none"> Implement waste minimization techniques in tourism sites through environmental management and other certification systems Control and possible forbid the use of Single use plastics (SUPs) 	Encourage the implementation of green building codes and other certifications related to waste minimization and recycling
Objective-2: Human Resources Development: Education and training of qualified human resources for tourism sector employment, Increasing employment of Jordanians, Engaging women and people with disabilities in tourism careers and jobs , Involvement of local communities in tourism activities and businesses throughout Jordan, Training programme for MoTA/DoA/JTB/ Sector staff.	NA	NA	NA	NA	NA	Integrate waste minimization and waste recycling into all tourism sector curricula	Ensure all courses for tourism jobs include mandatory material about waste minimization and recycling
Objective 3 Marketing: Enhancement and effectiveness of marketing, branding and positioning, Minimising the impact of seasonal tourism through the disbursement of regional and international visitors, Enhancing digital marketing, Building resilience and the ability to bounce back after adverse events, Enhancing travel to Jordan via Low-Cost Carriers	NA	NA	NA	NA	NA	NA	NA
Objective 4 Heritage Protection: Site Preservation, Conservation, Consolidation, Restoration, Rehabilitation which is within the remit of the DoA, while Site Improvement is undertaken by MoTA	Waste littering near cultural heritage sites Construction and demolition waste due to site renovation	Hight	Medium	Moderate	Provide proper waste collection containers and strictly enforce penalties for waste littering	Ensure site development strategies include waste recycling elements Control and possible forbid the use of Single use plastics (SUPs) in heritage sites	Encourage the implementation of green building codes and other certifications related to waste minimization and recycling
Objective 5 Reforms: Reforms have been identified as a key Enabler/Strategic	NA	NA	NA	NA	NA	NA	NA

Table 51: Proposed Mitigation and Enhancement Measures Related to Cultural Heritage

JNTS 2021 to 2025 Objectives	Possible Negative Impacts	Magnitude (L,M,H)	Sensitivity (L,M,H)	Significance (N.S, Mi, Mo, Ma)	Proposed Mitigation	Positive Opportunity	Proposed Enhancement Measures
Objective-1: Product Development. The Jordan National Tourism Strategy will focus on the following products: Culture and Heritage Tourism, Well-being Tourism (Wellness, Medical, Faith, Adventure Tourism), MICE Tourism (Meetings, Incentives, Conferences, Events), and Domestic Tourism	As tourism products are developed, more tourists will visit cultural heritage sites which could endanger the integrity of the sites and could cause gradual degradation of these sites	Hight	Hight	Major	Cultural heritage protection must be given higher priority to increasing tourism activities, only acceptable numbers of visitors should be allowed and in case any degradation occurs then sites should be closed until they are well protected	Develop sustainable site capacity number of visitors which allows utilization of cultural sites without degradation	Safe site capacity studies should be carried out and respected. For each site its safe capacity should be always respected
Objective-2: Human Resources Development: Education and training of qualified human resources for tourism sector employment, Increasing employment of Jordanians, Engaging women and people with disabilities in tourism careers and jobs , Involvement of local communities in tourism activities and businesses throughout Jordan, Training programme for MoTA/DoA/JTB/ Sector staff.	NA	NA	NA	NA	NA	Integrate cultural heritage protection into all tourism sector curricula	Ensure all courses for tourism jobs include cultural heritage protection material
Objective 3 Marketing: Enhancement and effectiveness of marketing, branding and positioning, Minimising the impact of seasonal tourism through the disbursement of regional and international visitors, Enhancing digital marketing, Building resilience and the ability to bounce back after adverse events, Enhancing travel to Jordan via Low-Cost Carriers	NA	NA	NA	NA	NA	NA	NA
Objective 4 Heritage Protection: Site Preservation, Conservation, Consolidation, Restoration, Rehabilitation which is within the remit of the DoA, while Site Improvement is undertaken by MoTA	As cultural heritage sites are renovated and developed its true identity may be jeopardized	Hight	Medium	Moderate	Provide guidelines for developing cultural heritage sites in order to protect its identity and integrity taking into account the natural surrounding environmental and culture	Protect cultural heritage sites and develop in order to allow for visitors to experience the sites in a safe and sustainable manner for the visitors and the site itself	Maintain and protect the integrity and identity of culture of heritage sites taking into account both tangible and intangible heritage
Objective 5 Reforms: Reforms have been identified as a key Enabler/Strategic	NA	NA	NA	NA	NA	NA	NA

Table 52: Proposed Mitigation and Enhancement Measures Related to Socio-Economics

JNTS 2021 to 2025 Objectives	Possible Negative Impacts	Magnitude (L,M,H)	Sensitivity (L,M,H)	Significance (N.S, Mi, Mo, Ma)	Proposed Mitigation	Positive Opportunity	Proposed Enhancement Measures
Objective-1: Product Development. The Jordan National Tourism Strategy will focus on the following products: Culture and Heritage Tourism, Well-being Tourism (Wellness, Medical, Faith, Adventure Tourism), MICE Tourism (Meetings, Incentives, Conferences, Events), and Domestic Tourism	NA	NA	NA	NA	NA	<ul style="list-style-type: none"> Positive socioeconomic impacts are anticipated related to increase in the national revenue from tourism Increased demand on tourism products can have a cascading effect of increased construction projects for tourism facilities and infrastructure which is positive for other sectors Tourism development can reach and develop remote societies which are typically difficult to reach in other sectors 	Ensure that local societies are partners and can benefit from tourism products developed in their areas
Objective-2: Human Resources Development: Education and training of qualified human resources for tourism sector employment, Increasing employment of Jordanians, Engaging women and people with disabilities in tourism careers and jobs , Involvement of local communities in tourism activities and businesses throughout Jordan, Training programme for MoTA/DoA/JTB/ Sector staff.	NA	NA	NA	NA	NA	<p>Integrate social development into all tourism sector curricula</p> <p>Gender equality and women empowerment in the training and hiring practices</p>	Ensure all courses for tourism jobs include social development material
Objective 3 Marketing: Enhancement and effectiveness of marketing, branding and positioning, Minimising the impact of seasonal tourism through the disbursement of regional and international visitors, Enhancing digital marketing, Building resilience and the ability to bounce back after adverse events, Enhancing travel to Jordan via Low-Cost Carriers	NA	NA	NA	NA	NA	NA	NA
Objective 4 Heritage Protection: Site Preservation, Conservation, Consolidation, Restoration, Rehabilitation which is within the remit of the DoA, while Site Improvement is undertaken by MoTA	NA	NA	NA	NA	NA	NA	NA
Objective 5 Reforms: Reforms have been identified as a key Enabler/Strategic	NA	NA	NA	NA	NA	NA	NA

9 STRATEGIC IMPLEMENTATION ARRANGEMENTS OF SEA RECOMMENDATIONS AND MONITORING APPROACH

As elaborated in this SEA, it became clear that tourism development could have environmental and social risks that should not be ignored but also that tourism development can have several positive impacts on environmental and social aspects that can be optimized and utilized to enhance sustainable development. Therefore, it is important to implement the SEA recommendations in parallel to the JNTS in order to avoid negative risks and optimise sustainable development opportunities. SEA recommendations implementation arrangements are proposed including the following:

Social and environmental policy. It is recommended that MoTA should develop and adopt a social and environmental policy which provides guidance to private and public entities involved in the tourism sector towards green and sustainable tourism. The policy shall include clear commitment towards social and environmental issues and shall be communicated and announced in a manner that is easily accessible to all entities at all times. This policy is to cover the following main topics:

- Biodiversity conservation.
- Water resources sustainability
- Energy efficiency and renewable energy
- Sustainable waste management
- Climate change
- Support of local communities
- Gender inclusion

This policy shall be in line with relevant international and local initiatives in Jordan including UN's Sustainable Development Goal, The Biodiversity-friendly Tourism Charter; Jordanian National Green Growth Plan; Support implementing of the national strategies in each sector effected by the JNTS including the national strategies for waste, transport, water, energy, etc.; Support the Intended Nationally determined contributions (INDCs) to reduce climate change, and support World bank ESS.

Review existing practices. It is recommended that MoTA shall look at their existing practices at all touristic sites in the kingdom specifically studying all existing impacts and practices at the sites in relation to:

- Any negative visual impacts near to cultural and historic sites
- Any negative impacts on surface or ground water bodies in the vicinity of tourism sites
- Any insufficient or negative waste management practices including waste littering activities

This review is to be performed by tourism managers according to predetermined check list and any deviations shall be reported to MoTA S.G office in order to study ways of rectifying such situations.

Review existing permitting and inspection procedures to make sure SEA recommendations are integrated well within the regular procedures when permitting new facilities and through the regular periodic inspection visits and audits.

Incorporate green elements into licencing of new projects. New projects being developed in the tourism sector should be required or at least encouraged and motivated to implement best practices related to water and energy saving in addition to use of renewable energy and sustainable waste management within the project design, construction, and operation phases.

Increase coordination with public entities relevant to SEA implementation. The main entities that can support MoTA in implementing the SEA recommendations include.

MoENV, whom are in charge of EIAs in Jordan insuring all tourism project that may have any sensitivity to biodiversity, water bodies, or other cultural heritage risks should have mitigation measures in addition to actions for enhancing positive opportunities related to environmental and social development through the EIA process.

MoLA and municipalities, whom are in charge of waste management in Jordan insuring that waste management practices at tourism sites are supplied to acceptable levels and are gradually enhanced to support waste minimization as recycling practices.

MWI, whom are in charge of water resources insuring that best water efficiency practises are applied at tourism sites and that any flood warning systems can be accessible and utilized by the tourism sector to increase safety of adventure tourism

RSCN, whom are in charge of protecting Jordan biodiversity insuring tourism products do not have long term impacts on biodiversity and their habitats.

Awareness raising and capacity building One of the most important activities related to SEA implementation is awareness raising which could be done through actual implementation of projects and initiatives to lead by example in addition to awareness campaigns. It is recommended the MoTA should start with its prominent buildings for example implementing water efficiency, energy efficiency, and waste recycling. Another possible opportunity is to encourage MICE venues to implement similar best practices in order to lead by example.

Also for capacity building and increasing know how within tourism human resource, it is recommended the MoTA shall include sustainable tourism best practices within the training curricula for courses that are provided directly by MoTA or through other tourism schools and universities.

Work with tourism NGOs to incentivise positive behaviour it is recommended the MoTA shall invite the tourism NGOs especially the hotels and restaurants associations to develop and adopt a green grading system for their members particularly focused on water, energy, material use, and waste management. This rating system shall be fair and adoptable to the Jordanian tourism industry. After implementation of such grading system, MoTA shall acknowledge the best performers and shall study ways of incentivising all the rest to improve their level of performance.

Develop an action plan for the implementation of the SEA recommendation

Based on the recommendations of the SEA, an action plan is proposed to be developed by MoTA which sets clear specific targets and actions to be implemented and identifies monitoring and evaluation approach. The proposed action plan can be based on the following table.

Environmental Component	MoTA Strategic Environmental Objectives	Implementation arrangements	Monitoring approach
Visual and landscape	To contribute towards avoidance or, where infeasible, minimisation of significant adverse visual impacts within and adjacent to the cultural and natural sites (V1).	<p>Tourism Managers in the governorates shall be instructed to inspect their sites for any existing activity or project in the vicinity of their sites that could have any negative visual impacts and to report any such impacts to the SG office.</p> <p>Any new projects near tourism sites which could have negative visual impacts must be reported to SG office to be addressed by the Tourism Committee.</p>	<p>Utilise MoTA Project Management Dashboard to ensure proper implementation</p> <p>Assign a dedicated person to follow up on the progress of SEA action plan implementation</p>
Biodiversity, Flora and Fauna	To ensure compliance and mainstreaming Biodiversity conservation into tourism projects and actions including protection of the identified key biodiversity areas (B1).	MoTA shall develop a Social & Environmental Policy that includes Biodiversity conservation.	Has the policy been developed or not
Water and Wastewater	<p>Ensure that water bodies and Ground water near tourism projects are protected, maintained and improved (W1).</p> <p>Ensure that water resources are sustainably managed to deliver tourism growth targets in the context of existing and projected water supply and wastewater capacity constraints (W2).</p> <p>Avoid inappropriate development in areas at risk of flooding and implement flood warning systems in areas prone to flooding (W3).</p>	<p>Tourism Managers in the governorates shall be instructed to inspect their sites for any existing impacts on water bodies in the vicinity on the sites and to report any such impacts to the SG office.</p> <p>Any new tourism projects near water bodies shall be instructed to obtain an environmental permit from the MoENV through the EIA process.</p> <p>MoTA shall develop a Social & Environmental Policy that includes water resources sustainability.</p>	<p>Utilise MoTA Project Management Dashboard to ensure proper implementation</p> <p>Assign a dedicated person to follow up on the progress of SEA action plan implementation</p>

Environmental Component	MoTA Strategic Environmental Objectives	Implementation arrangements	Monitoring approach
		<p>MoTA shall Invite the Hotel & Restaurant Association to develop to adopt environmental grading system particularly related to energy and water usage, recycling and accessibility.</p> <p>Direct adventure tourism activities in Wadies that are at risk of floods to get permits for their activities from???</p>	
Air Quality	To avoid, prevent or reduce harmful effects on human health and the environment as a whole resulting from emissions to air from all tourism activities with particular reference to emissions from transport, heating and cooling of hotels and other buildings (A1)	MoTA shall initiate contact with Ministry of Environment and Ministry of transport to encourage reduction in air pollution resulting from tourism transport (plus other forms of transport).	Number of coordination meetings with MoENV
Climatic Change and Energy	<p>Integrate sustainable design solutions into tourism projects (e.g. energy efficient buildings; green infrastructure) (C1).</p> <p>Contribute towards the reduction of greenhouse gas emissions in line with national targets (C2).</p>	<p>MoTA shall Invite the Hotel & Restaurant Associations to adopt MoTA's licensing environmental requirements e.g. energy, water usage, accessibility, recycling etc.</p> <p>MoTA shall develop a Social & Environmental policy which shall include encouraging the use of energy/water efficiency and renewable energy within MoTA premises</p>	<p>Has a green rating system been developed by the private sector or not?</p> <p>Has the policy been developed or not</p>
Waste Management	Promote circular economy principles, reduce waste, and increase recycling (WM1).	MoTA shall develop a Social & Environmental policy which shall include encouraging waste minimization and recycling within MoTA premises	Utilise MoTA Project Management Dashboard to ensure proper implementation

Environmental Component	MoTA Strategic Environmental Objectives	Implementation arrangements	Monitoring approach
	Adopt a policy to minimize the use of Single Use Plastics (SUPs) in touristic sites (WM2).	Develop and implement waste minimization and recycling system within MoTA main buildings. MoTA shall comply with their duties as specified in the Solid waste management framework law and shall work in coordination with municipalities to improve waste management practices at tourism sites.	Assign a dedicated person to follow up on the progress of SEA action plan implementation
Cultural Heritage	Protect places, features, buildings and landscapes of cultural, archaeological or architectural heritage (CH1).	MoTA shall implement a security plan for tourism sites that are vulnerable to vandalism such as Jerash which include secure fences and installation of CCTV cameras.	How many sites have implemented the security plan and how many are remaining
Socio-Economic	Promote economic growth to encourage creation and retention of good jobs for local communities near to tourist attractions (S1). Restrict land acquisition and compensate for any involuntary resettlement (S2). Gender equality and empowerment of women (S3).	Ensure local communities have access to good jobs from tourism projects their areas through tourism sites management procedures. Only utilize land acquisition as a last resort if it is absolutely necessary Continue with education for employment program and add environmental material into the training curricula Adopt the gender equality policy developed by MoTA	Utilise MoTA Project Management Dashboard to ensure proper implementation Assign a dedicated person to follow up on the progress of SEA action plan implementation

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