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Sustainable water management - perspectives for tourism development in north-eastern Morocco

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ABSTRACT

The objective of this article is to evaluate the regional development risk for the luxury tourism sector in Saidia, north-eastern Morocco. The study aims to provide input for tourism-related water management and governance. Based on a thematic literature review from different disciplinary angles key pressures for regional water resources are categorized. The identified key problems and pressures related to the critical regional water situation are contrasted with Moroccan tourism policy strategies which emphasize a sustainable pathway of regional tourism. Further, the state of practical implementation of sustainability principles in the hotel management standards were assessed. The opposing perspectives of science and policy on prospects and problems provide the basis for a destination-specific SWOT analysis to assess and discuss risks and opportunities of current tourism development. Core strategies and related measures are derived to provide impulses for sustainable water management and governance and as a support for concrete policy implementation.

1. Introduction

VISION 2020, the national tourism strategy of Morocco, anchored in the country's overall development policy, was developed to make Morocco one of the world's top twenty destinations and at the same time to become a role model for sustainable tourism in the Mediterranean (Roudies, 2013). As well as at the global level, tourism is a fast-growing industry in Morocco (UNWTO, 2014). The tourism sector has continued to develop favourably, increasingly contributing to Moroccan GDP (direct contribution: 8.6% of GDP in 2013) and employment (direct jobs: 7.6% of total employment in 2013) (WTTC, 2014). Tourism thus has become a very important non-agricultural sector of robust growth, it is expected to continue its positive performance, and it is regarded as an important component of the promoted sectoral diversification of the national economy (UNWTO, 2014; Royaume du Maroc, 2014).

Main socio-economic purposes of this development realignment are the lessening of the dependence on fluctuating agricultural market prices which might become even more volatile under climate change, and the reduction of unemployment and poverty (Spilanis, Tellier, & Vayanni, 2012; Royaume du Maroc, 2001, 2010). Positive economic effects and an improvement in the return on investment (ROI) by direct and indirect revenues from tourism are expected to result in jobs and increasing incomes. In general, this sectorial transformation is to effectuate an economic catch-up process mainly of structurally weak regions such as the north-eastern part of the country (region l'Oriental) with a focus on locational advantages of particular regions (Royaume du Maroc, 2010).

In the officially formulated programme objectives 'sustainability' constitutes the normative guiding principle: tourism development must be "socially fair", "cultural compatible", "environmentally friendly", and investment decisions and infrastructure projects should be "resource-adequate" (Roudies, 2013). This official sustainability rhetoric adds political legitimacy to a resource-intense, precisely because a highly water-consuming, development strategy. But is this understanding of sustainability reflected in a readjusted, adequate water management in tourism operations, e.g. in binding environmental standards for hotel companies.

Water resources in Morocco are very limited: the total actual renewable water resources per capita and year are below 900 m^3 (for the year 2012, compared to the global average of 6000 m^3, UNWATER 2015)[1] and water deficit situations occur frequently (Doukkali, 2005). In north-eastern Morocco, in the recent decades and due to high agricultural demand, water availability has already been compromised and led to water scarcity (Snoussi, 2004; UNEP, 2009). Thus, the establishment of an additional industrial water consumer such as tourism could foster a constant water shortage crisis unless countermeasures are taken. Otherwise, the envisaged positive economic effects could be superimposed by severe environmental degradation and associated socio-economic implications or even water conflicts (Schilling, Freier,

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[1] See http://www.unwater.org/kwip (Accessed 2 March 2015).

http://dx.doi.org/10.1016/j.tmp.2015.09.001
2211-9736/

Hertig, & Scheffran, 2012). It is thus a crucial question how continuous water supply for all sectors could be ensured taken into consideration the limited regional water resources.

With this article we follow up on earlier work on the vulnerability of regional water resources in north-eastern Morocco under climate change (Tekken, Costa, & Kropp, 2013; Tekken & Kropp, 2012; ACCMA research project[2]) (Fig. 1).

In this context and in the light of the results of a previous risk perception survey with regional decision makers of the north-eastern Moroccan provinces Nador and Berkane, focusing local development risks resulting from climate change and the current tourism-based development pathway, existing water scarcity was identified as a serious regional problem which has not been adequately taken into consideration in the realigned development program. From this the following question inferred: if and how are water scarcity strategies addressed, integrated, implemented, and monitored in current development activities in north-eastern Morocco? To find answers a research study was conducted to analyse water-related sustainability criteria and their effectiveness. The aim of the present study is an iterative review concerning how sustainability is anchored in the national tourism strategy for north-eastern Morocco with a particular emphasis given to the consideration of the critical water situation. Is *sustainability* a guiding principle for tourism development or only a catchword for marketing purposes?

The paper will begin with the clarification of the term *sustainability* in the tourism context. This will be followed by an inventory of scientific knowledge relating to regional key problems related to the freshwater situation in north-eastern Morocco. In order to detect if and how sustainable tourism development is reflected in concrete implementation we analyse tourism-related development plans: the Plan AZUR and its follow-up VISION 2020 (Roudies, 2010, 2013), and PROSPECTIVE Maroc 2030: Tourisme 2030 - Quelles ambitions pour le Maroc.[3]

By a qualitative comparison we investigate if the current water situation and efforts to avoid problems are adequately addressed in the tourism development plans for the region.

The actual implementation of sector-specific sustainable water management measures and the setting of sustainability standards (e.g. compliance with sustained corporate management practices) are reviewed through a website evaluation of hotel companies in Saidia. We use this as input for a qualitative SWOT analysis (**S**trengths-**W**eaknesses-**O**pportunities-**T**hreats) to discuss water-related risks and opportunities of the tourism industry. The article concludes with recommendations for a sustainable tourism agenda with an emphasis on water-related efficiency improvements for Saidia. Subsequently, recommendations for the tourism sector in two coastal provinces in north-eastern Morocco are derived, which could support the achievement of an eco-anthropocentric or sustainable development pathway.

2. Background and study area

In the context of the project "Adaptation aux Changements Climatiques au Maroc", ACCMA, 2007–2011) an (anonymous) survey among ca. 30 regional decision makers of the coastal provinces Nador and Berkane, region L'Oriental in north-eastern Morocco, in the year 2008 was conducted (number of returned filled-in questionnaires: 13). Questions addressed (a) the awareness and risk perception regarding potential regional climate change impacts (open question), and (b) the collection of opinions on potential constraints for regional development (open question). Existing "water scarcity" aggravated by climate change was ranked highest as a limiting factor for development, concurring with structural problems like "bad governance", "corruption", and "conflicts between interest groups". In further discussions at a project workshop with decision-makers and stakeholders criticism was expressed with regard to the construction of a luxury tourism mega complex ('Saidia Mediterrania' with an area of ca. 700 ha, hotel bed capacity: ca. 30,000) close to the coastal village of Saidia (province Berkane, region l'Oriental) which was already ongoing. The area and in particular the coastal plain and its groundwater were known as being strongly affected in water quality and quantity caused by the current agricultural over-exploitation. The expected additional increase of tourism-related water requirements in the region was viewed critically. Doubts were expressed regarding the sufficient availability of water resources to enable this new approach to regional development, and the question was raised whether economic growth will materialize or if the newly established tourism industry will create more problems than it intends to solve.

In the official representations of the national tourism development agenda the sustainability aspect is strongly emphasized (Roudies, 2010, 2013; Royaume du Maroc, 2010; Prospective Maroc 2030 - Tourisme 2030: quelles ambitions pour le Maroc[4]). However despite a generally high awareness towards water problems and scientifically substantiated warnings made by academics including Falkenmark (1989); Rijsberman (2006); Gössling, Hansson, Horstmeier, and Saggel (2002) and concrete regional studies highlighting the critical regional water situation (Snoussi, Haida, & Imassi, 2002; Kadi, 2004; Doukkali, 2005; Hoekstra & Chapagain, 2007) binding sustainability criteria and the monitoring of compliance for water use had hardly been established prior to the construction of the huge tourism complex in Saidia. This resource pragmatism, defined as an expectation of a constant availability of freshwater resources without the implementation of adequate compensation measures and effective water management, is in contrast to the regional resource reality (current over-abstraction of freshwater resources despite the transgression of critical limits and already frequently occurring water shortfalls) (Schyns & Hoekstra, 2014; Tekken & Kropp, 2012). The lack of political will to properly implement environmental laws and objectives despite a serious risk of water shortage is due to the economic importance of the tourism sector and the lack of compromise solutions. Environmental protection thus is often expressed in "ecological rhetoric, symbolic gestures and laissez-faire" only (Wöhlcke, 1991, 1993). In this context, we want to give suggestions for criteria that could support a sustainable form of tourism without compromising future water availability in the region, not only for tourism.

2.1. Sustainable tourism

Sustainable tourism is based on the concept of sustainable development which raised the need for a respectful, equitable, responsible and preserving interaction of humans and the environment. The publication of the concept "Limits to Growth" by the Club of Rome in 1972 resulted from an intense discourse regarding the conflict of resource use and good environmental quality under the paradigm of economic growth (Meadows, Meadows, Randers, & Behrens, 1992; Lee, 2011). Continued and expanded by the Brundtland Report (1987) the agreed definition of sustainable development was then based on the two concepts of *needs* (in particular the essential needs of the world's poor, to which overriding priority should be given) and *limitations* (the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs), taking into account the perpetual conflict between ecological conservation and economic development (WCED, 1987). Today, the terms *sustainable*

[2] The project "ACCMA–Adaptation to Climate Change in Morocco", runtime 2007–2011 was part of the program 'Adaptation aux Changements Climatiques en Afrique (ACCA)', financed by the International Development Research Centre Canada (IDRC) and the UK Department for International Development (DFID).

[3] See URL: http://www.hcp.ma/file/104423/ (Accessed 2 March 2015).

[4] See webpage of Haut Commissariat au Plan du Maroc, URL: http://www.hcp.ma/downloads/Maroc-2030_t11885.html (Accessed 26 July 2015).

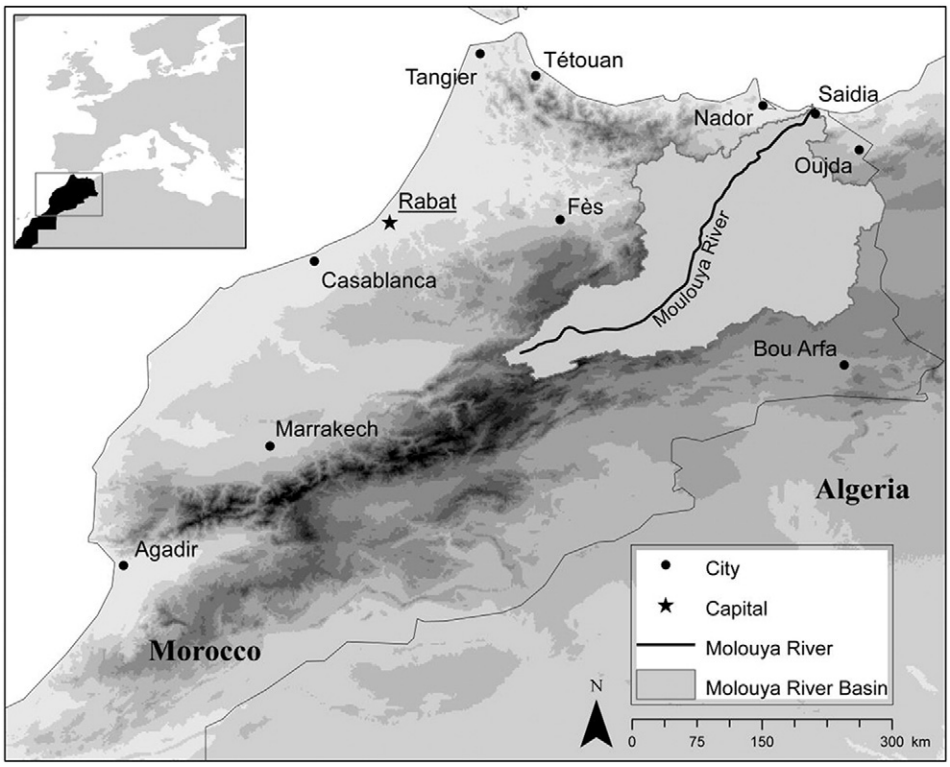

Fig. 1. Case study area Saidia in north-eastern Morocco.

and *responsible* are commonly used in the context of socio-economic development. However, the meaning of sustainability has become fuzzy and is increasingly used as a rhetorical justification of anthropocentric development (Wöhlcke, 1993).

UNEP/UNWTO (2005) defines sustainable tourism as: "*Tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities*". Ideally, a suitable balance can be established between the three dimensions environment, socioculture, and economy (UNEP/UNWTO, 2005). Very ideally from a business perspective, a socially responsible and environmentally friendly tourism does not compromise with involved economic interests. From a societal perspective tourism development should not create social inequality and lead to the transformation or loss of cultural traditions and heritage. From an environmental point of view ecological destruction, and depletion of resources must be avoided (Fig. 2).

The ecological perspective is an objective of primary importance in most approaches for a sustainable tourism development as environment often is a critical limiting factor (Schmied et al., 2009). For example, Müller and Flügel (1999) refer to the need of an intact nature and resource protection, which must be ensured by the reduction of the ecological impact of tourism activities. Baumgartner (2000) defines the ecological dimension as the "*most important source for a touristic development*" (Schnell, Scherer, Berwert, Bieger, & Rütter, 2002). Examples for the definition of ecological criteria are the reduction of resource consumption (e.g. water), or the avoidance of negative impacts on biodiversity (Schmied et al., 2009; Baake, Brundwieg, & Hellwig, 2002).

In general, a course towards achieving a more sustainable tourism means an inclusive and continuous process (UNEP/UNWTO, 2005). The "real" implementation of the environmental, sociocultural and economic standards however is still under discussion. The development of adequate sustainability criteria and a regular monitoring and regulation of the implementation need to be steered by public institutions, e.g. planning authorities, to ensure the sustainability compliance of tourism businesses (Bramwell, 2012; Wöhlcke, 1993).

To achieve long-term success of tourism development the degradation of natural resources in a way that other economic activities are not negatively affected or become impossible must be avoided. That is, sustainable tourism "*must aim at development of tourism in such a way that avoids damage to the environment, economy and culture* […]. *It requires simultaneous considering of lots of criteria including infrastructure, competitiveness and supply, socio-economic, land use/tourist facilities and service to meet the concept of sustainable development*" (Monavari, Farshchi, Karbassi, Abedi, & Abed, 2012).

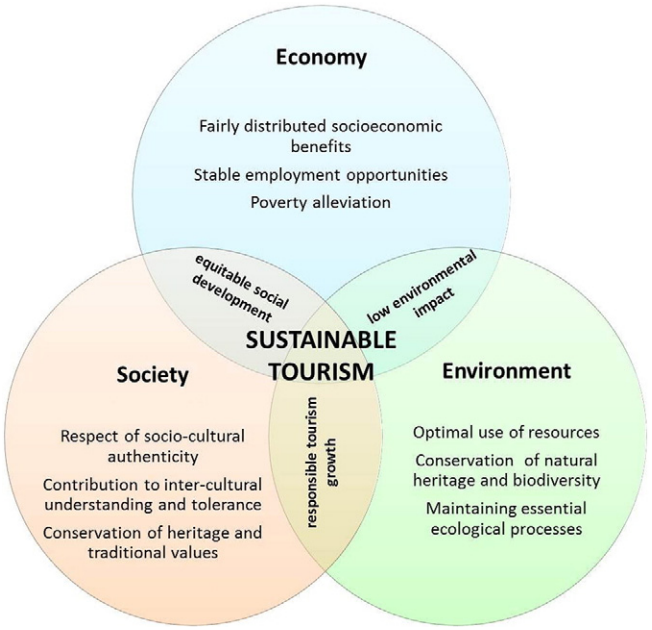

Fig. 2. Aspects of a sustainable tourism development (based on UNEP/UNWTO, 2005).

In this sense, tourism can support a sustainable development if it takes into "*full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities*" (UNEP/UNWTO, 2005). Regarding the balance between the economic, social and environmental dimensions and the setting of standards, the discourse on sustainable tourism is marked by many different perspectives and interests of the various stakeholders, e.g. tourism industry, environmentalists, host communities, or politicians (Muñoz Barriga, 2013).

However, as a starting point for the establishment of a large-scale tourism sector to accomplish positive development effects the investigation of a destination's ecological and social carrying capacity is required (Jurado et al., 2012; Spilanis et al., 2012; Castellani, Sala, & Pitea, 2007). The role of carrying capacity of tourist destinations and the operationalization of management recommendations has become an important research topic (Lee, 2011; Lu & Nepal, 2009). Much discussed is also the inclusion of local communities, and the consideration of their needs and interests (Moscardo, 2011). Participatory approaches, such as the involvement of non-state actors (e.g. input-legitimacy via "governance by the people") in the decision-making processes is of fundamental importance for political stability (Freyburg, 2012). But most tourism development plans pay very little attention on non-economic factors such as on the effects on local communities and their social structures, but narrowly focus on the core benefits of tourism (Moscardo, 2011).

2.2. State of the water situation in north-eastern Morocco

In north-eastern Morocco sufficient water availability and supply are particular problematic (Re, Sacchi, Mas-Pla, Menció, & El Amrani, 2014; Tekken & Kropp, 2012; Snoussi et al., 2002). Existing water problems are caused by increasing water scarcity, distribution problems, water-intense agriculture, and shifting seasonal climate patterns (Re et al., 2014; Tekken & Kropp, 2012; Giorgi, 2006). As part of the Mediterranean Basin, north-eastern Morocco belongs to the climate change hotspots in future climate change-projections (Giorgi, 2006). Over the last decades a strong decrease could be observed for precipitation amounts in the most rainfall relevant seasons winter and spring (Barkhordarian, von Storch, & Bhend, 2013). Recent studies project a regional drying and warming trend and a very likely reduction in rainfall (Niang et al., 2014, Barkhordarian et al., 2013; Schilling et al., 2012; Tekken & Kropp, 2012). However, climate change is accounted for a only a fifth of future water shortages compared to ca. 80% attributed to socioeconomic reasons (Droogers et al., 2012). Facing an increasingly difficult water situation requires innovative and sustainable concepts for water management (Schyns & Hoekstra, 2014). A critical water situation is a real limiting factor that could affect the commercial success, efficiency and competitiveness of the regional tourism sector (Gössling et al., 2012). Although Morocco represents a positive example regarding improvements of the individual water supply situation to fulfil the United Nations Millennium Development Goals (UNMDGs)[5], mainly by increasing access to improved sanitation and improved water sources[6], there is serious lack of progressive solutions to deal with existing seasonal water scarcity. In north-eastern Morocco the level of water scarcity is already severe (Schyns & Hoekstra, 2014; Tekken & Kropp, 2012). Here, as of recently, the dry summer period between April and September overlaps with the tourist season, which greatly increases the demand for potable water. This entails a high risk of structural problems caused by water shortages.

In dry regions, water governance is an ever important field of policy (Freyburg, 2012), particularly also because a correlation can be identified between effective water management and political stability (Freyburg, 2012). Society expects the government to secure water supplies; such water shortage may stir up local conflicts (Freyburg, 2012). Tourism, depending on the number of visitors at a place, has an effect on the quality of the environment and natural resources such as water (Gössling et al., 2012; Castellani et al., 2007).

2.3. Tourism development in north-eastern Morocco

The investigated area of tourism development is located in the low-lying coastal zone of north-eastern Morocco, close to the border with Algeria (see Fig. 1). The coastal zone has suitable beaches and a unique natural environment that is worth protecting, mainly the delta of the local Moulouya River, which is appreciated by its listing under the Convention on Wetlands, called the *Ramsar Convention* (http://www.ramsar.org). Located in a short distance to this *Ramsar* site and close to the beach a large tourism complex sprung up within a few years, including 5-star hotels, golf courses, pool areas, private villas, a marina, and beach promenades. The government-induced concept for regional tourism development "Plan Azur 2010" and its follow-up "Vision 2020" aims to achieve a capacity of approx. 30.000 hotel beds and private accommodation for national and international clientele (Royaume du Maroc, 2008, 2010; Roudies, 2010, 2013). This quick implementation for tourism development harms the natural environment by flattening of dunes, ground sealing, its location very close to a protected area, and the strong increase of seasonal freshwater demand. Without prior weighting this increasing water demand is particularly problematic, as during the recent decades the region has been experiencing an increasing drying trend (Carneiro et al., 2010; Tekken, Costa, & Kropp, 2009; Bzioui, Scozzari, & El Mansouri, 2010; Schyns & Hoekstra, 2014; Schilling et al., 2012; Snoussi et al., 2002; Falkenmark, 1989). The water situation has become more than temporarily critical, thus mainly caused by shifting climate patterns, increasing economic activities and associated population growth, agricultural water use and decreasing levels of groundwater and its degradation, e.g. due to salinization (Carneiro et al., 2008; Snoussi et al., 2007; Snoussi, Ouchani, & Niazi, 2008; Fetouani, Sbaa, Vandoosterc, & Bendra, 2008).

3. Methodology

Sufficient water availability is a key success factor for the establishment of a luxury tourism industry. In particular in water scarce regions water resources development and management should be an integral part of tourism policies and strategies. In north-eastern Morocco water shortages might interfere with socio-economic priorities of tourism development and, in particular when focusing on a sustainable development, water management must be integral part of tourism development strategies.

Following an iterative research approach, and based on current scientific evidence and postulations in regional sectoral policy documents, the current state of intent and implementation of sustainable water management standards for the luxury tourism complex in Saidia, north-eastern Morocco, is evaluated (Fig. 3).

Based on the thematic review of 19 empirical regional studies from different scientific disciplines addressing economic, socio-economic, hydrologic, and environmental and tourism management related research questions, four main problem categories within the context of sustainable regional tourism development were identified: population growth and urbanization, over-abstraction of fresh- and groundwater, lack of adequate water management, and climate change (Table 1). These key themes subsume various problems and pressures in particular related to the critical regional water situation.

These key problems and pressures in particular related to the critical regional water situation are contrasted with the two major policy strategy documents of the Moroccan Government which emphasize a sustainable

[5] See URL: http://www.un.org/millenniumgoals/ (Accessed 26 July 2015).
[6] WHI/UNICEF Joint Monitoring Programme for Water Supply, see URL: http://www.wssinfo.org/data-estimates/tables/ (Accessed 26 July 2015).

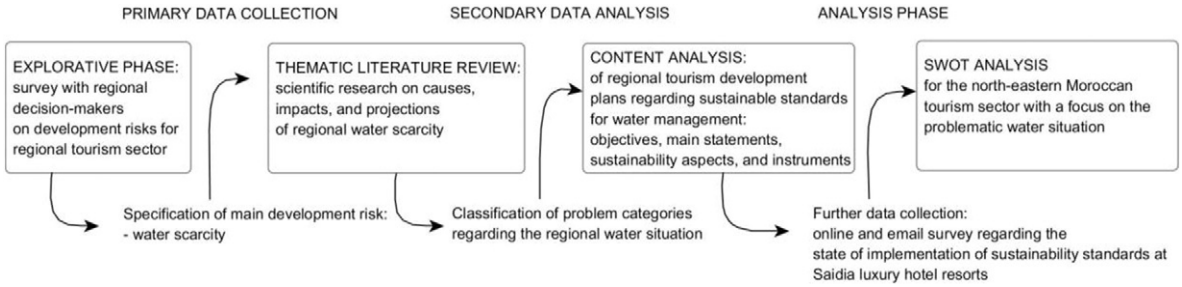

Fig. 3. Iterative research approach of water-problem focused sustainability assessment for tourism development in Saidia, north-eastern Morocco.

pathway of regional tourism. A qualitative content analysis is conducted to identify if these key problems are adequately considered in the tourism development planning documents (Table 2).

Further, sustainability certification is determined as one of the core indicators of a sustainable tourism development in the region. For a respective verification of the state of implementation of sustainability standards all hotels managements in 'Saidia Mediterrania' were contacted via E-Mail, additionally to an online research on the hotel and mentioned eco labels websites.

The opposing perspectives, resource-pessimistic by academia and resource-optimistic by the government, on regional tourism development prospects and problems provide the basis for a destination-specific SWOT analysis to assess and discuss risks and opportunities of current tourism development in the context of water scarcity. Four core strategies, related measures and recommendations for a destination-specific tourism development plan are derived in order to inspire governance and the tourism sector to reconsider current development pathways and to include empirical evidence on severe environmental restrictions.

Table 1
Literature-based inventory of main current water problems in north-eastern Morocco.

Problem category	Related pressures	References
Population growth and urbanization	• Rapid increase of freshwater demand • Increasing Imbalance of water supply and demand (water gap)	Bzioui et al., 2010; Fetouani et al., 2008; Kadi, 2004; Moustadraf, Razack, & Sinan, 2008
Over-abstraction of fresh – and groundwater	• Increasing water deficiency for natural and human environment • Inadequate water use (seasonal overexploitation) • Lack of agricultural irrigation water • Salinization of groundwater • Reduced groundwater recharge • Sea water intrusion into coastal aquifers • Wetland degradation (Ramsar site Moulouya river delta) • Water shortages	Bzioui et al., 2010; Carneiro et al., 2010; El Yaouti, El Mandour, Khattach, Benavente, & Kaufmann, 2009; Fekkoul et al., 2013; Schyns & Hoekstra, 2014; Zarhloule et al., 2009
Lack of adequate water management	• Lack of financial means to modernize the water sector • Lack of measures to reduce the decrease of groundwater • Lack of innovative water production in addition to conventional water supply • Water planning does not include climate change impacts on the water cycle • Inappropriate water infrastructures (e.g. open channels) • Health problems due to poor water quality • River dams lead to reduced recharge causing sea water intrusion	Alonso-Almeida, 2012; Boelee & Laamrani, 2003; Bzioui et al., 2010; Carneiro et al., 2008; Carneiro et al., 2010; Doukkali, 2005; Fetouani et al., 2008; Tekken et al., 2009; Tekken & Kropp, 2012
Climate Change	• Increase in the frequency of droughts • Disturbances in hydrological cycle • Precipitation decrease, temperature increase • Higher evapotranspiration rates • Increasing wind erosion • Coastal inundation and sea water intrusion into coastal aquifers due to sea-level rise • Siltation of river dams	Bzioui et al., 2010; Kadi, 2004; Moustadraf et al., 2008; Schilling et al., 2012; Snoussi et al., 2002; Snoussi et al., 2007; Snoussi et al., 2008; Schyns & Hoekstra, 2014; Tekken et al., 2009; Tekken & Kropp, 2012

4. Results

4.1. Inventory of water problems and associated pressures

The literature shows that there is scientific knowledge regarding the main water problems in the region (Table 1) which can be distinguished into four problem categories, thereof three that focus the impacts of human activities on water resources (population growth and urbanization, over-abstraction of ground- and freshwater, and lack of adequate water resource management), and one category that addresses climate change as an exacerbating factor in the already difficult water situation (Table 1). There are overlaps in the referred literature, however, it can be stated that the extent of human activities is the principle reason for an increasingly challenging situation regarding future water supply. Climate change has the potential to intensify current water problems, primarily because of the absence of appropriate water infrastructures and management, but as well due to a change of climate patterns, such as a decrease or shift of precipitation.

From a research point of view, most articles find the increasingly critical water resource situation not properly addressed in terms of water governance (reinforcement of laws and regulations, e.g. Snoussi, 2004; Doukkali, 2005). An insufficient water situation poses immanent threats for the establishment of a successful tourism industry, thus in recognition of the multitude of water availability restricting factors an assessment of the water-related carrying capacity of the tourist destination Saidia is an urgent necessity (Skaricic, 2007; Lu & Nepal, 2009).

4.2. Sustainable water management in Moroccan tourism strategies

Luxury tourism is water intense (Gössling et al., 2012). For the tourism industry, water shortfalls are a serious risk (Bethune & Schachtschneider, 2004). In this respect it is all the more surprising that the growing water need is not yet a specified part of regional water management strategies (Alonso-Almeida, 2012; Tekken & Kropp, 2012). The existing scientific knowledge regarding an increasingly critical water situation and related problems are not reflected in the development plans. Neither do they include clear

Table 2
Qualitative content analysis of two main Moroccan tourism development plans.

Institution	Royaume du Maroc, Département du Tourisme	Royaume du Maroc, Haut-Commissariat au Plan
Document title	Plan Azur/Vision 2020 (Roudies, 2010, 2013)	Prospective Maroc 2030: Tourisme 2030 – Quelles ambitions pour le Maroc[1]
General objectives	• New tourism programme announced by King Mohammed VI in 2001 in order to establish a new profitable economic sector • Development of large-scale tourism infrastructures: mainly seaside resorts located in areas with underdeveloped tourist potential • Establishment of a model of sustainability for Mediterranean destinations • Commitment to sustainable development	• Modernized tourism sector to meet challenges of globalization • Increased competitiveness by the alignment of tourism standards • Focus on sustainable and quality tourism • Focus on public-private partnerships in tourism sector expansion, e.g. public investments to support real estate developers of large-scale tourism projects
Main statements regarding tourism development	• Sector of national economic priority, contributing ca. 8% to GDP • Expectation of ca. 10 million tourists per year • Position of Morocco among the top 20 tourism destinations worldwide[2] • Increase of hotel bed capacity (200,000 new beds) • Creation of ca. 500,000 new jobs in tourism • Increase of foreign investments up to a share of ca. 17% of GDP • Establishment of new national and regional governance structures for tourism management • Focus on eco-resorts and luxury tourism	• International tourism is considered as increasingly important industry in Morocco • Tourism has positive effects on other economic activities and sectors • Tourism industry is key for regional development of structurally weak regions • Awareness of sectoral vulnerability to fluctuating turnovers due to dependency on external tourism revenues • High awareness regarding scarcity of natural resources and necessity of "rational exploitation"
Specified sustainability aspects addressing water management	• Acknowledgment of specific levels of environmental constraints of destinations • Wastewater treatment plans • Recommendations for water-saving sanitary devices in hotels • Development of performance indicators for environmental sustainability, incl. water availability	• Development of scenarios for tourism development, e.g. scenario on sustainable tourism development depicting the need for decentralised, local regulations for environmental issues • Awareness of high water demand of tourism • Awareness of conflict potential between water demanding sectors agriculture and tourism, which should mainly be prevented by modernization of irrigation techniques
Instruments for sustainable water management of the tourism sector	• Water management is not specified • La Clef Verte Maroc[3]/Green Key Eco-label for tourist establishments (awarded by NGO FEE International, see http://www.green-key.org/[4]	• Intention to establish sustainability indicators for water consumption • Strengthening of sustainability criteria in legal and regulatory standards, but water management is not specified • New hotel classification scheme to acknowledge sustainability efforts ("Green Star"[5]), but water management is not specified

[1] See URL: http://www.hcp.ma/file/104423/ (Accessed 2 March 2015).
[2] See URL: http://www.maroc.ma/en/content/tourism (Accessed 26 July 2015).
[3] See URL: http://www.clefverte.ma/index.php/en/the-green-key/what-is-the-green-key.html (Accessed 26 July 2015).
[4] FEE International (Foundation for Environmental Education) is a non-government, non-profit organization promoting sustainable development through environmental education. See URL: http://www.green-key.org/ (Accessed 26 July 2015).
[5] Possibly comparable to the "Green Star", an Egyptian hotel certificate reflecting the commitment of hotels to improve their sustainability performance, developed in PPP and a "recognized standards" of the Global Sustainable Tourism Council GSTC, see URL: http://www.gstcouncil.org/gstc-partners/gstc-recognized-standards/gstc-recognized-standards-for-hotels-tour-operators.html (Accessed 10 February 2015).

criteria or indicators for water management, nor measures to secure water supply in cases of water shortage situations. The description of sustainability lacks a commitment towards the specification of concrete water resources protection measures. Under the overarching policy aims to develop the tourism sector, the focus seems to be mainly on the economic aspects, however with a recognized importance of sustainability (Table 2).

4.3. State of implementation of sustainability criteria

Regarding the implementation of sustainable water management criteria in practice, as three large beach resorts in Saidia as part of the recently constructed coastal tourist complex in Saidia are already in operation since 2008, we conducted an online investigation relating to the companies' commitment to sustainability measures. We expected the anchoring of sustainability principles as part of the corporate marketing strategy. However, none of the hotels, all belonging to European hotel chains, have sustainability or environmental certification in accordance with international management standards (e.g. environmental preservation criteria of global eco label „Green Key"[7] or based on EU Eco-Management and Audit Scheme EMAS,[8] and ISO EN 14001).[9]

[7] http://www.green-key.org (Accessed 10 February 2015).
[8] http://ec.europa.eu/environment/emas/index_en.htm (Accessed 14 January 2015).
[9] For different labels available and applicable in Morocco see http://www.ecolabelindex.com/ (Accessed 14 January 2015).

The certification instrument "Green Key" is rather a marketing tool for tourism establishments and operators, than an effective environmental conservation measure. Despite the high risk of severe water shortfalls in the region, an adequate response is not yet formulated and determined. This runs counter to the explicit emphasis on sustainable tourism development as formulated in the regional plans (Roudies, 2013).

5. Discussion

5.1. The north-eastern Moroccan sustainability pathway

A strong environmental sustainable practice is characterized by the complete preservation of irreplaceable natural capital, while a weak sustainability ignores its loss, considers its substitution as possible, and focuses on the generation of capital (Bartelmus, 2014). Critically, the present situation of the tourism sector in north-eastern Morocco in terms of water management is an anthropocentric pathway where economic growth is given priority over environmental protection (Steurer, 2001; Bartelmus, 2014). The environment is protected as long as it is economically meaningful and the degradation of water resources is accepted as long as no serious difficulties arise. In Morocco, both tourism development plans emphasize a sustainable pathway; however, the economic interest clearly stands in the foreground. The importance of sustainability is often stated, but no criteria that adequately consider the limited capacities of water resources, or definitions

of sustainable thresholds for water exploitation, policies or environmentally responsible measures are actually implemented.

In most developing countries the institutional enforcement of environmental protection is weak (Ostrovskaya & Leentvaar, 2011; Wöhlcke, 1993). However, an effective environmental policy must be government-induced. The human economy is part of the biosphere and depends on resource availability (Daly, 1999; Döring, 2004). Following the economic logic, investments should focus on the limiting factors of production (Döring, 2004).

Thus, in the context of water scarcity in north-eastern Morocco, investments are needed for the improvement of water management, in particular as water resources are above their physical carrying capacity (Snoussi, 2004; Tekken et al., 2013). The environmental burden of large-scale tourism must be considered, e.g. the impact on the seasonal proportion of freshwater supply to total available water resources (Jie, Fu, Liu, Wang, & Xu, 2011; Gössling et al., 2012). Tourism must not be seen as the universal solution to solve all development problems and must not be at the expense of the environment (Arib, 2005).

The focus is on human beings and their well-being, but the integration of the environment towards a resource-conserving development must be the primary objective in the sense of an „ecologically extended anthropocentrism" (von Hauff & Kleine, 2009). The main beneficiaries of tourism such as the resort destination in Saidia are real estate and hotel companies (Spilanis et al., 2012). Experiences in other destinations reveal positive effects on employment, however, at the cost of high environmental damage (e.g. Tétouan) (Spilanis et al., 2012; Roudies, 2010). The high structural dependency on the success of the newly established tourism sector enhances the risk of detrimental socio-economic impacts in case of a resource collapse (e.g. severe water shortage and seasonal water shortfalls in the tourist season). The problem lies within the fact that large-scale tourism is not integrated into a vulnerable environment, but that it has the potential to even aggravate the problematic water situation (Tekken & Kropp, 2012).

5.2. SWOT analysis of risks and opportunities, core strategies and measures for the north-eastern Moroccan tourism sector

On basis of the results of a SWOT (strengths –weaknesses – opportunities –threats) analysis we captured the information of scientific studies on environmental, economic and tourism-related development obstacles to compared it with statements and postulations in tourism development plans (governmental perspective) (Fig. 4).

A destination-based SWOT analysis allows an assessment of contrasting risks and opportunities from different perspectives (empirical-scientific and regional development policy), and can support the identification of sustainable development potentials. We derive recommendations for sustainable water management and in the tourism context in order to complement the current regional tourism development plans.

The overview of SWOT in the region shows that science and policy observe several strengths and opportunities (SO). Weaknesses (W) and Threats (T) are severe and could lead to sectorial failure if not addressed. In the course of this comparison we make a proposal for four priority strategies and supporting measures for promoting a sustainable pathway to tourism development.

5.2.1. SO (Strengths/Opportunities) core strategy: become a role model for sustainable tourism in the Mediterranean

SO Measures:

- Introduction of economic principles for water resources in pursuit of environmental improvement goals, e.g. Environmental-Economic Accounting System (SEEA) for a balanced sustainability between economic interests and environmental protection water (Bartelmus, 2014).

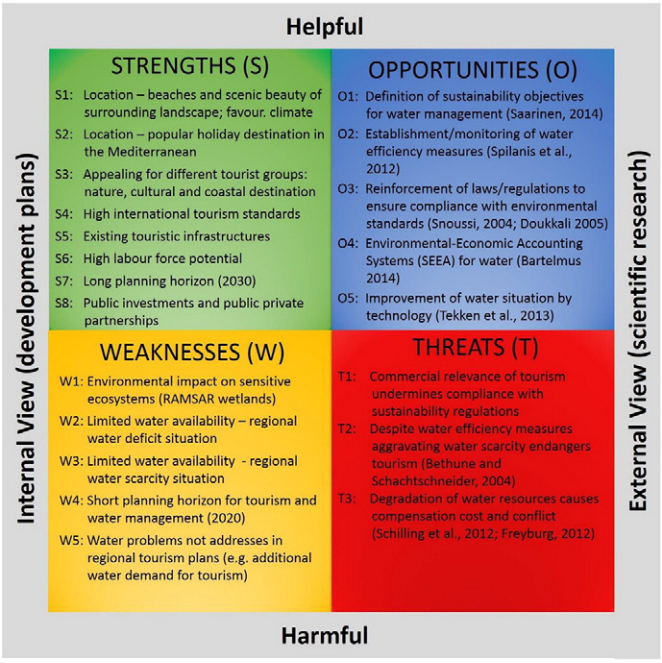

Fig. 4. SWOT analysis of tourism development in north-eastern Morocco.

- Technology assessment for the implementation of technological innovations for water-saving, water production and water supply, e.g. by the use of the regional solar power potential (Trieb et al., 2003; Trieb & Müller-Steinhagen, 2008).

5.2.2. ST (Strengths/Threats) core strategy: sustainable water management as marketing strategy for hotels

ST measures:

- Consider a water tax for luxury tourism facilities.
- Hotels and other large water consumers are committing themselves to maintain high environmental standards and become certified.
- Consider a marketing strategy to become a unique sustainability tourism destination.

5.2.3. WO (Weaknesses/Opportunities) core strategy: binding sustainability standards for tourism companies for water usage

WO measures:

- Instruments to make tourism companies' sustainability commitment measurable and transparent (e.g. ISO standards, sustainable tourism certificates).
- Regular environmental audits.
- Regular public consultations/hearings to discuss adequacy of water standards.
- Baseline survey of actual and future sectoral water needs.

5.2.4. WT (Weaknesses/Threats) core strategy: elaboration of region-specific development plan for tourism including compliance specification for water usage and supply

WT measures:

- Monitoring system and pro-active water management (Gössling et al., 2012).
- Participative governance design (Caffyn & Jobbins, 2003; Lawson, Schluchter, & Gordon, 2010).

- Regulations for public administration and private businesses and control mechanisms to ensure compliance (Cabanillas, Aliseda, Gallego, & Jeong, 2013).

6. Conclusions

This article analyses the luxury tourism development in Saidia, north-eastern Morocco. Despite a unique, sensitive and worthy of protection environment in the coastal zone between the cities Nador and Saidia (*Ramsar* site Moulouya river basin) the landscape will be altered significantly by a large-scale tourism development. Environmental awareness is reflected in a focus on sustainability; however, concrete criteria and regulations that enhance compliance with environmental law are not specified (Roudies, 2010, 2013). Sustainability rhetoric frequently replaces effective implementation (Bartelmus, 2014; Wöhlcke, 1993).

Many countries must take action to improve the living conditions of their populations. In Morocco, the economic diversification is an important step in the country's development from a mainly agrarian to a more service-oriented economy. Morocco has great potential for successful coastal tourism; however, to make tourism prospective and sustainable in the long-term, the estimation of the environmental carrying capacity should be an integral part of management strategies to avoid the depletion of ecosystem quality and a sectorial failure (Castellani et al., 2007; Spilanis et al., 2012).

In a region where water is already a scarce resource and in the view of an increasingly critical regional water situation under climate change new development strategies fostering long-term growth and employment should be measured against the principles of sustainability. This article wants to emphasize that despite an increasing awareness and the existence of scientific evidence ecologically responsible tourism has not made sufficient progress in north-eastern Morocco.

A key part of the current Moroccan economic strategy is the creation of favourable conditions for the expansion of the private tourism sector which is inter-alia reflected in the lack of stringent regulations ensuring compliance with environmental standards (Freyburg, 2012).

In the view of the problematic water situation restrictive regulations and standards must lead to compliance of the private tourism sector and to a protection of water resources so as to not exceed water thresholds. As due to the growing commercial and socio-economic relevance of the tourism industry an urgent question that arises concerns the risk of market failure related to water scarcity. The risk of business-disruptive water shortages and supply interruptions could be reduced by an adapted and efficient water management to exploit water saving potential. But, compared to the original intention of a socio-economic stabilization, resource over-exploitation can enhance the tendency towards impoverishment in certain parts of the population, e.g. unless tourism revenues are used to pursue economic diversification, to strengthen social capital, and to adapt the resource management in order to prevent an exceedance of certain sustainability levels (Saarinen, 2014).

In this article the anchoring of sustainability in the respective development plans for north-eastern Morocco was analysed. The neglect of the current critical water situation was detected, which is a crucial aspect for a successful establishment of tourism. In fact, it depends very much on the particular case, but for north-eastern Morocco tourism development plans are entitled to become a role model for sustainable tourism (Roudies, 2010). As regards an ideal development pathway, and in order to derive an appropriate balance between environmental, economic and societal interests, a multi-stakeholder approach that involves all interest groups in the decision making process is required. Instead of euphemisms concealing the problem of water scarcity the cooperation between science, policy and society in order to make optimal use of the tourism potential should be strengthened. If "sustainability" is to be a guiding principle for tourism development instead of a catchword for marketing purposes, new practices and standards regarding water management are needed, that go beyond mere rhetoric. Thus, the success or failure of socio-economic development in north-eastern Morocco, facilitated by luxury tourism, remains first and foremost a matter of governance structures (UNEP/MAP, 2012).

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