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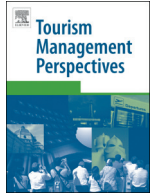


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An enhanced framework for regional tourism sustainable adaptation to climate change



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ABSTRACT

Tourism is not only contributing to climate change but also vulnerable to risks induced by changing climate regime. Sea level rise, extreme events, loss of biodiversity, water stress among other direct and indirect impacts pose potential danger for the tourism industry. Although mitigation to reduce GHGs is equally important, adaptation is urgent. The need for urgent adaptation to climate change has triggered tourism stakeholders and the research community to develop generic adaptation framework(s) for national, regional or local tourism destinations. These frameworks are used to guide tourism policy makers in the adaptation process with an aim of reducing destination's vulnerability and to increase their resilience. Whilst some destinations are already implementing planned adaptation using these frameworks, caution has been raised that current adaptation strategies sought are far from sustainable. Assuming that the frameworks are the guiding tools for adaptation we hereby question their suitability in achieving sustainable adaptation. Sustainable adaptation in this context refers to those approaches that reduce destination's vulnerability and increase resilience without jeopardizing its economic viability, social justice and environmental integrity. This paper reviews the existing tourism specific adaptation frameworks based on the basic principles of sustainable adaptation and the wider discourse on sustainable development. Claims are laid on how the existing tourism adaptation frameworks fail to fulfil the basic principles of sustainable adaptation. Further attempts are made to propose an enhanced Regional Tourism Sustainable Adaptation Framework. The framework is a significant contribution in two ways. First it contributes to the new school of thought, on sustainable adaptation, where knowledge is lacking and secondly, it provides a practical tool for sustainable adaptation that may be used by destination managers and policy makers in the adaptation process.

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1. Introduction

Historically, what was subscribed by the elite and wealthy individuals in the society in the dawn of the 19th century, tourism has grown to become part of nearly every household in today's society. The ever growing tourism industry recorded 1 billion arrivals in 2012 and is forecasted to continue growing at a rate of between 3 and 4% in the next two decades (UNWTO, 2013). The role of tourism in socio-economic development is acknowledged. Tourism is one of the top employers in the world providing about 260 million direct and indirect employments and contributes to about 9% of global Gross Domestic Product (GDP). Tourism is also not only a major foreign income earner to developing countries but also contributes to a large share of their GDP (between 10 and 13%) and a source of livelihood for many communities dependent on tourism. Furthermore, tourism sector is also recognized as a strategic sector in eradicating poverty and contributing towards achieving Millennium Goals in poverty alleviation (UNWTO–UNEP–WMO, 2008).

There is a consensus to a large extent that climate variability will remain a global challenge throughout the 21st century and tourism is considered one of the climate sensitive industries (IPCC, 2007). The First International Conference on Climate Change and Tourism, convened by the World Tourism Organization in Djerba, Tunisia in 2003, recognized the relationship between climate change and tourism (UNWTO, 2003). Tourism depends largely on climate and nature based resources (Becken & Hay, 2007; de Freitas, 2005). These resources are threatened by climate variability and changes have already been felt in several ecosystems (IPCC, 2007).

In response to these climate change challenges, adaptation and mitigation measures have been proposed. However, there has been a divided argument between pro mitigation; 'mitigationists' and pro adaptation: 'adaptationists' as commented by Weaver (2011, p. 110). Despite this polarized debate on mitigation and adaptation among commentators in literature, it is widely acknowledged that adaptation and mitigation actions are important processes in response to climate change (IPCC, 2012). Mitigation focuses at reducing the contribution of GHGs whereas adaptation addresses unavoidable consequences of climate variability caused by GHGs in order to reduce vulnerability (IPCC, 2012). However since the revelation that the already trapped

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Green House Gases (GHG) in the atmosphere is irreversible and will continue to impact the globe in a myriad ways, (IPCC, 2007; Sem & Moore, 2009), there has been an urgent call for adaptation actions (IPCC, 2012).

Adaptation strategies have been identified and in some countries adaptations are already being implemented and monitored. Some case studies on these adaptations are available (see case studies in e.g. Simpson, Gössling, Scott, Hall, & Gladin, 2008). However, Ericksen et al. (2011) caution that not all adaptation strategies sought are sustainable. Therefore there is a need for policy makers to consider measures that enhance social equity, environmental integrity and sustainable economic development (Brown, 2011; Ericksen et al., 2011).

Considering the vulnerability and importance of tourism in socio-economic development of developing and least developing countries, tourism research has continued advancing knowledge on adaptation to advise stakeholders on practical adaptation applications. So far this has been achieved through development of adaptation frameworks and/or models that provide step by step process for adaptation both at policy level (see UNDP's Adaptation Policy Frameworks for climate change: Developing Strategies, Policies and Measures' Lim, Spanger-Siegfried, Burton, Malone, and Huq (2005)), UNEP's 'Climate Change Adaptation and Mitigation in the Tourism Sector: Frameworks, Tools and Practices' (Simpson et al., 2008) and in academic literature [inter alia: (DeLacy, 2009; Fussel, 2009; Fussel & Klein, 2006; Jopp, Delacy, & Mair, 2010; Scott, McBoyle, Minogue, & Mills, 2006)]. However, none of the existing frameworks explicitly provide a step by step process for sustainable adaptation.

This paper aims at proposing an enhanced Regional Tourism Sustainable Adaptation Framework (RTSAF) which provides a step by step sustainable adaptation process. It borrows knowledge from existing frameworks much of which has been advanced by the works of Jopp et al. (2010) 'Regional Tourism Adaptation Framework' which I criticise for failing to explicitly address the need for sustainable adaptation. The proposed Regional Tourism Sustainable Adaptation framework (RTSAF) is informed by the works of Ericksen et al. (2011) 'Principles for sustainable adaptation'. The application of the framework shall seek to reduce destination's vulnerability to climate change risks, take opportunities presented by climate change and advancing sustainable economic development i.e. Sustainable Adaptation. The framework is a significant contribution to the new school of thought, on 'sustainable adaptation', where knowledge is lacking and secondly, it provides a practical tool for sustainable adaptation that may be used by destination managers and policy makers in the adaptation process.

The next section provides operational definition of the term sustainable adaptation which is later followed by a review of tourism adaptation frameworks with emphasis on RTAF model proposed by Jopp et al. (2010). The strengths and weaknesses of the model in enhancing sustainability are highlighted and finally an enhanced framework for Regional Tourism Sustainable Adaptation is proposed.

2. Sustainable adaptation

2.1. What is sustainable adaptation?

Sustainable adaptation has emerged in recent discussion on climate change response strategies. However the term sustainable adaptation lacks commonly agreed definition as noted by Brown (2011). In order to have an operational definition of the term we shall revisit some of the thoughts around the terms 'sustainable' and 'adaptation'. The term 'sustainable' has been widely discussed and defined in the context of development following the World Commission on Environment and Development (WCED) report of 1987 named 'our common future' which defined sustainable development as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. Sustainable development attracted criticism and earlier debates argued that the term sustainable development as 'vague' (Redclift, 1987). Despite these debates, sustainability has been

sought as a means to better conditions of development. For example sustainable tourism has been popularised in the past two decades to curb negative impacts associated with mass tourism in the post-industrial period (UNEP & UNWTO, 2005). In the case of sustainable tourism development, the idea is to develop tourism that promotes social wellbeing and environmental degradation is put on check.

On the other hand adaptation is derived from the word 'adapt' which means to cope, adjust or to accommodate. Adaptation in climate change research is defined as the process of coping, adjusting or accommodating stimuli and taking advantage of opportunities presented by the variability in order to reduce vulnerability and enhance resilience of an individual, society, and systems (Becken & Hay, 2007; Scott et al., 2006; Simpson et al., 2008).

'Adaptation is adjustment in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. This term refers to changes in processes, practices, or structures to moderate or offset potential damages or to take advantage of opportunities associated with changes in climate. It involves adjustments to reduce the vulnerability of communities, regions, or activities to climatic change and variability.'

[IPCC, 2007, p. 881]

Earlier, sustainability in climate change adaptation literature discussed adaptation in the context of development and 'sustainable adaptation' is rarely brought up. The IPCC (2007) report chapter 18 discusses adaptation in the context of sustainable development. The report argues that the ability to successfully adapt largely depends on the adaptive capacity hence underdeveloped regions have limited capacity to adapt. It further argues that enhancing adaptive capacity of such regions would require promotion of factors that enhance sustainable development which includes: Improving access to resources, reducing poverty, reducing inequities, improving education and information, Improving infrastructure, eliminating intergenerational inequities, Respecting experienced local experience, Moderating structural inequities, Assuring comprehensive and integrative responses, Encouraging active participation among stakeholders and by Improving institutional capacity and efficiency (IPCC 2007, p. 899).

In recent adaptation literature 'sustainable adaptation' is emerging. This follows a recent revelation that not every adaptation is sustainable (Brown, 2011; Ericksen et al., 2011) Similar arguments have been put forward in the wider discussion on sustainable tourism and adaptation. Weaver (2011) argues that adaptation is business driven and the need for social cultural and environmental sustainability is highly neglected.

However, lack of agreed definition of sustainable adaptation has given room for speculation among commentators. Some research has set the pace that might be critical for future agreed definition of the term sustainable adaptation. Leichenko and O'Brien [22: (2008, p. 31)] state that sustainable adaptation is coined from the terms 'sustainability' and 'adaptation' to infer the need to 'reduce vulnerability' and enhance 'long term resilience'. This definition is informed by the nexus that exists between climate change vulnerability and poverty. Ericksen et al., provide a critical analysis on the linkages between climate change and poverty reduction in an investigative report commissioned by the Norwegian Agency for Development Cooperation (Norad). The linkages between vulnerability and poverty can be summarized as: 1. 'any added risk by climate change to current ways of securing well-being', 2. 'The particular strategies or adaptive capacity of poor people in the face of climate stresses' and 3. 'the causes of vulnerability, or specific factors and conditions that make poor people vulnerable to climate stress' (Ericksen et al., 2011). In order to address these linkages sustainable adaptation measures have been proposed including: (a). *reducing the risk on wellbeing of the poor*, (b). *enhancing adaptive capacity and*, (c). *addressing the root cause of vulnerability*, (Ericksen et al., 2011, p. 342).

Brown (2011) provides a critical analysis of sustainable adaptation in climate research and argues that sustainable adaptation is closely linked to

sustainable development. This close link is identifiable in wider discussion on climate change and vulnerability where adaptation has been promoted to reduce vulnerability especially among the poor. Brown (2011) argues that sustainable adaptation is a move from conventional adaptation approaches to include measures that are aimed at reducing poverty and/or vulnerability to climate change and considering actions that promote long term resilience. Similar views have been expressed through other terms that are gaining popularity in climate change adaptation e.g. 'pro-poor climate change adaptation' (Tanner and Mitchell, 2008) and 'community based adaptation' (Ensor and Berger, 2009) all of which include measures aimed at reducing vulnerability among the poor and enhancing their means of securing livelihood in the long-term perspective.

There is limited research that seeks to understand how current adaptation strategies relate to social equity and environmental sustainability. However there are a few case studies that show how adaptation intervention resulted to negative outcomes. Beckman's (2011) study on central Vietnam on adaptation interventions revealed that strategies aimed at increasing resilience on one scale may increase vulnerability at another scale hence promoting conflict on resource use and inequality within the society. Owuor, Mauta, and Eriksen (2011) studied how formal policies and informal governance hindered the ability to adapt to drought in pastoral and agro pastoral region in Kenya. The study shows that policies that were aimed at protecting forest land limited the community to access forest land which acted as buffer for livestock during drought season hence creating tension between pastoralist and agro-pastoralist communities. Such interventions have led to loss of socio political and human rights (Owuor, Mauta, and Eriksen, 2011). Based on these arguments this paper defines sustainable adaptation as adaptation measures and or strategies that are aimed to reduce vulnerability and enhance resilience of an individual, society or system without compromising social justice and environmental integrity (Brown, 2011; Eriksen et al., 2011).

2.2. How can we achieve sustainable adaptation?

Current adaptation strategies have been criticised to be far from sustainable since adaptation have been sought in favour of development hence neglecting the two pillars of sustainability i.e. social equity and environmental integrity. In order to achieve sustainability in the adaptation process there are a number of guidelines proposed in literature. Eriksen et al., identify 'key principles for sustainable adaptation' (2011, p. 11–15):

Key principle 1: Recognise the context for vulnerability, including multiple stressors: Climate change presents an array of challenges whose impacts vary depending on the characteristics of the region's social, economic, institutional and cultural conditions. Therefore sustainable adaptation responses should consider the underlying context on which climate change risk is being experienced.

Key principle 2: Acknowledge that different values and interests affect adaptation outcome. Different individuals and groups have different interests and values. Acknowledging this fact will help reduce conflict of interests and resistance in the adaptation process.

Key principle 3: Integrate local knowledge into adaptation response: This principle recognises that adaptation is an ongoing process which produces learning among individuals, group and/society whose relevance is attached to local context. Therefore local knowledge is an important integral part of the overall adaptation knowledge.

Key principle 4: Consider potential feedback between local and global processes: Climate change is a global phenomenon whose effects are locally felt. Local adaptation decisions also have global implication especially in overall GHG emissions. It is therefore important that the adaptation considers the interaction between local and global processes. (See Eriksen et al. (2011) for detailed case studies and illustrations).

In addition adaptation cannot be achieved with list of interventions. There is a need to recognise that adaptation is a process which involves complex interaction. Furthermore adaptation stakeholders must ensure that the interventions they advanced not only comply with adaptation principles but are assessed on how they limit or enhance sustainability in the wider context of social equity and environmental integrity. Adaptation frameworks represent how such interactions can be managed in a systematic process by the stakeholder. However there are no frameworks on regional adaptation that can guide regional tourism stakeholders towards sustainable adaptation. The next section reviews current tourism specific adaptation frameworks and their ability to enhance sustainability.

3. Tourism adaptation frameworks

Adaptation frameworks provide actors with working tool for adaptation process. Earliest adaptation frameworks explicitly dedicated to tourism include the work of Simpson et al.'s (2008) 'A Framework for Climate Change Adaptation in the Tourism Sector'. The framework presents a seven sequence steps of the adaptation process. One of the major strengths of this model is that it emphasises the need for stakeholder's involvement in the adaptation process. However, Jopp et al. (2010) criticize the model for not considering consumers' (Tourists') as part of the stakeholders. The framework also provides feedback mechanism at different levels of the adaptation process, but fails to provide a feedback mechanism for the local and global processes which is important for sustainable adaptation.

Earlier models include model proposed by Scott et al. (2006) which involves a conceptual framework which provides enlists types of adaptation that are specific to the tourism industry. Three forms of adaptations are discussed including: Behavioural, technical and business management. For regional tourism stakeholders this is an invaluable input when considering the types of adaptations that may be considered by the tourism industry however this does not provide regional managers and policy makers with a working description of the adaptation sequence or steps to follow in the adaptation process (Jopp et al., 2010).

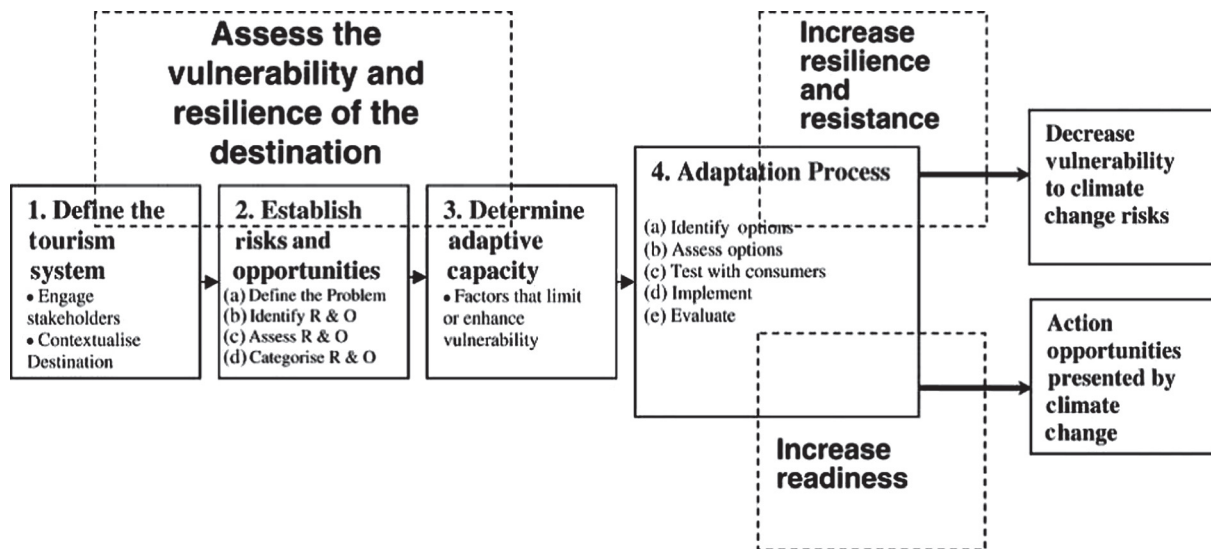
Becken and Hay (2007) employ risk science approach in presenting a framework for profiling risks that a system may be exposed to. Risk science approach evaluates exposure and the magnitude of the consequences for such risk. Such method has been widely used in evaluating risks and used as planning tool for planned adaptation however employing risk approach may be tricky for the tourism industry based on the complexity and high degree of uncertainties involved in the tourism sector (Jopp et al., 2010).

Jopp et al. (2010) provide a valuable input in regional adaptation discourse by proposing a Regional Tourism Adaptation Framework (RTAF) (see Figure 1). Their work was motivated by the need to develop a practical tool for adaptation that can be used by regional tourism stakeholders. RTAF model involves two major phases where the first phase involves assessing the vulnerability and resilience of the destination. A system approach is applied in this phase where the tourism system of the destination is defined, risks and opportunities are identified and the adaptive capacity of the destination is assessed.

In the second phase the adaptation process begins by identifying the adaptation options, accessing the options, testing with the consumers, implement and evaluate the option. By considering this the destination will enhance its resilience and readiness [15]. The model proves to be an important tool for adaptation especially in the Australian surf region where the model has been validated [28]. However like previous models this model has its own shortcomings in the context of sustainable adaptation. The framework possesses the following strengths and weaknesses:

3.1. Strengths

1. Simple: RTAF model is simple to understand. It provides the user an easy to understand adaptation tool.



Source: Jopp et al., (2010, p.599) Regional Tourism Adaptation Framework

Fig. 1. Regional Tourism Adaptation Framework.
Source: Jopp et al. (2010, p. 599).

2. Step by step process: The model provides a step by step working tool for the adaptation process. The tool is practical and easy to operate therefore favouring destinations with limited specialists.
3. Emphasises on the need for stakeholder's involvement (including the tourist): RTAF model understands the need for evaluating customer's perception on the adaptation considering the fact that tourists have high capacity to adapt (Scott et al., 2006). This enables destination managers to adopt strategies that meet the needs of the consumer.
4. Need oriented: The RTAF model is need oriented in the sense that first phase requires the user to evaluate destination's vulnerability and resilience after which the user can identify the options for adaptation in the second phase. Therefore the need recognition allows for specific adaptation strategies that are aimed at addressing the need.
5. System approach: RTAF employs Leiper's (2004) 'Tourism System' approach which enables the user of the framework to consider a holistic view of all elements involved in a system. The tourism system helps in understanding the relationships among different actors in the tourism sector thus providing a grasp of how different external forces may affect the system due to inter-linkages involved.
6. Local approach: Local knowledge is an important integral part of sustainable adaptation Erickson et al. (2011). The RTAF model employs a local approach rather than top down approach. The model seeks to understand the context of impact and the stressors involved thus allowing the user to developed adaptation strategies that befit the risks to be addressed.
7. Demand side considerations: Previous research has been focusing on the supply side neglecting the demand side despite the fact that the tourism industry is market driven. The model considers the demand side (tourist) who have high capacity to adapt therefore making a holistic view of the adaptation process.
8. Opportunities: The model considers opportunities presented by climate change hence providing a good platform for discounting the negative impacts of climate change.

3.2. Weaknesses

1. Lack of feedback between local and global processes: One of the prevailing principles for sustainable adaptation is the need for feedback between local, regional and global processes which the

model has failed to consider. This provides a leeway for maladaptation since an adaptation at one level may lead to maladaptation in another level.

2. Business oriented: The model overemphasises on the need for tourist opinion which is evaluated in the second phase of the model. This may lead to bias engagement in the process i.e. 'after all it must suit the tourist taste!' (Author's own quote). Therefore the model enhances business as usual adaptation process.
3. Lack of explicit adaptation option assessment: Research show that not all adaptation responses give desirable results Erickson et al. (2011). The RTAF model fails to provide an explicit formula for evaluation of the adaptation methods hence providing room for maladaptation. Therefore there is a need to develop models that provide a thorough assessment of the options in order to ensure that the three pillars of sustainability are enhanced.
4. Limited on community opinion: The role of the host community in sustainable tourism is acknowledged. In order to ensure a sustainable tourism development at any destination the host communities must be involved and their opinion sought at every level of decision making. In the RTAF model communities' opinion has been neglected in the adaptation process where only the tourist opinion is sought. Hence questions may arise on what if the tourist approves an adaptation option that would jeopardise social justice and environmental integrity? Therefore models that seek to evaluate host community's opinion should be developed.

In summary, tourism research on adaptation has come a long way in developing frameworks that can assist tourism stakeholders in the adaptation process. Whilst regional and local adaptations have become a focus in recent adaptation literature, RTAF model proves to be an important tool in that cause and more specifically for the tourism industry. However the existing frameworks may not be able to guide regional tourism managers and policy makers in achieving sustainable adaptation. We therefore put forward a proposed enhancement for the RTAF in the following section.

4. An enhanced Regional Tourism Sustainable Adaptation Framework (RTSAF)

RTSAF model aims at addressing the weaknesses of the RTAF model. Based on the RTAF model the following enhancements are considered.

Table 1

Interrelations between sustainability and tourism adaptation portfolio in the examined micro-region. Source: CSETE and SZÉCSI (2012, p. 104)

Types of adaptation	Aspects of sustainability			
	Environmental	Economic	Social	Institutional
Management	<ul style="list-style-type: none"> • Risk management • Climatic and environmental factors in decision-making • Preparedness for extreme events (disaster-climate local strategies) 	<ul style="list-style-type: none"> • Diversification product and market, substitute products and services, regional diversification in business operations • Award of excellent regional product branding, promotion regional quality labels 	<ul style="list-style-type: none"> • Risk management • Climatic and environmental factors in decision-making • Preparedness for extreme events (disaster-climate local strategies) • Action plan for the quick response • Training actors/people within different companies, organizations 	<ul style="list-style-type: none"> • Stimulating sectoral collaboration against the negative impacts • Implementation of Awareness and Preparedness for Emergencies at the Local Level (APELL). This specific risk mitigating method is elaborated by UNEP.
Behaviour	<ul style="list-style-type: none"> • Redirecting guests away from impact areas • Up-to-date information about UV-protection 	<ul style="list-style-type: none"> • Special insurance (force majeure events) • Suggesting and organizing optional programmes particular indoor substitute options • Priority for local products, resources in case of procurement 	<ul style="list-style-type: none"> • Suggesting optional programmes • Informing tourists especially of the current weather conditions 	<ul style="list-style-type: none"> • Developing of behaviour management strategies • Behaviour management techniques for adaptation
Education	<ul style="list-style-type: none"> • Information • Promoting time concept of soft responsible tourism, inspiring the tourists for environmental-conscious behaviour • Providing eco-alternatives • Promoting an attitude codex to service providers (water, waste management and other environmental aspects) 	<ul style="list-style-type: none"> • Promoting an attitude codex to service providers (water, waste management and other environmental aspects) • Tourism destination Management organizations technical supporting climate-guidance; brochures 	<ul style="list-style-type: none"> • Campaign, education training about new technologies, adaptation measures • Regional tourism forms • Inspiring the tourist and the staff for environmental conscious behaviour 	<ul style="list-style-type: none"> • Stimulating the collaborations, promoting best practices
Political	<p>Integrating climate aspect into the concept of regional development strategies</p> <p>Corporate social responsibility</p>	<ul style="list-style-type: none"> • Activity according to the law and other exogenous regulatory environment • Fitting to the new conditions of the insurance industry (force majeure events) 	<ul style="list-style-type: none"> • Activities according to the law and order exogenous regulatory environment • Integrating climate aspect into the concept of regional development strategies • Mapping the legal and finance subversion system assistance to the regional rendering operations 	<ul style="list-style-type: none"> • Coordinating political lobby • Mapping the legal and finance subversion system assistance to the regional rendering operations
Technological	<ul style="list-style-type: none"> • Concept of 'green' office • Technical optimization of office • Rain water collection and water recycling systems • Shielding techniques against sea and beach (tree) planting scheme • Energy efficient and saving techniques (buildings, technical instruments, heating-cooling) • Waste management (separate collection, reduce waste and recycling) • Renewable resources (solar and geothermal systems) • Water recycling and saving systems as a significant water-consumer • Snow making, snow-guns • Intensive conservation and protection against extreme weather events on historical sites (extraordinary heat waves, precipitation) 	<ul style="list-style-type: none"> • Concepts of 'green' office • Energy efficient and saving techniques • Improvement of (conditions of) the tourism infrastructure (alternative transport possibilities) 	<ul style="list-style-type: none"> • Shielding techniques: <ul style="list-style-type: none"> - Installation of freshening points - Providing shelters against extreme weather events 	<ul style="list-style-type: none"> • Concept of 'green' office • Technical optimization of office • Enable access to early warning systems and collaboration with meteorological services • Developing common website with practical information on adaptation measures to actor, territorial (micro-region) information systems

First the RTSAF model addresses the need for explicit evaluation of all proposed adaptation options. The use of 'sustainability and tourism adaptation portfolio' as proposed by [Csete and Szécsi \(2012\)](#), (see [Table 1](#)). Using this approach destination stakeholder will be able to suggest adaptation options that enhance social justice, environmental integrity and economic sustainability.

Secondly, whilst RTAF advocates for the need for seeking tourist opinion RTSAF advocates for the need to assess all stakeholders' opinion including the business community and the host community. Their opinion shall be evaluated before any options for adaptation are implemented. This will ensure that all stakeholders concerned are factored in the adaptation process.

Finally, in order to conform to sustainable adaptation principles, the lack of feedback between local and global processes is addressed. This is achieved by enhancing back and forward communication at the local level and vertical communication between local–national–global processes is introduced (i.e. phase 3).

Considering these recommendations expressed above the proposed RTAF model is enhanced in order to propose STRAF model.

4.1. Phase one: Assess the vulnerability and resilience of the destination

The first phase involves destination's vulnerability and resilience assessment. The three steps of the RTSAF are adopted from the RTAF model which includes: Defining the tourism system, identifying risks and opportunities and determining the adaptive capacity of the region ([Jopp et al., 2010](#)). A system approach is used to define the tourism system. Leiper's Tourism System includes five elements: The tourist, tourist generating region, transit region, tourist destination region and the tourism industry (organizations responsible for the production and facilitation of tourism product consumption) e.g. tour operators, government, airlines, tourism infrastructure, etc. (2004). This approach enables the user of the model to conceptualise the interaction among different actors and provides a first point entry for engaging stakeholders of the tourism industry in the adaptation process ([Jopp et al., 2010](#)).

After mapping all elements of the tourism system including the stakeholders the next step involves identifying potential risks. Local knowledge comes in handy and the role of stakeholders comes into play in identifying the risks being experienced or those which are perceived and/or expected to be experienced in the future. The main focus is climate change associated risks which are likely to impact on the tourism system. Risk matrix may be used to categorize/rank the risks depending on the extent of perceived impact ([Jopp et al., 2010](#)).

The third and final step involves the assessment of adaptive capacity of the region. Adaptive capacity varies from region to region and is influenced by the socio-economic characteristics of the region, level of technology access, institutional factors, information, skills, etc. ([Ericksen et al., 2011](#)). These factors enhance or limit the ability of a tourist region to adapt hence it is important to evaluate region's adaptive capacity in order to adopt the best adaptation measures or strategies ([Jopp et al., 2010](#)) ([Fig. 2](#)).

4.2. Phase two: Adaptation process

After assessing the vulnerability of the destination adaptation options are proposed. The proposed adaptation options are aimed at increasing destination's resilience whilst enhancing its ability to cope with externalities of climate variability ([Jopp et al., 2010](#)).

In order to establish the best adaptation option a step by step process is initiated. The RTAF identifies five steps which include: Identifying adaptation option, assessing the options, testing the options with the consumers, implementing the options and evaluation. These essential elements of the adaptation options are adopted in RTSAF, however explicit evaluation of the adaptation options is considered in RTSAF.

Furthermore, assessment of the options is not only limited to consumer evaluation but rather to other stakeholders which may include: Government institutions, business community/investors and civil society among other stakeholders. This is important during the implementation of the adaptation options in order to win stakeholders commitment through ownership. Therefore the enhanced model proposes six important steps for sustainable adaptation.

- a) Identify options: The first step is to identify options. The already identified climate risk in phase one may be considered case by case. At this point stakeholders' involvement is critical in order to provide their input on local knowledge and support for the process. [Ericksen et al. \(2011\)](#) observe that in order to adapt sustainably the process should be inclusive in order to gain acceptance by all stakeholders. [Kaján and Saarinen's \(2013\)](#) literature review on tourism sector adaptation to climate change also notes that local knowledge is an important integral part of the adaptation process. Focus groups, questionnaires, interviews and Delphi study may be used to gather information ([Jopp et al., 2010](#); [Simpson et al., 2008](#)). (See also [Ericksen et al. \(2011\)](#) for Delphi case study application).
- b) Evaluate the options: Once the options are identified the next step is to evaluate the options. This is a very important step in achieving sustainability. All options that have been identified are subjected to a thorough evaluation. A system of evaluation is applied based on various variables that include: *effectiveness, local acceptance, ease of implementation, distribution of benefit, affordability* ([Jopp et al., 2010](#)) and not limited to the adaptation's ability to enhance *social justice, environmental integrity and economic sustainability* ([Brown, 2011](#); [Ericksen et al., 2011](#)). Expert skills may be required to assess the adaptation option as opposed to [Jopp et al.'s \(2010\)](#) recommendation to use stakeholders in evaluating the options. RTSAF seeks a 'third eye' to accomplish this task. This is done to avoid stakeholders' bias in rating their favoured option with high rating. A tourism adaptation portfolio ([Scott et al., 2006](#)) is applied in order to come up with options that enhance sustainability ([Csete & Szécsi, 2012](#)) (see [Table 1](#) below). The options are then scored and are not disclosed as yet until stakeholders' opinion is evaluated. After the rating the options are ranked and stakeholders' opinion is assessed in the next step.
- c) Test adaptation option: At this step stakeholders opinion on the identified adaptation options are assessed. Key stakeholders opinion may be evaluated through questionnaires, interviews and focus groups. The key stakeholders include: Operators, Host community and Consumers (tourists). The scores are aggregated based on each opinion from all stakeholders whose opinion may have been sought.
- d) Rank the options: Once expert evaluation and stakeholders' opinion have been scored, both scores are aggregated. The options with high ranking from aggregated scores are considered for implementation.
- e) Implement: After thorough evaluation in the presiding steps, the options with high score are considered for implementation. Implementation programmes should be integrated into local, regional and national plans
- f) Evaluate viability of the options: The final step of the adaptation process involves evaluation and monitoring of the adaptation option. Feedback from the system should be monitored on how the adaptation options respond to the risks over time. Furthermore feedback from all stakeholders should be sought in order to ascertain the cost and benefits of the implemented options. Evaluation and monitoring shall provide for and support learning process of adaptation.

4.3. Phase three: communication and feedback

The final phase of the SRTAF model is feedback between local process and global process. Local action may have a global scale implication attributed by global interaction of resources and global processes ([Ericksen et al., 2011](#)). It is therefore important to have a good reporting

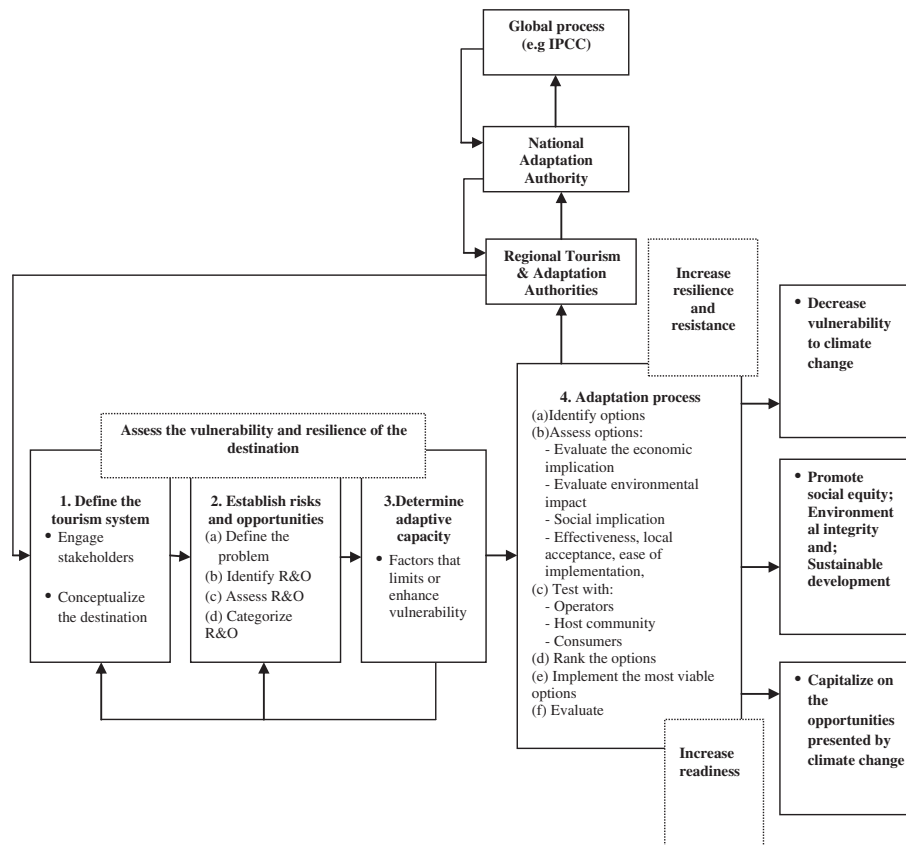


Fig. 2. Author: An Enhanced *Regional Tourism Sustainable Adaptation Framework* model adopted from RTAF model by Jopp et al. (2010).

system between local and national and between national and global adaptation processes. A good monitoring system shall inform both national (e.g. National adaptation plan) and global processes (e.g. IPCC and IFCCC processes) about the actions being undertaken at the local level. The global process on the other hand shall continuously give information on climate change research that continues to inform governments and non-governmental agencies.

The proposed enhancement of the RTAF model is aimed at achieving sustainable adaptation. RTSAF incorporates essential elements of RTAF and some important recommendations have been incorporated in the step by step process. The model will seek to adopt adaptation interventions that are not only reducing vulnerability of regional tourism but also measures that enhance social justice, environmental integrity and economic sustainability of a destination.

5. Conclusion

Whilst climate change remains a global phenomenon its impact is felt at a local level hence there is a need for local action to adapt. Response to changing climate will remain an important integral part of development agenda especially in climate sensitive industries like tourism. However caution has been drawn that not all adaptations sought yield good results. It is therefore important for regional tourism stakeholders to consider measures that will yield good net benefit. Currently there is no adaptation framework that provides an explicit guide on sustainable adaptation.

RTAF model proves to be an important tool for regional tourism adaptation. The framework provides a step by step process that can be used to guide regional tourism managers and associated stakeholder throughout the adaptation process however the model may not explicitly seek to enhance sustainability in the adaptation process. An enhanced RTSAF model has been proposed to address the limitation

hence may be used to help regional tourism managers achieve sustainability in adaptation process. These enhancements contribute to the literature on regional sustainable adaptation where the area is still grey in tourism research.

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