



# Flooded with risks or opportunities: Exploring flooding impacts on tourist accommodation

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## Abstract

Climate and weather-related impacts have become widespread particularly affecting the tourism industry. Flooding has gained research attention over the past decade, since the destruction creates many challenges for tourism businesses. Floods are a growing global problem, increasing in terms of frequency of occurrence, property damages, business economic losses, and fatalities. The study aimed to explore the perceived flooding impacts on different types of tourist accommodation. Thus, to determine if floods hindered any tourist bookings, offerings, and tourist length of stay. The exploration verified the possible flood risks to vulnerable accommodation and no adequate adaptation plans. A purposeful sample of 145 tourist accommodation businesses located across three flood-prone regions of the Limpopo Province of South Africa were selected to answer a semi-structured questionnaire combined with telephonic interviews and email responses to put across their flooding experiences from a management perspective. Coherent theme development within the theoretical framework was achieved through content analysis and allowed for the critical discussion of deductive and inductive themes found in the results. Floods during peak-seasons threaten and affect tourist accommodation, leaving them behind in business. Those not affected benefit with increased tourist demand and new opportunities in the hospitality industry. Alongside the destruction of tourism in the Province, were concerns of the provision of flood mapping and flood management plans for tourism businesses. Wider flooding impacts on the environment and the surrounding local communities demonstrates a growing problem for the future.

**Keywords:** tourist accommodation, flooding impacts; risks and opportunities, flood recovery, flood mapping, flood management plans

## Introduction

Tourism is climate sensitive and by nature, a place-dependent sector (Scott and Lemieux, 2010; Saarinen *et al.*, 2012; Crona *et al.*, 2013; Becken *et al.*, 2015). Tourism becomes sensitive to climate, when annual changes in weather occur. Changes in climate lead to changes in weather conditions across a variety of tourism destinations, regions and attractions (Vijayavenkataraman *et al.*, 2012). Global changes in climate affect numerous factors of tourism, making the industry highly dependent on weather (Belle and Bramwell, 2005; Gbetibouo and Hassan, 2005; Pang *et al.*, 2012; Kaján and Saarinen, 2013; Clar and Steurer, 2014; Komen *et al.*, 2015; Hambira *et al.*, 2016). Flooding can be defined as an excess of water in particular areas due to heavy rainfall, hail and strong winds, and can be categorised



as hazardous, devastating and costly to recover from (Pielke and Downton, 2000; Kundzewicz and Menzel, 2005; Scawthorn *et al.*, 2006; Ciscar *et al.*, 2011; Hapuarachchi *et al.*, 2011). Floods may cause large scale damages and may be associated with changes in climate. Tourist accommodation plays a vital role in the local and national economy of a country (Becken, 2005; Nelwamondo, 2009; Guizzardi and Bernini, 2012; Su *et al.*, 2012; Rogerson and Visser, 2014; Fitchett *et al.*, 2016). The global tourism industry cannot do without accommodation, since it is an important sector with high contribution returns (Su *et al.*, 2012; Rogerson, 2013a; Faasen, 2014; Bernard and Cook, 2015). The need for accommodation services and facilities are large, since tourists want to stay for a certain period at different destinations. Tourist accommodation can be understood as the temporary housing or a place to stay with important services supporting tourism (Guizzardi and Bernini, 2012; Su *et al.*, 2012; Rogerson, 2013; Rogerson and Rogerson, 2014). Tourist interest has gradually led to a heterogeneous pool of tourist accommodation services, emerging to offer different experiences, including; hotels, lodges, guest houses, bed & breakfasts and self-catering accommodation services (Nelwamondo, 2009; Walmsley, 2011; Rogerson, 2013a; Faasen, 2014). The vulnerability to climate variability can lead to a drop in tourist interest, reservations or bed-nights that affect profit, management and employment (Becken, 2005; Su *et al.*, 2012; Rogerson and Visser, 2014). Length of stay is of major importance to any tourism region, because longer stays are positively associated with the total earnings from tourist activities and more bed-occupancy rates (Thrane and Farstad, 2009; Barros *et al.*, 2010; Kruger and Saayman, 2014).

Global flood event investigations currently include flooding impacts on tourist accommodation businesses (Nicholls *et al.*, 2007; Ranger *et al.*, 2011; Balica *et al.*, 2013; Walters *et al.*, 2014; Bangira *et al.*, 2015). Flooding research and analysis indicate that the field has expanded to include multiple dimensions of tourism, types of flooding impacts, mitigation, adaptation, vulnerability and policy to allow for critical integration (Ingirige *et al.*, 2008; Becken, 2013a; Godfred, 2015; Klijn *et al.*, 2015; Thiemig *et al.*, 2015). Possible flooding impacts include implications such as a loss in business, tourist numbers, damaged facilities and infrastructure, and high recovery and rebuilding costs (Weber, 2010; Fatti and Patel, 2013; Bernard and Cook, 2015). The impact of flooding has resulted in damage to the tourism industry (Agnew and Viner, 2001; Chandler, 2004; Espiner and Becken, 2014). The tourist accommodation sector has begun to experience the consequences of frequent flood events. After floods the tourist accommodation businesses are in loss and may face many challenges to recover.

Despite the growing threat of floods to tourism businesses and destinations, only a few tourism businesses are prepared enough to handle the impacts (Changnon, 1998; Few, 2003; Kyriakidis and Partner, 2008; Zahed *et al.*, 2014). The flooding impacts on tourism sectors have become widespread and expose the lack of mitigation plans. Flooding impacts on tourist accommodation are generally assessed and evaluated economically to understand the purpose and nature of the business (Changnon, 1998; Brody *et al.*, 2007; Atta-ur-Rahman and Khan, 2011; Kundzewicz *et al.*, 2013). The economic evaluation might only provide the costs to recover after flooding events, but does not include the wider direct and indirect flooding impacts on tourist accommodation (Wordsworth and Bithell, 2004; Zerger and Wealands, 2004; Musungu *et al.*, 2016). Without the wider flooding impact assessments and evaluation, tourist accommodation management cannot mitigate and adapt in flood-prone areas (Nyaupane and Chhetri, 2009; Gouldby *et al.*, 2010; Ranger *et al.*, 2011; Guinea Barrientos and Swain, 2015).

Research on flooding impacts on tourist accommodation is a relatively new and emerging focus, alongside climate change impacts on tourism (Tempelhoff *et al.*, 2009; Hapuarachchi *et al.*, 2011; Musungu *et al.*, 2016). The majority of theory speculating flooding impacts, events, and recovery does not focus on themes suitable for tourism and related research themes. Current flood theories include flood risk modelling, disaster and management frameworks and policies, but only a few theories are relevant for the tourist accommodation sector. Floods



have increasingly become a common natural disaster in the Limpopo Province of South Africa (Rowberry *et al.*, 2011; Maposa *et al.*, 2014a; Musyoki *et al.*, 2016). The exploration of flooding impacts will assist in determining the possible changes in region attractiveness, tourist demand, tourism services, profits, and the importance of domestic tourism. The adaptive capacity of tourism accommodation businesses to flooding are weaker than other tourism businesses (Hamzah *et al.*, 2012; Guizzardi and Bernini, 2012; Becken, 2013b).

## Literature

### The tourism accommodation sector: flooding impacts and experiences

Flooding impacts on tourism have become a substantial and pressing issue worldwide (Agnew and Viner, 2001; Jeuring and Becken, 2013; Becken *et al.*, 2015). Flooding has the capacity to generate disorder in the tourism sector, creating difficulty for small tourism business management (Laws and Prideaux, 2005; Huq *et al.*, 2007; Jarvis and Ortega, 2010; Pang *et al.*, 2012; Bernard and Cook, 2015). The new role tourism plays in flooding literature indicates that tourism vulnerability and contribution remain complicated, since tourism research is expanding to approach the impacts from a geographical background (Berrittella *et al.*, 2006; Peeters and Dubois, 2010; Jeuring and Becken 2013). Flooding has affected the geographical setting, landscape, activities and attractions of the tourism accommodation sector (Berrittella *et al.*, 2006; Brown, 2006; McEvoy *et al.*, 2008; Yu *et al.*, 2009; Becken, 2013b; Wyss *et al.*, 2014). The global tourism sector has recently been exposed to flooding in many destinations both coastal and inland (Faulkner and Vikulov, 2001; Ritchie, 2004; Suarez *et al.*, 2005; Hall, 2010; von Bergner and Lohmann, 2013). Tourism flood consequences allow for studies to make simultaneous changes in tourist location supply and demand (Agnew and Viner, 2001; Berrittella *et al.*, 2006; Amelung and Nicholls, 2014). The outcomes may include consequences such as a loss in business, tourist numbers, damaged infrastructure and high recovery costs (Changnon, 1998; Mondlane, 2010; Weber, 2010; Atta-ur-Rahman and Khan, 2011; Hamzah *et al.*, 2012). Flooding research demonstrates that the field has grown to include multiple dimensions of tourism as well as mitigation, adaptation and policy to be more integrative and critical on flood analyses (Becken, 2013; Espiner and Becken, 2014). Perceptions of flooding impacts are often from a local perspective based on a specific area or place, where the tourism business owners and planners understand the local environment in which they operate (Somerville, 2004; Tsai and Chen, 2011; Saarinen *et al.*, 2012; Crona *et al.*, 2013; Wyss *et al.*, 2014).

Globally, investigations of flooding impacts on tourism have begun to include various countries and tourist destinations (Agnew and Viner, 2001; Nicholls *et al.*, 2007; Goodess, 2012; Fatti and Patel, 2013; Schuckert *et al.*, 2015). Floods in Prague, the capital city of Czech Republic in 2002 reduced the visitor numbers by one-third with a cancellation of 30 000 reservations for national airline flights (Suarez *et al.*, 2005; Kang *et al.*, 2010; Brázdil *et al.*, 2011; Filimonau *et al.*, 2011; Maharjan, 2014). Similarly, in 2005 hurricane Katrina hit the US state of New Orleans which dramatically caused the tourism sector to halt due to floods (Ritchie, 2008; Goodess, 2012; Walters *et al.*, 2014). Flash floods are very common in Australia and have impacts on tourist peak flow, short warnings times and high potential for loss of life (Yeo, 2003; Zenger and Wealands, 2004; Windle and Rolfe, 2013). A number of Australian tourism developments are at risk due to the exposure to floods (Yeo, 2003; Cioccio and Michael, 2007; Hadwen *et al.*, 2011; Sharma and Franks, 2013; Windle and Rolfe, 2013). Moving to less-developed and developing countries, Mumbai (India) is prone to flooding with severe disruptions annually to the tourism sector (Henderson, 2005; Humanitarian Policy Group, 2009; Ranger *et al.*, 2011;). Mumbai's vulnerability refers to the expected tourism business property damage costs based on the flood water level (Atta-ur-Rahman and Khan, 2011; Ranger *et al.*, 2011; Looney, 2012). Floods in Bangladesh have become a barrier for tourism and local economic development (Shahid, 2012). Flooding studies in Bangladesh are not explored in detail, since it lacks academic literature for both tourism and flooding (Ives, 1991;



Younus and Harvey, 2013; Cross and Cross, 2014). Pakistan has an historical record of flooding events, damages and losses every year (Atta-ur-Rahman and Khan 2011; Looney, 2012).

Different flooding types and scales are widespread throughout Africa with heavy rainfall and high temperatures (Ekblom *et al.*, 2012; Engelbrecht *et al.*, 2013; Hart *et al.*, 2013; Heritage *et al.*, 2014; Nicholson, 2016; Nka *et al.*, 2016). In East Africa, heavy rainfall and high temperatures over the Indian Ocean has resulted in countless flooding events from 2002 onwards, affecting countries such as: Burundi, Kenya, Rwanda, Tanzania and Uganda (Awuor *et al.*, 2008; Lehto *et al.*, 2008; de Sausmarez, 2013; Becken *et al.*, 2014; Malherbe *et al.*, 2014; Nicholson, 2016). Malawi has recently been affected by disastrous floods in 2014 (Hill, 2014; Msyamboza *et al.*, 2016). Parts of southeastern Africa have experienced changes in daily, monthly and annual rainfall patterns (Le Comte, 2010; Sen Roy and Rouault, 2013; Pohl *et al.*, 2014). West Africa has experienced serious flood damages since 1995 and the flood frequency and scale is increasing, especially in Ghana (Le Comte, 2010; Godfred, 2015; Nka *et al.*, 2016). Flooding in Nigeria has been extensively studied to understand the perception of the impacts and the adjustments to urban and rural flooding (Ayoade and Joubert, 1997; Olorunfemi, 2011; Adigun *et al.*, 2013; Dillimono and Dickinson, 2016).

Southern Africa has seen variability in temperatures and rainfall, causing localised floods in a range between 2.5mm to 500mm of rain in the south-eastern parts including Botswana, Mozambique, South Africa and Zimbabwe (Dube, 2003; Ekblom *et al.*, 2012; Hart *et al.*, 2013; Fitchett and Grab, 2014). In 2000, the Okavango Delta flooding resulted in the closure of the Moremi Game Reserve located centrally in the Delta for eight months due to impassable transportation links (Dube, 2003; Mbaiwa and Mmopelwa, 2007; Saarinen *et al.*, 2012; Hambira and Manwa, 2013). Floods in the Okavango Delta had direct impacts on tourist numbers. Mozambican areas prone to floods affect business operation, the local economy, and communities (Spenceley, 2006; Siteo *et al.*, 2015). Floods in Mozambique have put a halt to tourist activity in some parts of the country (Spenceley, 2006; Maposa *et al.*, 2014a). Both South Africa and Mozambique were affected by ex-tropical depression Dineo (Knight and Evans, 2017; SABC News, 2017).

### **Tourism exposure and vulnerability to floods through tourism demand**

For the past four decades, the global tourism industry has become progressively competitive and has become more accessible with a great number of consumers (Agnew and Viner, 2001; Pang *et al.*, 2012; von Bergner and Lohmann, 2013; Shani and Arad, 2014; Giampiccoli *et al.*, 2015; Hoogendoorn and Rogerson, 2015; Hambira *et al.*, 2016). In addition, tourism stimulates investment, through new infrastructure and tourism property development to increase the competition between different tourist countries and destinations (Coshall and Charlesworth, 2011; Sharma and Franks, 2013; Amelung and Nicholls, 2014; Bernard and Cook, 2015). Seasonal patterns present how sensitive the tourism sector is to weather events based on tourist and destination decisions (de Freitas, 2003; Bigano *et al.*, 2006; Kundzewicz *et al.*, 2008; Yu *et al.*, 2009; Hadwen *et al.*, 2011; Matzarakis, 2014; Ridderstaat *et al.*, 2014; Hall *et al.*, 2015). Other ways to analyse demand models include exploring the push and pull factors of tourist flows to a destination, including climate variables, facilities, setting, distance and travel costs (Rittichainuwat, 2007; Hein *et al.*, 2009; Ridderstaat *et al.*, 2014).

Tourism accommodation businesses under threat are often characterised as either vulnerable or exposed to floods (De Urioste-Stone *et al.*, 2015; Ghaderi *et al.*, 2015). The literature on flooding impacts and vulnerability frameworks have begun to include common sources of exposure, responses and preparedness of tourist accommodation businesses (Werritty *et al.*, 2007; Gasper *et al.*, 2011; Becken *et al.*, 2014). Accommodation flood vulnerability can be analysed through various adaptation measures, mechanisms and long-term plans to handle adaptation challenges (Kaján and Saarinen, 2013; Becken *et al.*, 2014). The flood vulnerability





of tourism accommodation businesses depend on identifying and managing risks to eliminate or reduce the impacts (Thomas *et al.*, 2011; Shaw *et al.*, 2012). The accommodation sector lacks understanding of their vulnerability to flood risks (Shaw *et al.*, 2012; Mycoo, 2014). Fixed assets, lower tourist interest and bookings, and the occupation of bed-nights make the sector vulnerable to flooding impacts, since floods will directly influence the sector profits, management, and employment (Su *et al.*, 2012; Kruger and Saayman, 2014). The South African tourism accommodation sector offers different types of accommodation and all types directly or indirectly affected by floods. Direct flooding impacts are the damages to the physical aspects of the tourism business (Merz *et al.*, 2010; Ranger *et al.*, 2011; Sharma and Franks, 2013). The direct flooding impacts can be referred to as the physical operations of a tourism business (Faulkner, 2001; Faulkner and Vikulov, 2001; Park and Reisinger, 2010; Ciscar *et al.*, 2011). The hardware includes the physical components of the business such as the building, facilities and the infrastructure (Chandler, 2004; Laws and Prideaux, 2005; Xu and Grunewald, 2009; Park and Reisinger, 2010; Pang *et al.*, 2012b; Bernard and Cook, 2015). The perceived direct flooding impacts on tourist accommodation firstly includes a direct destruction to property, infrastructure and the environment. Secondly, an immediate drop in tourist demand, reservations and length of stay. Lastly, a direct loss in profits, the economy and accommodation competitiveness.

Indirect flooding impacts are related to direct impacts and occur at a different time or place outside of the flood event (Jonkman *et al.*, 2008; Merz *et al.*, 2010; Ranger *et al.*, 2011). Indirect flooding impacts the social and cultural dimensions of direct flooding impacts, that include society and their behaviour (Benjamin, 2008; Styliadis *et al.*, 2014). Indirect flooding impacts in most cases include the decision making process (Walmsley, 2008; Jeuring and Becken, 2013; American Meteorological Society, 2016). Indirect flooding impacts are a diffusion of direct flooding impacts and include the consequences of the flood aftermath. Indirect flooding impacts are the intangible elements of any flood damages and destructions to property, buildings, and infrastructure of a tourism business (Cochrane, 2004; Law *et al.*, 2012). Indirect flooding impacts are more complex to identify and classify. The perceived indirect flooding impacts on tourist accommodation firstly includes, an indirect impact on repeat or return visits, tourist experiences and the decision-making process of both the tourists and tourist accommodation management. Secondly, an indirect impact on the loss of products and services, promotions and media. Lastly, an indirect impact on the local community, employment and accommodation staff.

### **The capacity and measures of the tourism accommodation sector through flood management and adaptation**

Tourism managers might face challenges in planning for the management and adaptation process, since it relates to the quantification of the flooding impacts to extract the maximum benefits (Ranger *et al.*, 2011; Thomas *et al.*, 2011; Walsh *et al.*, 2013). Flooding impacts can be successfully managed to fully understand the drivers of the impacts and to have relevant adaptation strategies and policy options (Nicholls *et al.*, 2007; Klijn *et al.*, 2015; Hoogendoorn and Fitchett, 2016). Flood management plans aim to reduce the risks at all levels of society and the environment (Olorunfemi, 2011; Wilby and Keenan, 2012; Hegger *et al.*, 2016). Flood risk management plans assist in promoting the vulnerability to floods to control and reduce the structural damage through non-structural approaches (Gouldby *et al.*, 2010; Olorunfemi, 2011). Tourism businesses in environments prone to flooding should measure and manage floods to recognize the flood safety factors, flood resilience and resistance of both new and existing infrastructure (Wilby and Keenan, 2012). Management should modify rules to develop control under flooding episodes, flood forecasting, risk area retreats and periodically review and adapt to new management guidelines (Wilby and Keenan, 2012). Tourist destinations have to focus on the responsibility to include tourists, tourism businesses, enterprises and the local communities for flood risk management (Steene, 2005; Benjamin, 2008; Adamson *et al.*,



2016; Hegger *et al.*, 2016). Flood risk management research and flood adaptation models will assist in determining the amount of change and development to justify tourism development zones (TDZ's) (Ahn *et al.*, 2002; Bernard and Cook, 2015).

Flood adaptation is the capacity of a tourism business to alter its systems, operation, structure, and management to endure any threatening changes to the business' existence, location, and success (Cartwright *et al.*, 2013; Kaján and Saarinen, 2013; Wyss *et al.*, 2014). Tourism adaptive capacity includes the conceptualisation of sectors, systems and networks to gain knowledge, experience, creative and flexible risk-evaluation, decision-making and problem solving skills (Becken, 2013; Fatti and Patel, 2013; Kaján and Saarinen, 2013; Mycoo, 2014; Woodward *et al.*, 2014). Flood adaptation planning involves a broader spectrum of flooding impacts for assessment. Flood adaptation assessment allows managers to understand the levels of flood vulnerability and to recognising the damages and costs (Ranger *et al.*, 2011; Younus and Harvey, 2013). Tourism adaptation to flooding has become dimensional, functional, and geographical. Tourism development activities take place at different times (seasons) and places (regions) based on dependence and adjustability to climate (Hein *et al.*, 2009; Lew, 2013; Sharma and Franks, 2013; de Kumar, 2015). The adaptation to any climate change risk has become a key issue since the 2012 International Climate Policy negotiations in Europe and again in 2016 during the Climate Change Agreement Summit in Paris, France (Gössling *et al.*, 2010; Ciscar *et al.*, 2011; Scott *et al.*, 2016; Kundzewicz *et al.*, 2017). Tourism accommodation businesses with a less adaptive ability within destination regions and communities trigger the decision-making and the development of adequate adaptation plans (Kaján and Saarinen, 2013; Walsh *et al.*, 2013; Amelung and Nicholls, 2014). In tourism research, adaptation is documented under the practical application of the tourism system, changes and decision-making (Kaján and Saarinen, 2013; Kietäväinen and Tuulentie, 2013).

### **The tourism accommodation sector flooding impact assessment challenges**

Flooding impact assessments have become more complex, since the climate variability is linked to wider socio-economic factors (Yu *et al.*, 2009; Tol and Walsh, 2012). The flood assessment difficulties led to concerns over future weather related impacts and adequate adaptation plans for tourist accommodation businesses (Cartwright *et al.*, 2013; Woodward *et al.*, 2014). It has always been challenging addressing and assessing flood impacts and vulnerabilities (Olorunfemi, 2011; Scott *et al.*, 2016). This is mainly due to the reduced scholarly attention and the emphasis on traditional management responses and approaches to mitigate and adapt to flooding impacts (Olorunfemi, 2011; Scott *et al.*, 2016). A few common barriers around the perceived flooding impact assessment include different degrees and scales of challenges. Short-term planning, costs, lack of awareness, inadequate adaptation plans, failure to respond are common flood assessment barriers implementation level challenges (Nhamo, 2013; Gómez-Martín *et al.*, 2014b). The implementation of adaptation plans, research and information insufficiency, and technological restrictions and doubts leads to numerous flood assessment barriers that the tourism accommodation sector cannot overcome (Nhamo, 2013; Gómez-Martín *et al.*, 2014a).

Flooding impacts can be assessed in various ways, dependent on the scale and duration of floods. Floods can be assessed through economic impacts, socio-cultural impacts, environmental impacts and other related impacts on society (Guinea *et al.*, 2015; Klijn *et al.*, 2015; Arvind *et al.*, 2016). Direct flooding impacts can be measured and indirect flooding impacts are projected to understand the time scales in months and years (Merz *et al.*, 2010). Flooding research has shown the progress in flood damage data collection, analysis and adaptation development (Jonkman *et al.*, 2008; Merz *et al.*, 2010; Hapuarachchi *et al.*, 2011). The flood impact assessment scales are methods for tourism businesses to undertake, for successful flood management. These spatial and temporal scales classify the flooding impacts as micro-, meso- and macro-economic effects to understand the long-term barriers to regional development in flood-prone areas (Gouldby *et al.*, 2010; Merz *et al.*, 2010).



Flooding impacts on the tourism accommodation sector include many challenges in interacting with the environment and the local community. Flood barriers include factors that hinder the affected business to continue with the flood assessment, management and adaptation (Zerger and Wealands, 2004; Guinea Barrientos and Swain, 2015). The barriers to assess the perceived flooding impacts on the tourism accommodation sector have become twofold, since the sector is constantly undergoing reconstruction and development. Developing tourist destinations have poor response rates and coping mechanisms to disasters (Few, 2003; Khandhela and May, 2006; Woodward *et al.*, 2014). Tourism at local and national level have begun to assess flooding impacts that create significant uncertainties for the sector (Filimonau *et al.*, 2011; Gössling *et al.*, 2012; Klijn *et al.*, 2015). Different flooding impacts have to be classified to ensure for assessment and evaluation (Asante *et al.*, 2007; Arvind *et al.*, 2016). Flooding impacts are classified for assessment, specifically to separate the valuable and the non-valuable, the sensitive and the non-sensitive and lastly, the large and small scales of damages.

The improvement in flood management mainly focusses on the operational structures to include communication tools to ensure valid information and awareness to determine any flood incidents (Tempelhoff *et al.*, 2009; De Groen and Robinson, 2015). The forecasting of rain is seen as a difficult weather prediction task due to the complexity and variability of rainfall processes and the accurate prediction of other depending factors (Dyson, 2009; Hapuarachchi *et al.*, 2011; Ekblom *et al.*, 2012).

The South African Weather Services (SAWS) have begun to focus on the causes of flash flooding, particularly the Limpopo River basin (Oyekale, 2005; Malherbe *et al.*, 2014; Maposa *et al.*, 2014; Komen *et al.*, 2015; De Groen and Robinson, 2015; Du Plessis and Burger, 2015). This will improve the quality of flooding information in different areas and provide real time flood observation and analysis of information (De Groen and Robinson, 2015). These improvements in flood forecasting will assist in identifying the flood hazard, vulnerability and manageability of areas (World Meteorological Organization, 2012; De Groen and Robinson, 2015; Thiernig *et al.*, 2015).

## Results and Discussion

The perception of flooding impacts by managers of tourist accommodation in South Africa need to be understood to prepare for future flood challenges (Filimonau *et al.*, 2011; Reddy, 2012; Kundzewicz *et al.*, 2013). Studies have been conducted to explore and assess the flooding impacts of coastal towns, but only a few focused on inland, rain-derived floods, since the changes in the weather pattern make it difficult to predict localised floods. The aim of this study is to explore the management's perception of flooding impacts on tourist accommodation in the Waterberg, Vhembe, and Mopani regions Figure 1 (below) of the Limpopo Province, South Africa.

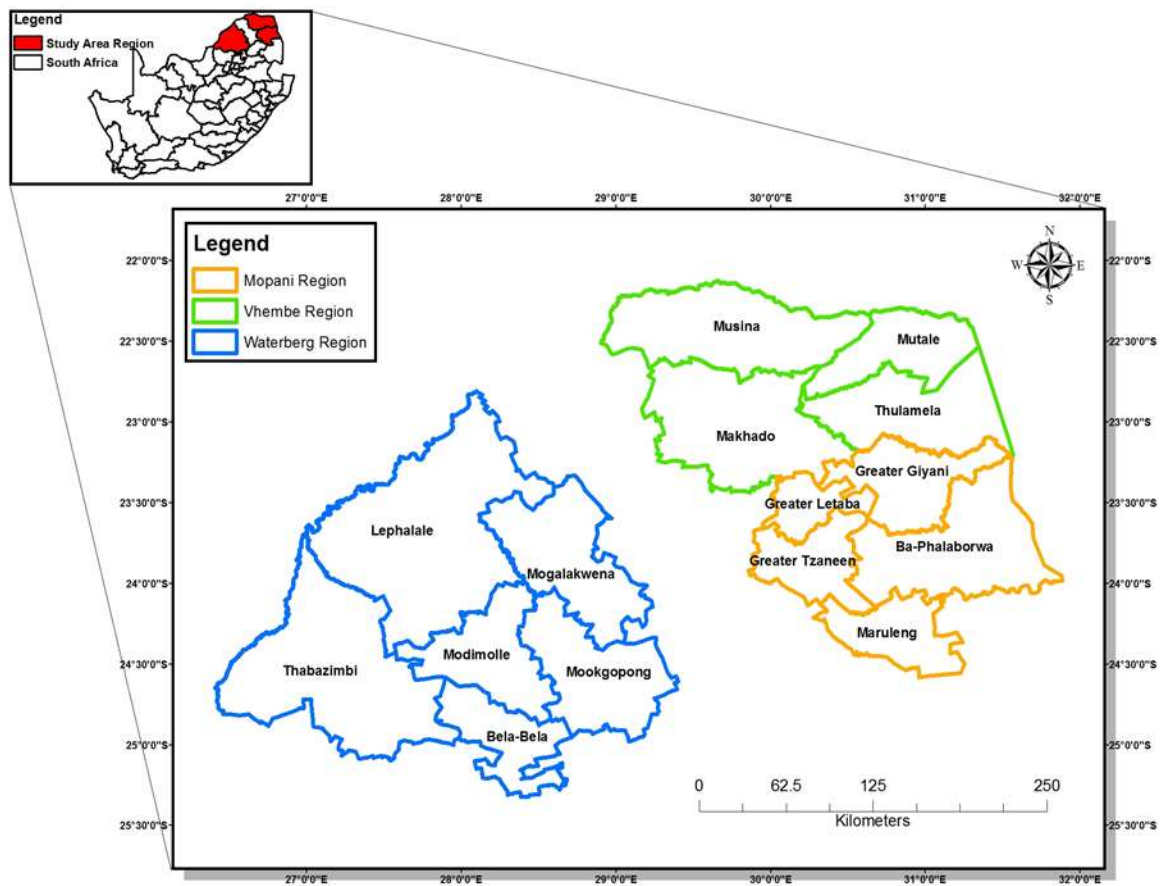


Figure 1: Map of the research study sites (Source: Southon, 2017).

### Methodological consideration

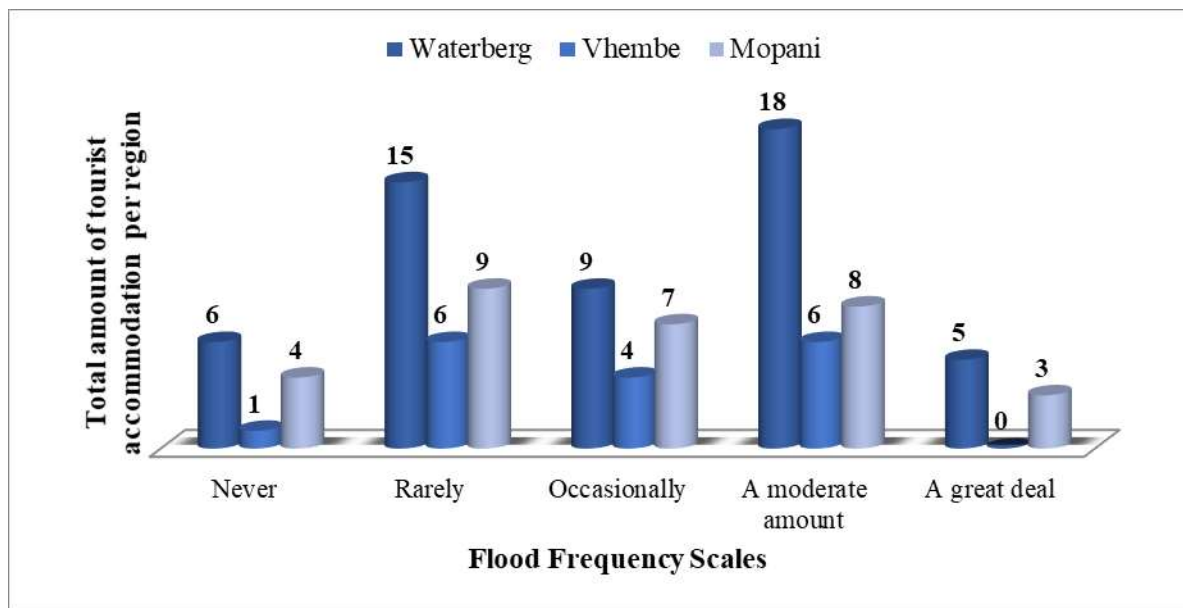
The Limpopo Province has declared the Waterberg, Vhembe and Mopani regions as flood prone, due to the increased summer temperatures and rainfall (Komen *et al.*, 2015; Musyoki *et al.*, 2016). The Waterberg, Vhembe and Mopani regions creates a focus for the study to explore the perceived flooding impacts on tourist accommodation in the Limpopo Province. 145 tourist accommodation businesses across the study regions were approached to participate in the study. A pilot study assisted in reducing the possible research limitations. A total of 119 tourist accommodation managers participated in the study through answering a semi-structured questionnaire, telephonic interviews and email responses. Ethics permission was achieved through the institute, the University of the Witwatersrand to conduct the data collection.

Content analysis was employed to analyse the answered online questionnaires, emails and telephonic conversations. This approach involved organising and coding the data into themed or theory categories, to develop new concepts, the formulation of theoretical frameworks and content analysis flowcharts, definitions and relationships among concepts. The regions are regarded as areas for tourism development and growth to offer tourism products and opportunities, especially nature and cultural tourism to promote domestic tourism and local economic development (Mafunzwaini and Hugo 2005; Spenceley, 2006; Boonzaaier and Philip 2007; Conelius *et al.*, 2009; Mbedzi, 2011).



## The perception of floods as a natural hazard by accommodation managers

Floods are defined as a hazard with a high probability or chance for it to occur (Balica *et al.*, 2013). The perception of floods as a hazard are from the frequent responses from tourist accommodation managers. Most of the respondents described floods as being negative and a risk to their livelihood and business' success. Floods pose a risk to anyone before and during occurrence. Figure 2 (below) show how the accommodation managers perceive floods as a hazard through the frequency of floods in the Waterberg, Vhembe, and Mopani regions. The flood frequency was measured on a five-point Likert scale with the following scales of frequency: *never*; *rarely*; *occasionally*, *a moderate amount* and *a great deal*. The use of the Likert scale assisted in quantifying the frequency of flood occurrence in the three regions.



**Figure 2:** The frequency of floods in the regions Waterberg, Vhembe, and Mopani perceived by accommodation managers (Source: Southon, 2017).

Frequent floods are recorded to be the most destructive and costly natural hazard based on the local and global economy (Brody *et al.*, 2007). Based on previous studies, short-duration storms that may take place over a few days can easily increase the magnitude and occurrence of floods (Douglas *et al.*, 2008).

*"I think floods are becoming a problem in the area and we might feel it in the long run as a privately-owned business."* (Self-catering Accommodation, Respondent 43, Questionnaire).

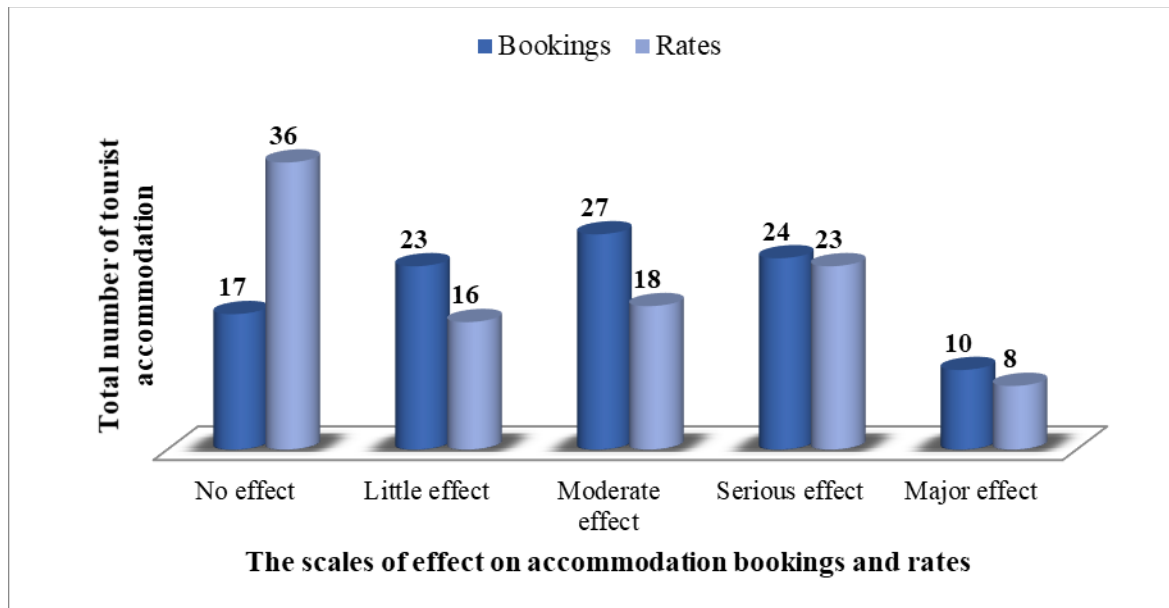
*"It can happen anytime. Changes in the weather and climate pattern cannot be controlled."* (Guest House, Respondent 96, Questionnaire).

Finally, identifying floods as a hazard rests on the responses from accommodation managers to understand the different perceived flooding experiences and impacts (Hamzah *et al.*, 2012; Cioccio and Michael, 2007; Sharpley, 2014; Ghaderi *et al.*, 2015).

## The effect of floods on tourist accommodation bookings and rates

Tourist bookings and rates have become one of the central findings of this research. The interested tourist loses out on time, value for money and experiences that is included in the booking. Tourist bookings are dependent on other variables of the accommodation such as services, rates, and tourist experiences. Figure 3 (below) represents the scale of flood effects

on the accommodation bookings and rates measured using a five-point Likert scale with the following scales of frequency: *no effect*; *little effect*; *a moderate effect*; *a serious effect* and a *major effect*. The use of the Likert scale assisted in understanding the effect in terms of how important the floods were for the accommodation bookings and rates.



**Figure 3:** The effect of floods on accommodation bookings and rates in the Waterberg, Vhembe, and Mopani regions (Source: Southon, 2017).

Flooding events in the Limpopo Province may have numerous impacts and affect the booking patterns, systems and rates (Brody *et al.*, 2007; Fitchett *et al.*, 2016; Hoogendoorn and Fitchett, 2016). Once the floods affect the bookings and rates, there may be no income capital to ensure the full functionality of the accommodation. The majority of the tourist accommodation managers experienced *little*, *moderate*, and *serious effects* that floods have on the accommodation bookings and rates. 85% of these tourist accommodation managers create packages, promotion deals, and specials during and after floods to increase the bookings.

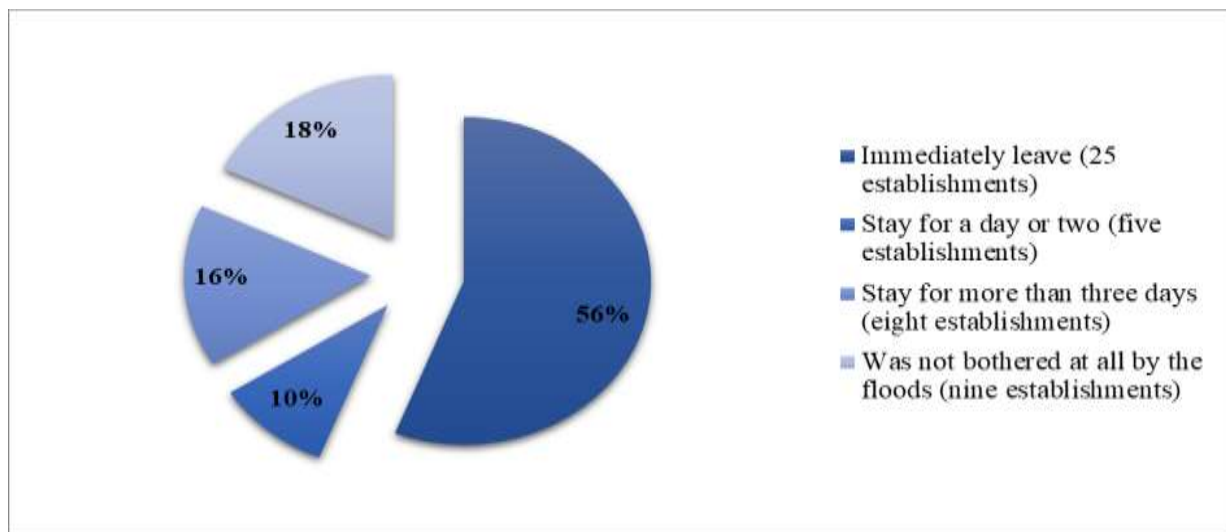
*“Guests decide to book elsewhere when there are flooding episodes in Bela Bela and the effect it has on our accommodation bookings are very negative.”* (Guest House, Respondent 7, Questionnaire).

*“Bookings drop between 10 and 15% once floods are announced in the region.”* (Lodge, Respondent 9, Questionnaire).

The sharp decline in bookings, altered the tourist demand and booking patterns. Accommodation managers highlighted the issue of booking deposit requirements and booking cancellation policies that affected the profit and working capital. The research findings indicate that the flood exposure and changes in accommodation bookings and rates were predominantly conveyed through the media, word of mouth by other tourists, and local messages regarding the flood risk. The finding show that the peak seasons are high in tourist demand and bookings. Tourist packages are usually compiled during the off-peak season, ironically after the flood season to recover any losses from floods.

## An immediate evacuation as a result of disrupted tourist length of stay during and after floods

Tourists make decisions to visit particular tourist destinations and accommodation, and these decisions define the length of stay and the duration of the tourist peak season (Bigano *et al.*, 2006; Dwyer *et al.*, 2009; Gössling *et al.*, 2012; Tol and Walsh, 2012). Tourists make accommodation bookings well in advance, but floods influence their length of stay, the quality of their experiences, and their safety. Tourist length of stay is the duration tourists spend at any accommodation type, whilst engaging in related activities and expenditure in the area (Bigano *et al.*, 2007; Kruger and Saayman, 2014). Shorter tourist length of stay compromises tourist risks and safety. Figure 4 (below) presents the tourist length of stay using four categories: *immediately leave*, *stay for a day or two*, *stay for more than three days* or *not bothered at all by the floods*.



**Figure 4:** The influence floods have on tourist length of stay at tourist accommodation during and after floods (Source: Southon, 2017).

*“Very bad direct and indirect flooding influenced the B&B and guests immediately leave, cancel the rest of their stay and the business loses guests who usually book for the whole week if they attend business conferences in the area.”* (Lodge, Respondent 39, Questionnaire).

*“No evacuation points were established. No safety (or evacuation to higher ground). Tourists and staff called the police, ambulances, and fire fighters. Booking cancellation policies could not be applied and freak accidents took place.”* (Lodge, Respondent 48, Questionnaire).

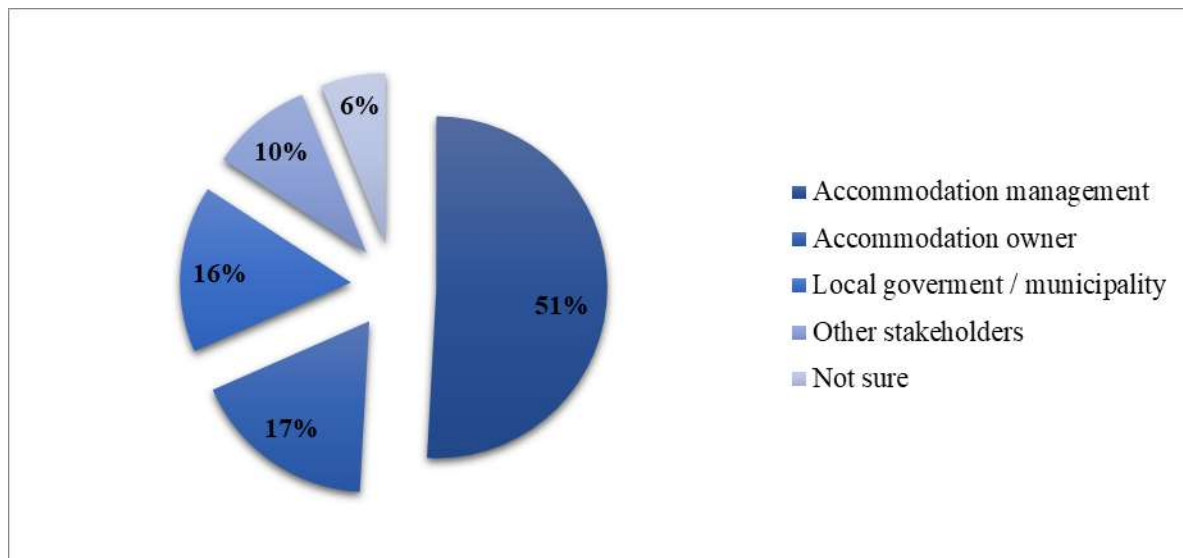
It is important to analyse the tourist length of stay relative to the type of stay, accommodation type, motivation, behaviour and experiences (Goh, 2012; Becken, 2013a). Psychologically, tourists react quickly to events and changes, and their preferences can either destroy or promote the tourist destination (Park and Reisinger, 2010). The finding shows that floods influence the tourist’s consumption and behaviour and encourage tourists to cancel, postpone, or shorten their trips and depart.

## The responsibility and need for flood risk management plans across the flood-affected regions

Flood risk management plans are strategies and approaches to better manage current flooding impacts for earlier and faster responses, resilience and recovery (Yeo, 2003; de Bruijn, 2004; Buchecker *et al.*, 2013; Kellens *et al.*, 2013; Filatova, 2014). The importance of having flood risk management plans in place during and after floods are key managerial tasks

the tourist accommodation managers should perform. In this study, 69% (74 out of 119) of establishments *do not have* flood risk management plans. A total of 31% (33 out of 119) of establishments *do have* flood risk management plans.

The finding indicates that establishment flood risk management plans are challenging managerial tasks that require compiling reports, applying the correct measures, finding both time and finances. Flood risk management plans are seen as a luxury for some tourism businesses (Wilby and Keenan, 2012; Filatova, 2014; Kind *et al.*, 2014). A total of 61 out of 119 tourist accommodation managers Figure 5 (below) acknowledged that it was the managements' responsibility to implement flood risk management plans, however only 33 out of the 61 tourist accommodation managers indicated that they have flood risk management plans.



**Figure 5:** The responsibility of accommodation flood risk management plans (Source: Southon, 2017).

The finding indicates that the responsibility to set up and implement flood risk management plans by accommodation managers is not a priority. A strong emphasis is placed on accommodation owners, stakeholders, and investors to assist in taking the responsibility to ensure flood risk management plans for establishments.

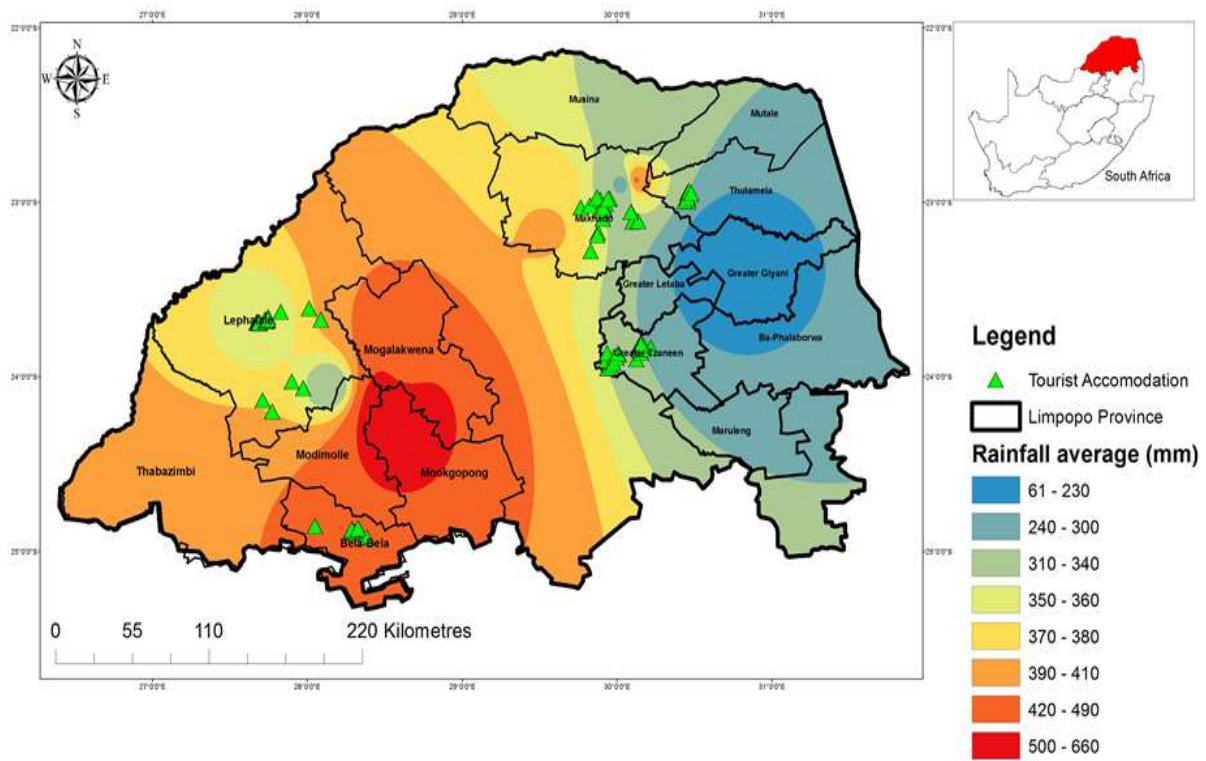
### **The wider flooding impacts on the surrounding local communities**

The research finding includes that the relationship between the accommodation, the environment, and the local community is important. Floods might have wider impacts on the environment and the local community. Tourist accommodation employs individuals from local communities. Tourism is seen as a tool for local economic development, employment and poverty alleviation (Bowd *et al.*, 2012; Day *et al.*, 2013; Rogerson, 2013b; Saarinen and Rogerson, 2013; Bernard and Cook, 2015). Floods have wider impacts on the environment through degrading the quality of ecosystems, soil, and agricultural activities. The environment forms part of the accommodation products and services (Awuor *et al.*, 2008). A few legal implications arise during floods and in cases of theft, legal policies, and claims are not taken seriously. A lack of service delivery and a lack of funds to recover from flooding may hinder new building plans and infrastructure. Unfortunately, floods do not only affect tourist establishments, but also affect everyday life and operations in the surrounding environment.

There is currently insufficient Geographical Information Systems (GIS) and research done to assist in predicting possibilities of floods in South Africa. Figure 6 (below) presents a possible GIS flood map that can be used as a forecasting and information tool for the tourist accommodation in the three flood-prone regions. Local GIS flood mapping can be compiled



using various available climatic data (Mondlane, 2010; Elkhachy, 2015; Thiemig *et al.*, 2015; Musungu *et al.*, 2016).



**Figure 6:** Precipitation averages from years 2000 to 2015 across the research study regions (Source: Southon, 2017).

An attempt to create a GIS flood map with the study regions precipitation total averages for 15 years (2000-2015) has been included, since the interest in flood mapping is increasing. The 15-year precipitation figures from SAWS have been analysed for the GIS flood map. The GIS flood map provides an average rainfall over the past 15 years in areas where the tourist accommodation is located. The weather stations situated close to the flood prone research study sites and tourist accommodation were points to start the interpolation analysis of the total precipitation averages. Tourist accommodation managers can be provided with GIS flood maps to plan and prepare for future floods and changes in rainfall patterns.

## Conclusion

The study created an opportunity to advance the understanding of flooding and tourism research in flood-prone tourist destinations. The consequences of floods for tourism businesses have become important factors for the tourist demand and tourist destination development. However, research has shown that tourism businesses lack response, resilience and recovery measures to combat the flood challenges (Ritchie, 2008; Klint *et al.*, 2012; Espiner and Becken, 2014). This study indicates that tourist accommodation types across the study regions experience a wide range of flooding impacts and the flooding impacts expose them to weather related natural disasters. Tourist bookings and reservations are central to the subject of floods and tourism. Floods directly and indirectly impact the booking and demand patterns that further affect the business operations during floods. The flooding impacts result in opportunities and risks for tourist accommodation in a highly competitive



tourism environment. The study concludes with the urgent need for flood risk management plans for the survival of tourism in the study regions. Finally, in conclusion, for those managers of tourist accommodation establishments, it is hoped that this study makes a contribution in advancing our knowledge of the impact flooding has on the local tourism sector. Furthermore, the tourist accommodation managers' perceptions of flooding impacts, speak to the grim reality they often face.

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