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Tourists' perceptions on whether South African national parks are environmentally friendly

The increasing number of tourists to South African national parks raises concern about the effect these tourists have on the environment. This article aims to investigate how SANParks manage environmentally friendly South African national parks in order to reduce the impact of tourism on the environment. To examine these concerns, a survey was conducted to measure tourists' perceptions of the environmental impacts of tourism in these parks. A web-based survey was carried out via the official SANParks website to collect data. The findings of this study will help SANParks to manage the environmental impacts of tourism in the national parks more effectively.

Toeriste se persepsies rakende of Suid-Afrikaanse nasionale parke omgewingsvriendelik is

Stygende getalle toeriste wat reis na Suid-Afrikaanse nasionale parke wek kommer rakende die effek wat hierdie toeriste op die omgewing het. Die artikel beoog om ondersoek in te stel na hoe omgewingsvriendelik SANParke bestuur word, sodat die impak wat toerisme op die omgewing het, verminder kan word. Ten einde hierdie kwessie te bestudeer, is 'n opname gedoen om die persepsies van toeriste wat betref die impak van toerisme op nasionale parke in Suid-Afrika te meet. Data is versamel deur middel van 'n opname op die webtuiste van SANParke. Die resultate van hierdie studie sal die bestuur van SANParke help om die impak van toerisme op die omgewing in Suid-Afrikaanse nasionale parke meer effektief te bestuur.

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The post-World War II period saw the birth of a new era in tourism.[1] Air travel made high-volume tourism possible, and tourism grew in popularity to become the world's largest industry, touching people's lives worldwide (Awang *et al* 2009: 67, Narayan 2005: 1157, Patterson *et al* 2008: 407). The tourism industry, which initially posed few negative effects, soon became a subject of disapprobation as people began to realise how much environmental damage high-volume tourism can do if not properly managed (Jackson 2007: 35, Logar 2009: 125, Spenceley 2005: 137). Research indicates that the increase in tourism, particularly in protected areas such as national parks, has severe adverse environmental impacts.[2] If tourism is not well managed, it can become a major threat to the parks, rather than a way to protect and conserve them (Mason 2003: 53, Weaver 2006: 1, Patterson *et al* 2008: 407).

Alonso (2009: 4) states that, if natural areas and their resources are degraded or destroyed, the meaning of sustainable tourism fails to be appreciated in the process. The 'green' movement and the concept of being environmentally friendly received heightened attention as the realisation of the vulnerability and protection of nature became an increasingly important issue. This alerted the tourism industry to manage its activities in a more environment-friendly manner in order to protect a country's natural resources (Weaver 2006: 7, Gössling 2006: 13). South Africa is concerned with protecting its natural resources. In this regard, national parks play an important role, since their main focus is to conserve the country's biodiversity, which is ranked third in the world (STATSSA 2009, Retief 2006: 104, DEAT 2008: 10-4). As the custodian of 21 national parks, including the Kruger, Tsitsikamma, Addo Elephant and Kgalagadi Transfrontier National Parks, South African National Parks (SANParks) takes the lead in nature conservation in South Africa. A large number of tourists visit South African national parks each year and from 2007 to 2008 the tourist numbers increased from 4.587 million to 4.720 million (SANParks 2008b). The increasing number of tourists to national

2   *Cf* Berry & Ladkin 1997: 434, Jackson 2007: 35, Chin *et al* 2000: 20, Baysan 2001: 218, Butler 2000: 218, Pandey 2008: 1543, Farrel & Marion 2002: 31, Bresler 2007: 167.

parks each year exerts pressure on park management to cope with these numbers while curbing impacts on the environment (Eagles 2009: 235, Spenceley 2005: 141, SANParks 2008a, PMG 2009). This article aims to determine tourists' perceptions as to whether South African national parks are being managed as environmentally friendly since, as a leading conservation authority, SANParks is expected to set the example. This will provide SANParks with valuable information on how to adapt current management plans in order to be more environmentally friendly.

1.   Literature review

The World Conservation Union defines a protected area – a national park, for instance - as "an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means" (IUCN 1994). In 1872, Yellowstone National Park in the US was established as the first national park in the world. Since then, protected areas cover nearly 11.5% of the earth's surface. The primary mandate of national parks is the conservation of biodiversity (Eagles *et al* 2002: 9, Eagles 2009: 231, SANParks 2009). These parks are often established in sensitive areas that have important environmental values and that need to be protected for future generations (Bushell *et al* 2007: 1, Pandey 2008: 1544, Eagles *et al* 2002: 6).

Tourism was only introduced at a later stage in national parks, and soon park management realised that the resulting income could be used for management and conservation. In South Africa, government funding for national parks (in real terms) is decreasing annually. This implies that income from tourism operations has become vital (Phillips 2009, Eagles 2009: 235). However, the resulting increase in tourist numbers has intensified the impact on the environment (Lindsay *et al* 2008: 730, Bushell & McCool 2007: 12). For this reason, it is vital that national parks are managed in an environment-friendly manner (Dearden *et al* 2005: 90).

Environmentally friendly tourism means tourism practised according to ecologically sound principles and shifting the global focus from mass consumption to one that is more aligned with that of the human race within larger ecosystems (Han *et al* 2009: 325, Butler

2000: 344). Management ought to take responsibility and have policies, practices, processes, procedures and resources in place to reduce the impact caused by the daily operations of tourism (Erdogan & Tosun 2009: 406). Some examples of tourism practices that are kind to the environment are landscaping with indigenous plants; energy-efficient systems; recycling programmes; renewable energy systems; grey water systems; architecture compatible with the local environment; items made from recycled materials; recycled items such as maps and trail guides; water-use reduction programmes; composting waste, and items made from natural or organic materials.[3]

Previous research concerning the environmental impacts of tourism in national parks has made valuable contributions to this issue.[4] Harriot (2004) identified some of the prevailing environmental impacts of tourism in national parks, namely littering, tourist crowding, disturbance of wildlife, water pollution, soil compaction or erosion, trampling, unauthorised taking of souvenirs, noise and visual impacts, overuse of water and energy, inappropriate solid waste disposal, and overdevelopment.[5]

To deal with these impacts, international experts developed several management approaches as a starting point for making parks more environmentally friendly (Boyd & Butler 1996: 559, Moore *et al* 2003: 349, Spenceley 2005: 137). Table 1 provides a summary of these management approaches.

3   *Cf* Andereck 2009: 1, Erdogan & Tosun 2009: 410, Spenceley 2005: 157, Li 2004: 562, Han *et al* 2009: 325.
4   *Cf* Erdogan & Tosun 2009: 407, Laven *et al* 2005: 168, Turton 2005: 145, Moore & Polley 2007: 294, Chin *et al* 2000: 20, Spenceley 2005: 138, Jackson 2007: 35, Butler 2000: 337, Harriot 2004: 18.
5   *Cf* Farrell & Marion 2002: 32, Marion & Reid 2007: 5, Erdogan & Tosun 2009: 407, Spenceley 2005: 138.

Table 1: International frameworks used to manage natural environments[6]

Widely used methods applied internationally	Description	Used by SANParks?
Limits of Acceptable Change (LAC)	Identifies appropriate and acceptable resource conditions and the criteria needed to protect and achieve these conditions. A widely used example is the principle of zoning.	√ As stated in the SANParks Conservation Mission document in 2005
Visitor Impact Management (VIM)	This framework addresses aspects of tourism impacts.	X
Visitor Experience and Resource Protection (VERP)	The VERP framework is designed to strike a balance between the quality of the tourist experience and the quality of natural resources.	X
Visitor Actuality Management Process (VAMP)	A conceptual planning model used to ensure that park-related facilities are appropriate	X
Leave No Trace (LNT)	An educational programme used to educate tourists about how to reduce their impact in natural areas	X
Precautionary Principle	This guiding principle encourages decision-makers to consider the likely harmful effects of their activities on the environment before they persue these.	√ The use of this framework was discussed by the Chief Executive officer of SANParks (Mabunda 2008)

Based on the information in Table 1, SANParks only applies the LAC Framework and the Precautionary Principle. However, further investigation revealed that SANParks applies several other approaches to manage the relationship between tourism and the environment, of which the most popular method is the 'touch the earth lightly' approach. This entails purchasing and procuring eco-friendly products and materials, minimising and preventing waste, using precious resources such as water in a sustainable manner, and using sustainable energy (SANParks 2006: 13). Other approaches

6   *Cf F*arrell & Marion 2002: 31, Eagles *et al* 2002: 176, Fennel & Ebert 2004: 462, SANParks 2006: 12, Moore & Polley 2007: 292, SANParks 2005, Mabunda 2008.

include the Adaptive Management Approach, which includes the Conservation Development Framework (CDF). SANParks has also adopted the combined Department of Environmental Affairs and Tourism (DEAT) and South African National Biodiversity Institute (SANBI) framework for the effective management of biodiversity (SANParks 2008: 10). In addition, national parks are divided into zones by making use of a Strategic Environmental Assessment (SEA) which is regarded as essential for conservation. Saayman (2009: 372), Butler (2000: 351) and SANParks (2006: 13) explain that zoning is a tool used to guide and co-ordinate tourism activities, conservation as well as tourist experience initiatives in and around the national parks. The Strategic Adaptive Management Approach (SAM) is used to better understand the different ecosystems in national parks (SANParks 2006: 44). For any new development to take place, it is now required that an Environmental Impact Assessment (EIA) be conducted prior to the development (SANParks 2006: 45). The variety of methods applied raises further concerns about how effective these different approaches are and who is co-ordinating or ensuring that implementation takes place.

Given the above methods used by SANParks to manage their parks in an eco-friendly manner, this article sets out to examine tourists' perceptions of the implementation thereof by determining their perception of current environmental impacts. Previous research has shown that tourists' perceptions of environmental impacts and how they are managed often differ from those of management (Hillery *et al* 2001: 853, Priskin 2003: 189, Baysan 2001: 218). Consequently, it is imperative to identify and measure tourists' perceptions in order to devise management strategies to address problem areas and be more environmentally friendly (Moore 2004). The research question is: Are the environmental management policies of SANParks successful from the tourists' perspectives?

2. Methodology

This exploratory research makes use of a questionnaire survey. The methodology will be discussed as the questionnaire, the sample and the statistical analysis.

2.1   The questionnaire

The questionnaire used to survey tourists to South African national parks was based on similar studies by Hillery *et al* (2001: 855) and Chin *et al* (2000: 20). The questionnaire surveyed the demographic details of the respondents as well as their perceptions of the environmental impacts of tourism on South African national parks. The perceptions were measured by means of 99 constructs/environmental impact statements under the headings: general management, rest camps and campsites, commercial sector, tourist routes, tourist facilities, and the marine environment. A five-point Likert scale was used to measure the degree to which tourists perceived environmental impacts upon visiting national parks over the past three years (1= almost never; 2= occasionally; 3= often; 4= mostly, and 5= almost always). A pilot study of 10 questionnaires was conducted to ensure the reliability of the questionnaire.

2.2   The sample

A total of 451 questionnaires (n) were completed during the survey. Any tourist to South African national parks (non-South African residents could also participate) who used SANParks' website for booking or for information purposes were invited to participate in the study. The study thus made use of the availability sampling method. The survey was conducted from June to August 2009. Web-based surveys have proven to be an objective and reliable instrument for gathering data (Roth 2006: 190, Morris *et al* 2004: 248, Brennan *et al* 1999: 83). The low costs of data gathering, potentially quick responses and the fact that web-based surveys have become easier to use and more flexible for both the researcher and the respondents, make this a popular method (Morris *et al* 2004: 248, Fricker *et al* 2005: 371). The profile of tourists correlates well with previous research conducted on tourists to South African national parks, and can therefore be regarded as representative.[7]

7   *Cf* Saayman *et al* 2008: 69, Hood 2009: 67, Oberholzer *et al* 2009: 20, Du Plessis *et al* 2009: 25.

2.3   Statistical analysis

The data capturing was done using Microsoft© Excel©; this was followed by an exploratory factor analysis conducted by means of SPSS (Statistical Package for the Social Sciences). Tabachnick & Fidell (2001: 25) and Field (2006: 619) describe factor analysis as a statistical method used to discover the dimensions of a set of variables by reducing the large number of variables to a smaller number of factors. An exploratory factor analysis more specifically combines the correlated variables.

The results of the principal component factor analysis using promax rotation revealed the presence of a six-factor structure with *eigen* values greater than 1. Six meaningful factors that emerged from the data were labelled fauna and flora; management; tourism impacts; aquatic impacts; tourist routes and trails, and tourism development. These six factors accounted for 82.82% of the total variances. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was also calculated to confirm whether the sample size was adequate for a factor analysis. A score of .928 was reported for the KMO statistic, exceeding the necessary threshold of 0.6 (Field 2006: 640). Cronbach's *alpha* coefficients were calculated for the six factors and scores ranged from .827 to .931, indicating an extremely high reliability of measurement for each of the six factors.

3.   Results

3.1   Socio-demographic profile

All the tourists in this sample had visited national parks at least once in the previous three years (2007-2009). Table 2 shows that a considerable number (16%) of tourists had made three visits in those three years. The respondents were mostly married, English-speaking and on average 44 years old. They originated mainly from Gauteng or the Western Cape, were well-educated, and occupied a professional or managerial position.

Table 2: Visitor profile

Home language	English (52%)
	Afrikaans (42%)
Age	35-49 years (40%)
	50-64 years (30%)
Marital status	Married (69%)
Province of residence	Gauteng (52%)
	Western Cape (19%)
Level of education	Matriculation (24%)
	Diploma/Degree (43%)
	Postgraduate (22%)
Occupation	Professional (19%)
	Managerial (19%)
Three visits in the past three years	16%

3.2 Factor analysis

In total, 99 impacts/constructs were used in the factor analysis. From these, six factors were extracted (*cf* Table 3).

Table 3: Factor analysis of main components (Pattern matrix)

Impacts	Factor 1 Fauna and flora	Factor 2 Management	Factor 3 Tourism impacts
Mean values	1.51	2.33	2.65
Cronbach *alpha*	.931	.920	.890
Specimen collection (tourist routes)	.784		
Introduction of alien flora/fauna (trails)	.783		
Introduction of alien flora/fauna (tourist routes)	761		
Specimen collection (trails)	.742		
Veld fires due to tourism	.685		
Flower collecting	.673		
Track/trail design not fitting into natural environment	.641		
Wildlife attracted to rubbish bins	.612		
Wood collecting by tourists	.608		
Plant collecting (routes)	.588		

Impacts	Factor 1 Fauna and flora	Factor 2 Management	Factor 3 Tourism impacts
Feeding of wildlife	.545		
Sewerage systems	.493		
Interference with wildlife feeding	.480		
Inappropriate waste disposal at restaurants		.723	
Restaurants not using local products		.712	
Brochures/information not on recycled paper		.679	
Use of non-renewable resources		668	
Lack of energy-saving measures		.656	
Use of non-renewable resources (tourist facilities)		.633	
Natural products not used for buildings		.632	
Lack of energy-saving measures		.607	
Noise pollution		.597	
Inadequate water-saving measures		.583	
Too many tourists in park at one time		.556	
Man-made structures not eco-friendly		.526	
Insufficient management of waste		.440	
Pollution at restaurants		.420	
Lack of eco-friendly transport		.409	
Poaching			.795
Road-kill due to speeding/reckless driving			.717
Erosion along routes caused by tourists			.717
Speeding staff and delivery vehicles			.690
Rubbish bins attract wildlife (rest camps)			.624
Interference with wildlife breeding			.624
Rubbish bins attract wildlife (tourist facilities)			.615
Overcrowding of tourists			.609
Supplementary feeding of wildlife			.542
Litter			.493

Factor 1: Impacts on fauna and flora

Impacts on fauna and flora included, among other things, "specimen collection (for example, butterflies and flowers)", "the introduction of alien plants and animal species by tourists", "veld fires" and the "impacts of flower collecting". Other studies showed similar results for this factor. It scored a mean value of 1.51 – the lowest mean value of the six factors, indicating that these environmental impacts were the least experienced by tourists.

Factor 2: Management

The second factor included managerial aspects such as "inappropriate waste disposal facilities at restaurants", "restaurants not making use of locally produced products", "not printing brochures and information booklets on recycled paper" and "impacts of using non-renewable resources (for example, plastic)". The relevance of this factor has been confirmed. The mean value of this factor was 2.33, the second highest of the six factors, indicating that these are problem areas experienced by tourists.

Factor 3: Tourism impacts

The third factor scored the highest mean value (2.65) of all six factors, thus representing the most important kind of environmental impact in national parks. This factor included impacts such as "poaching", "road-kill", "erosion" and "speeding of staff and delivery vehicles". Several studies support this factor.

Factor 4: Aquatic impacts

This factor was based on selected national parks connected with marine impacts. Important variables were "littering", "waste discharge by boats" and "uncontrolled fishing". Research on similar subjects supports this factor. With a mean factor value of 2.18, this factor indicates the visible environmental impacts of tourism on marine areas.

Factor 5: Tourist trails and routes

This factor involved impacts caused by tourist routes and trails, such as "dust caused by 4x4 vehicles", "erosion" and "fuel and oil leaks of tourist vehicles". It scored a mean value of 2.00, thus ranking fourth of the six factors. Studies done in protected areas revealed similar results, thus confirming the viability of the factor

Factor 6: Tourism development

This factor covered variables such as "erosion due to tourism development", "visual pollution" and "damage to natural vegetation in rest camps". Research has emphasised the importance of environmentally friendly development. This factor had a mean value of 1.93, ranking fifth of the six factors.
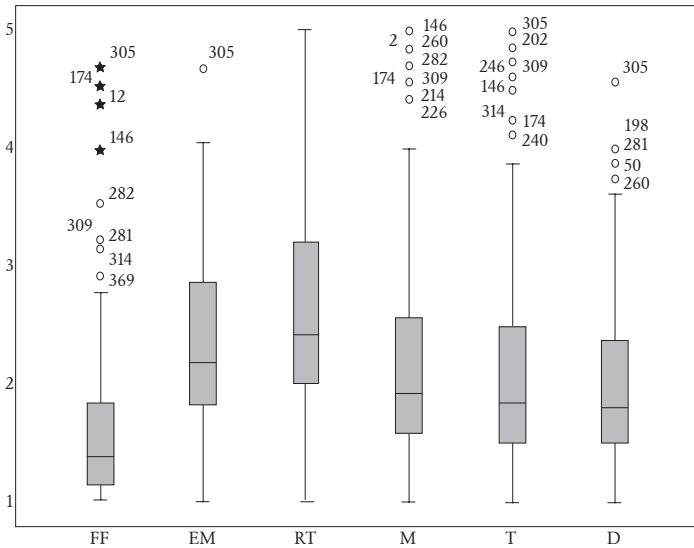

Figure 1: Box plot

The y-axis represents the Likert scale used, where 1= almost never; 2= occasionally; 3= often; 4= mostly; 5= almost always

The box plot in Figure 1 shows the position of the six factors in correlation with the five-point Likert scale used. The factors that lie closest to option 4 ("mostly") and 5 ("almost always") on the Likert scale are those perceived by tourists as being most harmful to the environment. The box plot therefore confirms the results obtained from the factor analysis and shows that the factors "management" and "tourism impacts" need management's attention in terms of environmental friendliness.

4.   Findings and implications

This study suggests that SANParks, as a leading conservation authority, needs to do a great deal more in terms of being environmentally friendly and thereby contributing to sustainability. First, results indicate that some gaps require management's attention. This could be the result of applying too many methods or approaches in order to ensure environmentally friendly products. Tourists perceived that waste management and the recycling of waste in national parks require attention. Similar studies conducted in other national parks confirm these issues.[8] The implication is that park management needs to implement policies that will address or avoid impacts, and dispose of waste properly. However, more specifically, it is clear that SANParks requires a holistic framework that addresses all issues raised by the research. Such a framework should be specifically developed for all national parks in order to guide policy development. The framework must take the results of the factor analysis into consideration, for example waste management. The problem of waste management could be dealt with in the following ways:

- Bins for recycling could be provided in both the accommodation units and the commercial areas. Three bins, labelled "organic", "recyclable" and "non-recyclable", should be made available to separate the waste prior to disposal. Recycled waste such as paper and glass can be used in the parks.

- SANParks should educate both tourists and their staff about the proper disposal of waste and about recycling by means of educational displays in tourist areas and by hosting workshops for staff. Games should be developed for children, specifically to teach them about the correct disposal of waste from a young age.

- Restaurants could also participate in the recycling of waste by developing organic gardens where the organic waste can be used as compost to reduce the production of solid food waste, and by purchasing food supplies in bulk, preferably from local producers, to reduce the amount of waste from packaging. A recycling plant could be installed to recycle the waste generated by tourists. A pilot

8   *Cf* Erdogan & Tosun 2009: 411, Spenceley 2005: 160, Buultjens *et al* 2005: 741, Lim & McAleer 2005: 1434.

project could be launched at the Kruger National Park. Although the recycling plant would be driven by SANParks, the community should be encouraged to manage the project. If this pilot project is successful, it could be implemented in other national parks.

Secondly, SANParks is not making proper use of renewable resources, for example forms of energy other than the increasingly scarce and expensive thermal electricity. Several researchers have confirmed this.[9] The implication of this finding is that park management should use alternative sources of energy (solar, wind, water and wave). For example, solar panels could be used to supply power to accommodation units.

Thirdly, tourists were of the opinion that more environmentally friendly products and practices should be adopted. Lim & McAleer (2005: 1432) also mention this need. Consequently, park management should:

- supply accommodation units with environmentally friendly products, such as biodegradable soaps and detergents;
- use paperless communication and billing systems where possible, or otherwise use recycled paper;
- provide maps, information and marketing material on recycled paper, where aesthetically acceptable, and
- encourage the general packaging of SANParks' products in an environmentally responsible manner.

Lastly, results also indicate that infrastructure development (accommodation units, restaurants, and so on) in the national parks has still not reached a stage where one could describe it as being environmentally friendly. Policies governing national parks should be amended to address this problem. Any new infrastructure should be designed to have minimal impact on the environment, as confirmed by previous research.[10] Examples of improvements include:

- New infrastructure should be non-permanent (tented wilderness camps), using natural building materials, and designed to fit into the immediate environment.

9   *Cf* Erdogan & Tosun 2009: 410, Spenceley 2005: 157, Li 2004: 562.
10   *Cf* Shafer & Inglis 2000: 81, Li 2004: 563.

- The use of natural light and natural ventilation should be encouraged in order to avoid using artificial light or air-conditioning.
- Recycled waste-water systems should be installed in new developments in order to release recycled ("grey") water back into the environment.
- Gardens surrounding the new developments should consist of indigenous fauna and flora.

5.   Conclusion and recommendations

This study sought to determine how tourists perceive the environmental impacts caused by tourism in South African national parks. A review of the literature revealed that considerable changes are taking place in the management of natural areas, particularly with reference to tourism. Recognition of the adverse environmental impacts of tourism has led to more environmentally friendly management approaches. The majority of environmental impacts identified in the reviewed literature were associated with the effects that tourists and their activities have on the natural resources of protected areas. This highlights the need to manage tourism in a more environmentally friendly manner. From the six factors identified in the factor analysis of responses to survey questionnaires, four areas for improvement were noted: better waste management; greater use of renewable energy sources; use of more eco-friendly products, and infrastructure development that would have a minimal impact on the environment (*cf* Figure 2).

This research has made the following contributions:

- It is the first study of tourism impacts on the environment as perceived by tourists visiting South African national parks. This research can therefore be viewed as a benchmark in this field of research and will therefore contribute to the literature on sustainable management of national parks and other nature-based tourism enterprises in South Africa.
- The results provide insights into how tourists perceive the environmental management of South African national parks. These findings are important, since SANParks is a leader in conservation, and tourism in parks is dependent on the environment.
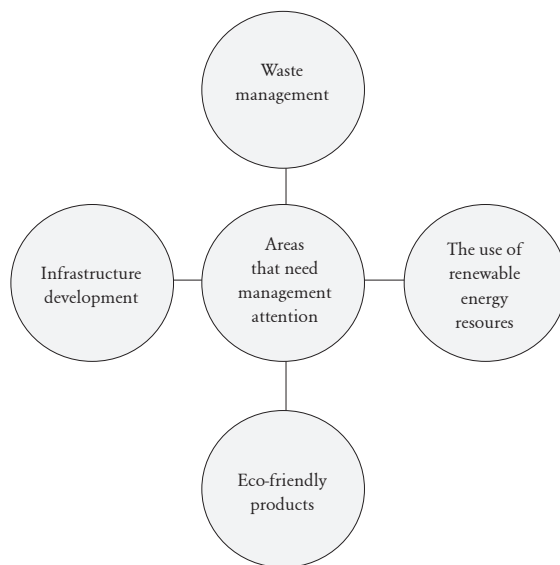
Figure 2: Four areas for improvement

Further research is needed to determine, more specifically, the perceptions of environmental impacts within each national park and how to effectively educate tourists to national parks about environmental issues, in order to reduce environmental impacts. An in-depth understanding of the relationship between tourism and the environment is needed. It is therefore recommended that this type of research be conducted on an ongoing basis in order to monitor the environmental impacts of tourism in South African national parks.

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