

Astrotourism in The Mara

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Astrotourism offers the night sky as a product and service to be sold to tourists. We present the implementation of astrotourism in the Maasai Mara National Reserve, a renowned game park on the border of Kenya and Tanzania. By the formation of partnerships with private members of the hospitality industry, we have been able to take the first steps in the establishment of a thriving astrotourism industry in Kenya. We have leased a telescope to two lodges and conducted basic astronomy training to the staff of those lodges in the reserve known as The Mara. This training is meant to augment the traditional wildlife tourism of the area. Our team is currently assessing the viability of the product as a business model, and we are in talks with representatives from the University of Dar es Salaam on the possibility of introducing a similar product in Tanzania.

Introduction

The Kenyan tourism industry is one of the largest sources of revenue for the country (Sindiga, 2018). Kenya's ideal equatorial location, low light-pollution in rural areas and relatively dry climate make it a strong candidate for astrotourism. Kenya also has the highest unemployment rate in East Africa, with 9.2% of Kenyans being unemployed. The youth (15-24) unemployment rate is a staggering 17.6% (UNDP, 2019). With more young people graduating each year and the job pool only becoming more competitive, it is important to develop new industries that can provide young Kenyans with stable, secure jobs. This motivated the formation of the astrotourism project Sayari ("Planet" in Swahili).

Sayari is meant to ignite and give weight to the astrotourism industry in Kenya. Astrotourism has been explored as an economic possibility in South Africa (Jacobs, 2019) and Namibia (Gairiseb, 2019). By

introducing astrotourism into the national park with the most tourist traffic (which are more frequented by tourists than nearby villages and town), Sayari aims to generate

local community development, employment opportunities and revenue.



Figure 1. The Sayari team who are part of the DARA-Kenya Cohort 3 students attend the DARA networking meeting in Muldersdrift, South Africa. Credit: Sayari

Astrotourism is a service industry which relies on two forms of knowledge. The first is local knowledge of the night sky otherwise known as ethnoastronomy (Holbrook, Medupe, & Urama, 2008). The second is an appreciation for the night sky in the modern scientific paradigm. Thus, it can be argued that the night sky is not the product being sold, but knowledge. It was this that informed us of the need to begin Sayari by conducting training in the local lodges.

Training

The Sayari team trained guides from two lodges based in the Maasai Mara National Reserve in Narok County, Kenya. Two four-day long trainings were conducted concurrently at Governors' Camp Mara and Ashnil Mara Camp in the Maasai Mara Game Reserve. Training took place between the 27 November and 1 December 2018. A team of eight students travelled to the Maasai Mara Nature Reserve. Four trainers placed at each camp trained the lodge guides. The lodge guides were permanent staff in the lodges. They were then trained in basic optical astronomy and modern scientific knowledge of celestial bodies to enable them to educate the visiting tourists. Each lodge was also provided with a telescope. The trained guides are expected to also conduct outreach sessions within the local community to educate community members about conservation and light pollution (Holker, 2010a).

At both camps, we were able to train ten guides. Some of the guides who attended the training had some prior experience with astronomy and physics which made con-

tent dissemination easy. The guides were enthusiastic and motivated to learn during training. They confessed that they did not consider dark skies as an important concern of conservation. During the training we emphasised the value of dark sky conversation (Walker, 2010), pointing out the importance of dark skies to human and animal sleep patterns (Holker, 2010b), which the guides reported to have found illuminating. The Maasai Mara is in an excellent position to promote dark sky awareness, as it is one of Kenya's main tourist attractions, and we found that it already has sustainable ecological practices in place.

Outcomes

Increased Understanding of Science

Almost all of our trainees had very limited prior knowledge of theoretical and practical astronomy. After the training they could confidently differentiate between properties of various celestial bodies, use mobile phone applications to track celestial objects, and even identify specific objects in the night sky.

Increased Revenue from Tourism

The short term increase in revenue from the lodges will be tracked for a span of one year from their implementation of astronomy in their tourism packages. The long term increase might be harder to monitor, but we expect it to be correlated to the increase in the number of trained guides (trained directly by our team or through a guiding school if we can get our training content certified as a short course). One

camp has begun a pilot test of the programme and the team will work with them as they finalise the implementation.

Challenges & Recommendations

Complexity of Content

Astronomy is a vast field of knowledge. It was challenging to find the right balance in terms of how much detail to go into and what to omit. We also did not know the extent of our trainees' science background. They absorbed most of the material well, but there were instances where they were encountering challenging concepts for the first time. This can be remedied by formalising the course content and teaching it in a tourism guiding school. This can then be taught over an extended period of time.

Monitoring

Most of the students engaged in the preparation and implementation of the project have since left for further studies out of the country. We are currently in search of a contact in Kenya to help us monitor the impact of the project in the long term.

Sourcing of Local Ethnoastronomy Stories

From our interactions with the tourists, we have realised that a large part of their experience is immersion in local culture. This includes an interest in local ethnoastronomy. The Plain Nilotes residents in the area have a rich ethnoastronomy tradition which will be explored in later work. Implementations of a similar pro-



Figure 2a & 2b. The Sayari team prepares to travel to Maasai Mara, a game park in southwestern Kenya. Credit: Sayari



Figure 3. The Sayari team during a public outreach mission in Kirisia Boys High School in the town of Maralal, Kenya. Credit: Sayari team

ject should strive to add a local flavour to it by researching local myths and legends about the stars, planets and constellations.

Conclusion

We have explored the possibility of introducing astrotourism in two lodges in the Mara. While judgement of the sustainability of the project cannot yet be made, there are positive signs of astrotourism developing into a product in the Mara. In the long run, we hope to apply for a dark sky status (Welch & Dick, 2012) in the game reserves, especially for those located in the Southern Rift Valley (Maasai Mara) and towards the equator (Laikipia, Samburu, Maralal, and Sibiloi National Parks). Having dark sky preserves across Kenya is expected to increase the revenue from tourists by the diversification of products sold. We are currently in talks with astronomy academics in Tanzania who are interested in running a similar project in Tanzania.

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Biography

Dennis Kulvinder is a telecommunications engineer with interest in radio astronomy. He holds a bachelor's degree in telecommunications from Kabarak University. He is the current Sayari Coordinator.

Brian Bichang'a is a student at the University of Cape Town pursuing a research master's degree in astronomy. He is a beneficiary of the South African Research Chairs Initiative (SARChI) South African Astronomy Observatory (SAAO)/National Research Fund (NRF) scholarship.

Maurice Wafula works at KOKO Networks as a calibration technician, a venture-backed technology company operating in East Africa and India. Maurice is a trained DARA student.

Eric Meli holds a bachelor's degree in astronomy and astrophysics from the University of Nairobi. He is also a graduate of DARA's basic training programme.

Bonface Osoro is a master's student in the University of Strathclyde doing satellite applications with data science. Previously, he studied geospatial engineering at the Technical University of Kenya.

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Paul Akumu is currently working on an MPhil/PhD project, setting up an array of parabolic antennas for the Mauritius Radio Telescope (MRT) site for radio astronomy experiments at the University of Mauritius.

Alex Orieko holds a bachelor's degree in astronomy and astrophysics from the University of Nairobi. He is currently working for Airtel Communications Limited.

Kioko Mutisya holds a bachelor's degree in electrical and electronic engineering from the Jomo Kenyatta University of Agriculture and Technology.

Carringtone Kiyanjui is a master's student at the University of Manchester studying science policy and communication under DARA-Big Data. He holds a Masters of Science in physics (theoretical) from the University of Nairobi.

Samyukta Manikumar has a Bachelor of Science (Honors) in Applied Mathematics, with a focus on cosmology, from the University of Cape Town. She has also been trained in radio astronomy through the DARA programme.

Professor Paul Baki is the Chairman of the Department of Physics at the Technical University of Kenya. He is also the national point of contact for DARA in Kenya. He was the principal investigator of the Sayari project.