Geothermal Tour Management

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ABSTRACT

The geothermal industry is a combination of many disciplines and one of them is travel & tourism industry. From hot water swimming pools to spas to mud pools, geothermal tourism, field trips or excursions are an integral part of geothermal industry. People who conduct geothermal tours within the geothermal industry are often geothermal experts, professors, lecturers or course co-ordinators who sometimes lack the exact tour management skills. There are many geothermal experts in geothermal industry similarly there are many tour managers in the tourism industry but as of now there is no concept of a Geothermal Tour Manager with both geothermal and tour management skills. A Geothermal Tour Manager could be seen in two different ways. First a person can be an exclusive Geothermal Tour Manager or second a geothermal expert can have tour management as an additional skill apart from his or her regular geothermal work.

This paper is about need of a Geothermal Tour Manager, their training and scope of work. It is comparatively easier to create a Geothermal Tour Manager out of an existing geothermal expert by organising workshops than teaching an existing tour manager all about geothermal engineering and earth science. The idea is to bridge the gap between geothermal and travel & tourism industry. A geothermal expert has a good knowledge of his respective area of study for example geophysics or geochemistry or drilling engineering but he or she somewhere lacks good overall knowledge of the country, city or location with respect to parameters like local cuisines, brief history, demographics, accommodation, transportation, food and other important and interesting things. According to International Geothermal Association there are 83 geothermal countries so it would be good if initially there could be a team of geothermal tour manager in every country who would also take the responsibility of further training and creating multiple teams of tour managers as per requirement in every concerned organisation.

1. Introduction

Geothermal industry is about the development and utilization of geothermal resources around the world, the two main areas of utilization of geothermal resources are electricity generation and the direct use of geothermal resources which further includes farming, aquaculture, dairy, crop drying, cosmetic products, wellness and travel.
Tourism industry is all about travel and exploring places of interest, different kinds of food, culture, history, recreational activities. One of the main areas of tourism industry is geotourism which is all about exploring different geographical landforms, islands, beaches, mountains, rivers, volcanoes, plateau, basin and many more.

When we combine the two industries we get into the geothermal tourism industry which mainly includes exploring geothermal areas a unique environment of its own. A country which has geothermal resources is often called a geothermal country there are 83 such geothermal countries and geothermal tourism is one of the main areas of tourism in these countries. Geothermal tourism is often associated with volcanoes, hot pools and spas and some of the casual relational activities such as bathing, egg boiling, cooking and more serious activates such as wellness and medical treatment. Geothermal tourism is an organized tourism in many countries and still untouched in many other countries.

There are two terms associated with tourism industry which are tour guide and tour managers who are responsible for conducting and managing tours but as of today there is no concept of a geothermal tour guide or geothermal tour manager. Hence, there is a good opportunity of capacity building and creating human resource which can act as a bridge between geothermal and tourism industry which could be called a geothermal tour manager especially in countries which are still in early stages of development of geothermal and geothermal tourism.

A Geothermal Tour Manager could be seen in two different ways. First a person can be an exclusive Geothermal Tour Manager or second a geothermal expert can have tour management as an additional skill apart from his or her regular geothermal work. This paper further deals with the different aspects of a Geothermal Tour Manager, their training and scope of work.

The concept of geothermal tour management is not there, all the existing literature deals with geothermal tourism or volcanic tourism. They mostly talk about the geothermal areas their development and utilization but none of them talk about how the tours show be conducted and essentials of geothermal tour management. Many countries have developed geothermal tourism and there are many literatures on geothermal tourism or volcanic tourism but there is no literature dedicated specifically to geothermal tour management. A simple Google search also doesn’t come up with the terminology “geothermal tour management” it either shows geothermal tourism or tour management.

2. Geothermal Tour Management

It is comparatively easier to create a Geothermal Tour Manager out of an existing geothermal expert by organizing workshops than teaching an existing tour manager all about geothermal engineering and earth science.

A geothermal expert has a good knowledge of his respective area of study for example geophysics or geochemistry or drilling engineering but he or she somewhere lacks good overall knowledge of the country, city or location with respect to parameters like local cuisines, brief history, demographics, accommodation, transportation, food and other important and interesting things.
2.1. Four Main Areas of Training for Geothermal Tour Managers

2.1.1 Geothermal Tour Operations.

2.1.2 Study material for Geothermal Tour Manager.

2.1.3 Geothermal Tour Itinerary.

2.1.4 Geothermal Tourism Catalogue.

2.1.1. Geothermal Tour Manager Operations

Conduct of a Geothermal Tour Manager:

There are some basic guidelines that every tour manager needs to follow in the tourism industry keeping in mind the customers from diverse background with different need. A smart positive image is important to any professional organization and same applies to the tourism industry as well. The tour manager should create a positive image of geothermal industry at all times and spread awareness about the benefits of geothermal development and utilization during the tours. He should be responsible for the comfort and safety of the group members and make sure they enjoy every moment of the tour with talks about culture, history, scientific and interesting facts about the place.

Travel and Transport:

It is an integral part of any tour operations the tour manager should be aware of all the procedures of airport like visa, boarding, baggage, quarantine procedures, meals, security, flight arrival and departures, pickup, tour member name list with contact numbers, safety and security procedures, dos and don’ts. The same applies to travelling in coach or by bus and a good coordination with the driver or the caption of the coach. It is important to talk with the drive in advance about the itinerary and stick to it. If the tour group is getting off the coach for sightseeing or meals announce not to leave any valuables specially passport and such important things. Group count is very important to insure that no one is left behind better if done twice or thrice.

Accommodation and Stay:

It is important to reconfirm hotel bookings to avoid any inconvenience, Check-in and Check-out of a group takes take time so special attention should be given and tour group should be accordingly informed to remain calm and cooperate. The tour manager should collect all the room keys from the reception and hand it over to the group members one by one. It will be good if the accommodation has access to geothermal hot pools and spa so that the tour group can enjoy the same.

Meals:

Proper and on time meals are very important during tour as the group member should not feel hungry during the tour and at the same time should eat light as to avoid laziness. The tour group should be informed about the meal so that people don’t eat something they should not
due to personal, cultural or medical restrictions. There should be enough seating for all the group members in one designated area in a restaurant. If available and possible they should be offered meals cooked in hot geothermal water such as rice or eggs.

**Briefing:**

A good tour briefing is the most important part of the tour. It will create an image of the entire tour. It should include all the safety and security procedures in a geothermal area.

**Time Management:**

The tour manager should always stick to the time one needs to spend at the location. It is important to leave the hotel on time and reach the hotel back on time so that the group can get proper rest. It is also necessary to keep some time for the recreational activities at the geothermal locations. The tour manager himself needs to be on time to set an example for others.

**Crisis situations management:**

Geothermal area are often dangerous as there is boiling hot water and chances of subsidence of the surface so one should always be ready for a crisis situation, first aid and emergency facilities such as number of nearest hospital and police station in case of any mishap. The tour manager should always stay calm and must never panic in such situation and handle it with maturity. The tour group should always be alerted and be informed on regular intervals and at the same time not to scare them.

**Geothermal responsible tourism:**

Geothermal is a fragile environment and regular tourist visits in large numbers could degrade the environment so the tour should be conducted accordingly.

### 2.1.2. Study Material for Geothermal Tour Manager (tentative format)

- General Country Information

<table>
<thead>
<tr>
<th>Name of the Country</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Capital city</td>
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<tr>
<td>Area</td>
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<tr>
<td>Population</td>
<td></td>
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<tr>
<td>Neighboring countries</td>
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<tr>
<td>Currency</td>
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<td>Calling code</td>
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<tr>
<td>Area</td>
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<tr>
<td>Official Languages</td>
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<tr>
<td>National animal</td>
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<tr>
<td>National flower</td>
<td></td>
</tr>
<tr>
<td>National bird</td>
<td></td>
</tr>
<tr>
<td>Rivers</td>
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<tr>
<td>Lakes</td>
<td></td>
</tr>
</tbody>
</table>
2.1.3. Geothermal Tour Itinerary (tentative format)

- General Information
- Geothermal Tour Sites
- Accommodation and Stay
- Meals
- Itinerary

Day 1 Information
Day 2 Information
Day 3 Information
Day 4 Information
Day 5 Information
  - Points to be Noted
  - Terms and Conditions

2.1.4. Geothermal Tourism Catalogue

Geothermal tourism catalogue will include geothermal country map and a picture of each of the geothermal areas with a brief description of geothermal potential and use of geothermal. It will also include some of the general information about the country as mentioned in the study material.
3. Target Audience

School Student
College Students
University Students
Conference Events
Common Tourists

4. Discussion:

The four main areas of geothermal tour management training include the guidelines for tour manager, study material, itinerary and geothermal tourism catalogue. The study material will include general information about the geothermal country and some other necessary information. It will further include the information related to all the geothermal sites available in the country such as geothermal parameters and utilization of geothermal resources. The itinerary for the tour will include activities for each day. Here only one itinerary has been mentioned but there could be multiple short and long itineraries based on the requirement which may or may not include all the geothermal areas but some of the geothermal areas. For example there could be an itinerary only for direct use geothermal facilities or only for electricity generation but there will be a master itinerary which will include all the geothermal locations in the country. The fourth and the last part will be a geothermal tour catalogue which will include some of the information from the study material with a picture of the geothermal site. It will be mainly used as a marketing tool for promotion of geothermal tourism for the country.

An example of Geothermal tour management in Kenya based on the above format has been given ahead for better understanding of the idea of geothermal tour management. Here the general information of Kenya has been given followed by some other information like cuisines and interesting facts about Kenya. The information has been given as an example and it need to be thoroughly researched for each and every country for which the study material, itinerary and catalogue has to be made. Kenya has almost fifteen geothermal areas as per the geothermal map of Kenya so information for all the fifteen areas needs to be researched and added to the study material. Similarly there will be a master itinerary which will include all the fifteen geothermal areas including accommodation facilities for each geothermal site and the meals that will be provided while on tour. Out of this one master itinerary several small itinerary could be made as per requirement such as location, budget, geothermal use, and target audience such as for school or college or university students or conference events.

The tour manager should as much as possible remember each and every information in the study material and the entire itinerary by heart and must not depend on accessing the study material all the time. This entire geothermal tour management could be included as an additional paper in all the geothermal courses currently running across the world which would give the students an additional skill and job opportunity and human resource to the geothermal organizations.

I myself have a postgraduate degree in geothermal and a certificate in world tour management so this is how I came up with this idea of bridging the gap between geothermal
industry and tourism industry as I always felt the need to have more knowledge about the country in general apart from all the geothermal knowledge and the skills to conduct a geothermal tour.

It would be good if initially there could be a team of Geothermal Tour Manager in every country who would also take the responsibility of further training and creating multiple teams of tour managers as per requirement in every company or concerned organisation.
5. Geothermal Tour Management in Kenya: (as an example)

5.1. Study Materials for Geothermal Tour Manager

5.1.1 Country Information

<table>
<thead>
<tr>
<th>Country Name</th>
<th>Republic of Kenya</th>
</tr>
</thead>
</table>
**Capital City** | Nairobi City  
--- | ---  
**Major Cities** | Nairobi, Mombasa and Kisumu  
**International Airport** | Jomo Kenyatta International Airport, Eldoret International Airport, Moi International Airport, Kisumu International Airport  
**Area** | 591,383 sq km  
**Population** | 50 million (2020)  
**Neighboring Countries** | Ethiopia, South Sudan, Uganda, Tanzania, Somalia,  
**Currency** | Kenyan Shillings  
**Calling Code** | +254  
**Official Languages** | English, Swahili  
**GMT Difference** | GMT +3  
**Rivers** | Nile, Tana, Ewaso Ngiro, Dawa, Mara, Athi-Galana-Sabaki, Turkwel, Nzóia.  
**Lakes** | Turkana, Baringo, Naivasha, Natron  
**Mountain** | Mt Kenya, Mt Elgon, Aberdare Range, Cherang'any Hills, Chemnirot, Mount Ng’iro, Mount Kulal  
**Important Geographical Features** | Great Rift Valley, Kenyan Highlands  
**Climate** | Tropical climate with sunshine all year round, with two rainy seasons. Long rains from April to June and short rains from October to December.  
**Ethnic Groups** | Kikuyu, Luhya, Luo, Kalenjin, Kamba, Kisii, Meru  
**Religion** | Christianity, Islam, Indigenous belief, others  
**Government** | Semi presidential republic  
**Major Industries** | Consumer goods, agricultural and farming, crude oil, manufacturing, tourism.  

### 5.1.2 Brief History of Kenya

Kenya is known as the birthplace of human ancestors. The modern history of Kenya did not start until the Cushitic people of North Africa moved into present-day Kenya around 2000 BC. Thousands of years later, around 200 AD, the Bantu people arrived and settled along Kenya’s coast. Later between 10th and 14th centuries, the Nilotic people or the people of the Nile valley arrived and occupied the Great Rift Valley planes. With the arrival of Vasco da Gama in April 1498 the Portuguese became the first Europeans to explore the region of current-day Kenya. Portuguese went on to construct Fort Jesus in Mombasa in 1593 but soon the Portuguese influence was clipped by the English, Dutch and Omani Arab incursions into the region during the 17th century. Later Arab, Shirazi and coastal African cultures created an Islamic Swahili culture. Imperial Germany set up a protectorate over the Sultan of Zanzibar's coastal possessions in 1885. Germany handed its coastal holdings to Britain in 1890, in exchange for German control over the coast of Tanganyika. British government on 1 July 1895 established direct rule through the East African Protectorate, subsequently opening the fertile highlands to white settlers in 1902. Mau-Mau Uprising during 1952 – 1960 was a major revolt against the British rule in Kenya. The independent Republic of Kenya was formed in 1963. Kenya was ruled by one-party state by the Kenya African National Union, led by Jomo Kenyatta from 1963 to 1978. He was succeeded by Daniel Arap Moi who ruled as President from 1978 to 2002. Mwai Kibaki, was the third President of Kenya, serving from...
December 2002 until April 2013. Uhuru Kenyatta is the incumbent president, since 9 April 2013. He is the son of the first president, Jomo Kenyatta.

### 5.1.3 Common Phrases

<table>
<thead>
<tr>
<th>English</th>
<th>Swahili (Kiswahili)</th>
<th>English</th>
<th>Swahili (Kiswahili)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hello</td>
<td>Habari</td>
<td>Thank you</td>
<td>Asante</td>
</tr>
<tr>
<td>Good morning</td>
<td>Habari za asubuhi</td>
<td>Please</td>
<td>Tafadhali</td>
</tr>
<tr>
<td>Good evening</td>
<td>Habari za jioni</td>
<td>Thank you very</td>
<td>Asante Sana</td>
</tr>
<tr>
<td></td>
<td></td>
<td>much</td>
<td></td>
</tr>
<tr>
<td>Good night</td>
<td>Usiku mwema,</td>
<td>How are you</td>
<td>Hujambo</td>
</tr>
<tr>
<td></td>
<td>alamsiki</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Okay</td>
<td>Sawa</td>
<td>I am fine</td>
<td>Sijambo</td>
</tr>
<tr>
<td>Yes</td>
<td>Ndiyo</td>
<td>Excuse me</td>
<td>Samahani</td>
</tr>
<tr>
<td>No</td>
<td>Hapana</td>
<td>Sorry</td>
<td>Samahani</td>
</tr>
<tr>
<td>See you</td>
<td>Tutaonana</td>
<td>Do you speak</td>
<td>Unasema Kiingereza</td>
</tr>
<tr>
<td></td>
<td></td>
<td>English</td>
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</tbody>
</table>

### 5.1.4 Interesting Facts

- Kenya is located in East Africa, on the equator.
- The “Big Five” is a term that is used to refer to the 5 African animals that early big game hunters considered most difficult and dangerous animals to hunt on foot in Africa. These animals include the African elephant, lion, leopard, Cape buffalo, and rhinoceros.
- Masai Mara Nature Reserve is best-known for the Great Wildebeest Migration when, every year, more than a million wildebeest, zebra and antelope migrate clockwise around the Serengeti-Masai Mara ecosystem.
- Mount Kenya is the highest mountain in Kenya and the second-highest (after Mt Kilimanjaro) in Africa.
- Kenya shares Lake Victoria, the world's second largest fresh water lake, with Tanzania and Uganda.
- Agriculture is important to Kenya's economy, especially tea, coffee and flowers.
- Hydroelectricity is the largest contributor to Kenya's electricity supply.
- Kenya is one of the top ten Geothermal electricity producing countries in the world.

### 5.1.5 Cuisines

Kenya’s long standing relationship with foreign settlers such as British, Arabs, Europeans, Indians and Pakastani’s have greatly influenced its food. The dishes in Kenya are diverse and are a mix of ethnicity and tradition.

Ugali is a Kenyan staple. It's a dish made of maize flour, though it's sometimes made of millet or sorghum flour. It's made by adding the maize flour to boiling water until you get a dough-like consistency. It's a bodybuilding food and a good source of iron.
Sukuma wiki is a dish made of collard greens, and sometimes people confuse it with kale. Ugali can be eaten with sukuma wiki. It's a dish in which collard greens are cut into thin slices and sautéed along with onions and tomatoes. It's a simple dish but full of flavor. Sukuma wiki, when translated into Swahili, means "week-pusher." It is called this because it's an affordable meal.

Nyama choma is roasted meat, and it's one of Kenya's most beloved dishes. It is usually served with kachumbari salad and ugali. Only salt and pepper are used to season this dish. It's one dish that should be purchased from a Kenyan street vendor in order to enjoy it to the fullest.

Chips Mayai is basically a combination of French fries and an egg omelet. It's considered junk food. It is served with kachumbari and tomato sauce.

Githeri is a one-pot meal made up of corn and any kind of bean. It can be eaten plain or with onions, tomatoes, and seasonings of your choice. It is very easy to make and is one Kenya's nourishing staples.

Mandazi is an African doughnut. It is cooked by frying dough in oil. Sometimes coconut milk is added into the dough for flavor. The main ingredients are flour, milk, eggs, yeast, and sugar to taste. It's incredibly tasty and goes well with tea.

Tilapia is widely eaten fish and very popular in Kenya because it is readily available and affordable. It is deep-fried and served with kachumbari, ugali, or pilau. This fish is rich in nutrients like vitamin A, omega-3 fatty acids, and protein.

Pilau is one a popular Kenyan dish as well. It is served at almost all social gatherings. It is rice cooked in a flavored broth with meat, chicken, or vegetables. I love this food because of the various spices used, and it's incredibly flavorful.

Chapatis are soft and layered flat breads that are eaten in many East African homes. It is very light and is eaten with tea, beef stew, or beans. I can say, without a doubt in my mind, that Kenyan chapatis are one of the best chapatis you will ever eat.

Kachumbari is a refreshing salad made of fresh tomatoes, onions, green chillies, coriander, a few drops of lemon juice, and salt as desired. It's a great dish when combined with grilled meats.

Mukimo is a tasty staple food cooked by mashing green peas, potatoes, maize, and pumpkin leaves or spinach leaves all together. Sometimes beans can be used as a substitute for green peas.

Bhajiyas are a popular snack in Kenya. They're made by slicing boiled potatoes into thin, circular slices, dipping them into a seasoned gram flour batter, and then deep-frying them. They're served hot with ketchup or other homemade sauces. They're very crispy and very filling. They taste incredible and are one of my favorite evening snacks.

Samosas are triangular-shaped pastries that are deep-fried and usually filled with minced meat. The fillings can also be potatoes or peas. This dish is very flavorful, and it's a perfect evening snack to have with tea.

Maharagwe is red kidney beans cooked in coconut milk. It is served hot with ugali, rice, chapati, or even mandazi. It can either be sweet or savory.
Matoke is a dish made up of green bananas, meat, tomatoes, onions, capsicum, spices like cayenne pepper, salt to taste, and garnished with coriander. It's very healthy and also affordable.

5.1.6 Geothermal Potential and Uses in Kenya

Kenya has geothermal potential of about 10,000 MWe out of which a total installed capacity is 1,193 MWe for electricity generation. The Government of Kenya plans to have 5,000 MWe on line by 2030. The Olkaria Geothermal Field is producing the most geothermal power. The Menengai & Bogoria – Silali Geothermal Field are under development. Kenya has several other geothermal fields namely Barrier, Namarunu, Emuruangongolak, Silali, Paka, Korosi, Baringo, Bogoria, Arus, Eburru, Longonot, Suswa, Akiira One, Lake Magadi, Homa Hills, Badlands and Mwananyamala.

Direct use of geothermal energy in Kenya includes geothermal heated greenhouses for flower farming, tomato farming etc. Geothermal spa and swimming pool, Pyrethrum crop drying, Fish farming, Milk Pasteurization, Laundry and many more.

5.1.7 Geothermal Map of Kenya
5.1.8 Geothermal Areas

Magadi: Magadi is Swahili word for Soda it the name of a township and a lake which lies close to the Kenya Tanzania border area. Magadi is northeast of Lake Natron in Tanzania. Magadi Township lies on Lake Magadi’s east shore, and is home to the Magadi Soda Company, now owned by Tata India. This factory produces soda through evaporation of lake water in sections. Magadi area also has hot springs where tourists often go for camping and bathing. Magadi was a filming location for Fernando Meirelles's film The Constant Gardener, although in the film, the shots are supposed to be at Lake Turkana, which are actually at Lake Magadi.

Suswa: Mount Suswa is a shield volcano in the Great Rift Valley, Kenya. It is located between Narok and Nairobi, the capital of Kenya. Suswa town is just northwest of the mountain and it is the main access point for visits to the mountain. Mount Suswa has a unique double crater with a moat-like inner crater surrounding a tilted block of rock. The mountain is
also known for its lava tubes on the northeast side of the outer crater. It is possible to drive up the lesser-end of the mountain into the outer crater with a four-wheel-drive vehicle or motorbike; however, there are numerous barricades across the trail where local Masai try to collect a fee for allowing you through. Arrangements can be made to pay a set fee and get a guide to take you past the barricades. It is also possible to climb the mountain, which has a 2,356-meter summit. There are no specified paths, but Mount Suswa is best accessed from the mountain from the north and northeast. Also, there are many Masai homesteads surrounding the base of the mountain. With the exception of Rauch's Trail, there are no designated pathways to the summit. The peak can be reached on foot by following Rauch's Trail, which begins approximately one-and-a-half kilometers from the summit, from the northeast. Rauch's Trail is marked with a wooden sign, overlooking the crater. The network of lava caves on the east side of the mountain can also be visited and some of these caves are inhabited by baboons. The BBC documentary 'The Great Rift: Africa's Wild Heart', shows baboons entering one of these caves to seek shelter from leopard; this underground chamber in the rocks has been nicknamed 'baboon parliament'.

Longonot: Mount Longonot is a stratovolcano located southeast of Lake Naivasha in the Great Rift Valley of Kenya, Africa it contains a large 8 x 12 km caldera formed by vast eruptions of trachytic lava some 21,000 years ago. It is thought to have last erupted in the 1860s. The current summit cone was developed within the earlier caldera. This cone itself is capped by a 1.8 km crater. The Mountain has several parasitic cones and effusive lava eruptions occur on the flanks and within the caldera floor. Its name is derived from the Maasai word Oloonong’ot, meaning "mountains of many spurs" or "steep ridges". Mount Longonot is protected by Kenya Wildlife Service as part of Mount Longonot National Park. A 3.1 km trail runs from the park entrance up to the crater rim, and continues in a 7.2 km loop encircling the crater. The whole tour (gate-around the rim-gate) of 13.5 km takes about 4–5 hours allowing for necessary rest breaks - parts of the trail are heavily eroded and very steep. The gate elevation is around 2150 m and the peak at 2780 m but following the jagged rim involves substantially more than the 630 m vertical difference.

Olkaria: The Olkaria volcanic complex is the main geothermal area in Kenya. The rocky outcrops are dominated by rhyolite flows and pyroclastics of which the youngest is the Oloobutot rhyolite obsidian flow. The landscape is also dotted with volcanoes. The structural systems at Olkaria are dominated by reactivated old rift structures that trend NW-SE and younger near N-S faults. The NW-SE structures are more common in the west where they merge into the Pliocene Mau escarpment and end within the Olkaria area. These reactivated oblique structures form the most important reservoirs for the Olkaria geothermal system. The younger N-S faults formed loci for recent volcanic eruptions, e.g. Oloobutot lava flow. Since these faults are more open, they provide channels for shallow ground water recharge into the geothermal systems. The heat source for the Olkaria system is due to shallow discrete magma bodies associated with the surface rhyolites while the reservoir is hosted within ‘flood’ Trachyte. Most of the geothermal area has been heavily drilled and produces the current 862.5 MW with a further 223.3 MW under development. Plans are underway to explore the areas outside the exploited area.

Oserian: Oserian meaning "Place of Peace" in local Masai language is a flower farm on the south shores of Lake Naivasha. It is Africa's largest rose producer. Originally a country estate, the Moorish-style mansion was built in 1927 by Major Cyril Ramsay-Hill, a rancher, former officer in an Indian regiment, and sometime Hollywood actor. In 1969, Oserian was established as a small vegetable growing farm. In 1982, it became the first flower farm on
Lake Naivasha. Oserian Development Company Ltd owns and operates geothermal power plants for own use in the greenhouses and farm installations. The Company installed a 1.8 MWe binary plant in 2004 using steam from well OW-306 that was drilled as an exploration well by KenGen but was not used due to long distance to KenGen power plants. In 2006, the Company installed a second 1.8 MWe backpressure power plant for own use. The plant uses steam leased from KenGen.

Eburru: Eburru geothermal field is located to the north of Olkaria in an area of high physiography marked by the Eburru hills. Detailed surface studies were undertaken in the 1980’s which culminated in drilling of three exploration wells in 1990-1991 which confirmed existence of a geothermal system under the mountain. Subsequently three appraisal wells were drilled which indicated that the resource is small and is restricted to an area defined by a ring of explosive craters measuring 4-km in diameter. Out of the wells drilled, well OW-01 encountered over 250° C is able to sustain discharge of more than 2.52 MWe while the others either flow low enthalpy fluids are non-productive. However, MT/TEM surveys undertaken after drilling of the wells refined the old model. An additional 25 MWe is planned for development. The Eburru geothermal field is managed by KenGen. Detailed surface studies carried out between 1987 and 1990 by KenGen resulted in the drilling of six exploration wells between 1989 and 1991. One of the wells recorded temperatures of over 250° C with an output of 2.5 MWe. Further studies involving the combination of MT data and data from drilled wells indicated that Eburru field has a geothermal potential of more than 50 MWe. In 2011, KenGen commissioned a 2.52 MWe wellhead generating unit. In 2016 and 2017, KenGen carried out more detailed exploration studies in the larger Eburru area. Currently, plans are underway to drill appraisal and production wells.

Menengai: GDC developed pilot direct use facility at Menengai geothermal field that includes greenhouse heating, geothermal operated laundry, aquaculture pond heating and geothermal milk pasteurization. In the project, geothermally heated water from well MW-03 at 90°C is cascaded through laundry, milk pasteurizer, aquaculture and finally greenhouse after which the water is re-circulated. The greenhouse has tomatoes and capsicum. GDC has also installed a grain dryer to demonstrate use of geothermal heat in drying agricultural produce. Three IPPs have entered into a steam sales agreement with GDC for power generation. Each of the IPPs will install a 35 MWe power plant and GDC is the Steam-field developer. So far, 49 wells have been drilled with 25 tested providing an estimated potential of about 170 MWe. The development of Menengai geothermal power plant is planned under the signed Project Implementation and Steam Supply Agreement (PISSA). The PISSA agreement mandates GDC to provide steam and manage the reservoir during generation while the IPPs to finance, design, construct, install, operate and maintain the plants on a Build-Own-Operate basis.

5.2. Geothermal tour itinerary

- General Information
  - Currency: Kenyan Shillings
  - Time difference: GMT+3

- Geothermal tour sites
<table>
<thead>
<tr>
<th>Lake Magadi and Hot Springs</th>
<th>Lake Baringo and Hot Springs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suswa Volcano</td>
<td>Korosi Volcano</td>
</tr>
<tr>
<td>Longonot Volcano</td>
<td>Paka Volcano</td>
</tr>
<tr>
<td>Olkaria Geothermal Plant</td>
<td>Siali Volcano</td>
</tr>
<tr>
<td>Oserian Flower Farm</td>
<td>Emuruangogolak Volcano</td>
</tr>
<tr>
<td>Eburru Water Harvesting and Crop Drying</td>
<td>Namarunu Volcano</td>
</tr>
<tr>
<td>Menengai multiple geothermal direct use</td>
<td>Barrier Volcano</td>
</tr>
<tr>
<td>Lake Bogoria and Hot Springs</td>
<td></td>
</tr>
</tbody>
</table>

- Accommodation
  - 03 night accommodation in Nairobi.
  - 02 night accommodation in Naivasha.
  - 01 night accommodation each at Nakuru, Bogoria, Baringo, Korosi, Paka, Siali, Emuruangogolak, Namarunu and Barrier or nearest city.

- Type of Meals
  - Daily Breakfast, Lunch and Dinner.
  - Kenyan and Western Cuisines.
  - Vegetarian / Non-vegetarian meals.

- Tout Itinerary

Day 1:
Welcome to Magical Kenya, enjoy your evening in Nairobi and have a good night rest.
Welcome to Nairobi, Kenya. On arrival to Nairobi you will be greeted by your friendly tour manager / local representative outside the baggage hall area at the airport. Sit back in the comfort of your coach, as we drive you to the hotel. In the afternoon, check into your hotel and relax. In the evening explore the town and nearby areas on your own take good rest and be prepared for a long day tomorrow.
Dinner and overnight stay in Nairobi.

Day 2:
Spend whole day at Lake Magadi enjoying flamingos, hot spring and Nyama Choma. Learn about the extraction of soda from the lake along the Kenya Tanzania border.

Today after a breakfast at the hotel, depart from Nairobi to Magadi in a coach. Get ready for three hour of scenic road drive to Lake Magadi via Magadi road: Rongai Kiserian route. En-route visit Olorgesailie pre-historic museum for site seeing on the excavations and tools used by early man. Proceed further for Magadi: check in at the Magadi sports club. Drive to the lake view point: Hike and view the lake. Bird watching at the bird’s rock Drive to the hot springs; you can bath and dip yourself in the hot massaging water. View Flamingoes in the
lake and wildlife around. Drive to the sports club for lunch and enjoy appetizing Nyama Choma for lunch. Relax and cool off the heat; you may shower/swim. Drive off to Nairobi as the sun sets.

Dinner and overnight stay in Nairobi.

Day 3:
Hike to Suswa or Longonot and explore the volcano.

Suswa: Today after a Kenyan breakfast at the hotel, depart on a three hour journey from Nairobi to top of Mount Suswa. Mount Suswa has a unique double crater with a moat-like inner crater surrounding a tilted block of rock. The mountain is also known for its lava tubes on the northeast side of the outer crater. Summit the peak can on foot following Rauch's Trail, which begins approximately one-and-a-half kilometers from the summit, from the northeast. Explore the network of lava caves on the east side of the mountain and get to meet some baboons. Enjoy your packed lunch on the top of the volcano before heading to the Lake town of Naivasha.

Longonot: Today after a Kenyan breakfast at the hotel, depart on a three hour journey from Nairobi to top of Mount Longonot. 3 km trail runs from the park entrance up to the crater rim, and continues in a 7.2 km loop encircling the crater. The whole tour (gate-around the rim-gate) of 13.5 km takes about 4–5 hours allowing for necessary rest breaks. Enjoy your packed lunch on the top of the volcano before heading to the Lake town of Naivasha.

Dinner and night stay in Naivasha.

Day 4:
Visit to Oserian flower farms and Olkaria Geothermal steam field and power plant.

Today after breakfast get ready for one of the most exiting visit to a flower farm and see now geothermal resources are used to run the farm one of the direct use facilities of geothermal energy. After lunch visit Olkaria one of the most developed areas of geothermal in Kenya. Learn all about generation of electricity from extraction of steam by drilling to running of a steam turbine and cooling towers. Olkaria is the reason Kenya is one of the top five geothermal electricity generation countries in the world. Olkaria is located in Hells Gate National park so a must visit for Lion King movie fans. Head back to Naivasha as the sun sets.

Dinner and night stay in Naivasha.

Day 5:
Visit to Eburru geothermal water harvesting and crop drying facility.

After an early morning breakfast head towards Eburru a volcanic area full of homemade water harvesting facilities use by the villagers. Explore the volcanic village. Eburru also has a small 2.5 MWe power plant you wish you had in your locality. After lunch visit one of the direct use geothermal facilities of crop drying located in between a beautiful farm. Later drive towards Nakuru.

Dinner and night stay in Nakuru.
Day 6:

Visit to Geothermal direct use facility at Menengai one of the biggest calderas in the world, the largest volcanic caldera in Kenya and the second largest volcanic caldera in Africa.

The Geothermal Development Company (GDC) has developed a pilot direct use facility at Menengai geothermal field that includes greenhouse heating, geothermal operated laundry, aquaculture pond heating and geothermal milk pasteurization. In the project, geothermal heated water from well MW-03 at 90 degree Celsius is cascaded through laundry, milk pasteurizer, aquaculture and finally greenhouse after which the water is re-circulated. The greenhouse has tomatoes and capsicum. GDC has also installed a grain dryer to demonstrate use of geothermal heat in drying agricultural produce.

Dinner and night stay in Nakuru.

Day 7:

Return to Nairobi

Today after breakfast at your accommodation, proceed to Nairobi as this tour comes to an end. Enjoy the evening in Nairobi and take good rest.

Dinner and night stay in Nairobi.

Day 8:

Today after breakfast depart for airport and fly back home with wonderful memories of your geothermal tour.

5.3. Geothermal tourism catalogue

Geothermal tourism catalogue will include geothermal map of Kenya and a picture of all the geothermal areas with a brief description as shown below.

Lake Magadi is home to the Magadi Soda Company, now owned by Tata India. This factory produces soda through evaporation of lake water in sections. Magadi area also has hot springs where tourists often go for camping and bathing. Magadi was a filming location for Fernando Meirelles’s film The Constant Gardener, which is based on the book of the same name by John le Carré, although in the film, the shots are supposed to be at Lake Turkana, which are actually at Lake Magadi.
6. **Conclusion:**

The creation of a geothermal tour manager as a job profile within a geothermal organisation will bridge the gap between geothermal and travel & tourism industry. Initially there could be a team of at least one geothermal tour manager in every country who would also take the responsibility of further training and creating multiple teams of tour managers as per requirement in every concerned organisation.

**REFERENCES**


https://www.volcanodiscovery.com

http://www.lakemagadi.com/