

In Search of Better Health

The GDAR Study Hosts Key Workshop to Enhance Urban Resilience

INSIDE

97

GENE DRIVE: A NEW HOPE FOR MALARIA CONTROL - PG 5



Prof. Charles Obonyo, the GDAR Spaces Project Lead Principal Investigator delivering his opening remarks

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BY BRIAN OTIENO

The Institute in partnership with the County Government of Kisumu's Climate Change and Health Directorate, organized a one-day workshop to tackle the complex impacts of climate change, health, and urbanization on residents of the lakeside city of Kisumu and its environs. This initiative is part of the Global Diet and Activity Research (GDAR) Spaces project, which aims to understand how urban communities in Kisumu respond to climate change events and rapid urbanization.

The workshop, held recently at a Kisumu hotel, brought together stakeholders from various sectors, including health, gender, and food security. The forum served as a collaborative platform to discuss the effects of climate change-induced disruptions, focusing on floods and droughts.

Prof. Charles Obonyo, Lead Principal Investigator of the GDAR Spaces project, emphasized the importance of understanding the interplay between health,

climate change, and urbanization in Kisumu using systems thinking methodology. "Our goal is to uncover how these factors influence health outcomes and overall urban resilience. By engaging with the community and stakeholders, we can develop targeted interventions that promote sustainable and healthy living environments," he noted.

A significant area of focus during the forum was urban agriculture's role in improving food security, promoting physical activity, and reducing non-communicable diseases. A representative from the county environment department highlighted that urban agriculture can enhance food security while encouraging physical activity and mitigating risk factors for non-communicable diseases. This integrated approach can lead to healthier and more resilient urban populations.

Early warning systems were identified as a critical strategy in preventing the adverse effects of floods on vulnerable communities. The forum highlighted the necessity of implementing robust early warning mechanisms to safeguard families in flood-prone areas. "The use of early warning systems is essential to prevent floods from devastating families and livelihoods. These systems enable timely evacuations and preparedness, reducing the overall impact of such events," remarked one participant.

The forum also discussed various strategies communities deploy during climate change events and the factors that influence the success of these strategies. Participants concluded with a consensus on the importance of policy influence in shaping resilience strategies. They agreed that sound policies are crucial for driving sustainable coping mechanisms within urban populations. "Policy plays a pivotal role in guiding and supporting community resilience initiatives. We must advocate for policies prioritizing health, food security, and environmental sustainability to ensure that urban communities can thrive amidst the challenges posed by climate change and urbanization," emphasized Prof. Obonyo.

The GDAR Spaces programme is part of the broader GDAR network, which includes research and academic institutions from Kenya, Cameroon, Brazil, Nigeria, South Africa, Jamaica, and the United Kingdom.

In Kenya, KEMRI's Centre for Global Health Research (CGHR) participates in the network with funding from the UK National Institutes for Health. The collaboration with the Kisumu County Department of Health and Climate Change is paving the way for innovative solutions to enhance urban resilience through transdisciplinary research.



Attendees gather for a photo during the stakeholder engagement forum held at a Kisumu Hotel

















- $\hbox{PIC 1: Prof. Obonyo elaborates on policy implications during the plenary session.}$
- PIC 2: Ms. Penrine Omoro registers guests during the stakeholder engagement forum
- PIC 3: Mr. Ken Koyoo, Director of Environment at C.G.K, attentively follows the presentation.
- PIC 4: Mr. George Anyona, a lecturer at Maseno University, examines the consent form during the group consent session.
- PIC 5: Mr. Fredrick Oluoch, Director of Public Health at C.G.K follows the proceedings.
- PIC 6: Dr. Joseph Nyaundi, KMFRI and Ms. Kosome representative from C.G.K Environment Department peruse group work questions during the meeting
- PIC 7: Mr. Ken Koyoo representing the County Government, Director Environment giving the opening remarks
- PIC 8: Participants engage in group discussions

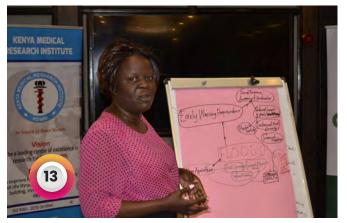
PHOTOS BY BRIAN OTIENO

















PIC 9: Ms. Gladys Odhiambo Research Officer from KEMRI, GDAR taking participants through the consent process.

PIC 10: Ms. Mary Adhiambo from K.R.C.S Kisumu branch actively participates.

PIC 11: Mr. Fordrani Okumu explains the concept of generating casual loop diagrams

PIC 12: Edwin John from K.R.C.S West Kenya region

PIC 13: Ms. Anne from the C.G.K P&RMC department presenting during the plenary discussion

PIC 14: Mr. Charles Lwanga listens to group discussions during the group work session

PIC 15: Participants during the QandA session.

PIC 16: Participants during the Registration process

Gene Drive: A New Hope for Malaria Control as KEMRI and Imperial College Discuss Collaboration

BY AMOS PESI AND WINFRED KATUMBI

KEMRI welcomed a delegation from Imperial College London to discuss a potential collaboration on genetic approaches, specifically Gene Drive, to control malaria in Kenya. This meeting follows joint grant submissions by the two institutions for research and innovation funding from Horizon 2020. On June 24, 2024

During the visit, Prof. Christophides George and Prof. Windbichler Nikolai of Imperial College were officially received by Dr. Martin Bundi, the Acting Deputy Director of Research and Development at KEMRI. Dr. Bundi, standing in for Acting Director General Prof. Elijah Songok, emphasized the critical need to leverage advanced technologies to combat malaria in Kenya.

"Malaria is an endemic disease in this country, and there is a need to control it. It is, therefore, important to embrace new technology that can assist in curbing it," stated Dr. Bundi. He expressed confidence in Gene Drives and acknowledged the

contributions of the entomology and vector control departments. Dr. Bundi also highlighted KEMRI's openness to collaborations that enhance vector control and improve public health.

Prof. Christophides George noted the progress Imperial College has made in developing genetically modified mosquitoes, which are now ready for field testing in Kenya. He praised Kenya for its conducive environment for such research, citing the robust intellectual capacity of institutions like KEMRI and the presence of a genetic modification (GM) framework. The GM mosquitoes have shown promising results in laboratory settings, and the next step is to evaluate their effectiveness in the field.

Dr. Damaris Matoke-Muhia, Acting Deputy Director of Biotechnology Programs at KEMRI, mentioned that the institute has ample land suitable for the large-scale field tests required by Gene Drives. She also emphasized the potential for the partnership to extend into capacity-building



Prof. Nikolai Windbichler from the Imperial College, London and Dr. Martin Bundi from KEMRI at the briefing at KEMRI Headuarters recently

initiatives, including exchange programs and training opportunities for students and scientists at the KEMRI Graduate School (KGS).

The meeting was also attended by Dr. Luna Kamau, Acting Deputy Director of CBTRD, Dr. Elizabeth Matei, Dr. Lydia Kibe, and Prof. Charles Mbogo, Chair of PAMKA.

This collaborative effort between KEMRI and Imperial College London marks a significant step towards utilizing cutting-edge genetic research to tackle malaria, a disease that continues to pose a major public health challenge in Kenya.









PIC 1: Ag. Deputy Director ,Centre for Biotechnology Research

listening to presentations
PIC 2: Prof. Christophides George, of the Imperial college,

London makes a presentation during the visit
PIC 3: Research scientist Prof. Charles Mbogo makes his
remarks during the engagement session as Dr. Lydia Kibe and
Dr. Damaris Matoke look on

PIC 4: Ag. Deputy Director Students welfare, Dr. Elizabeth Matey makes her presentation

PHOTOS BY LISPER MOKAYA

Unraveling Brucellosis: International Collaboration Explores Livestock Transmission in Kenya

BY DR. SAMOEL KHAMADI & ALANDO MOSHE

In a pioneering effort to delve into the complexities of Brucellosis transmission among livestock, researchers from the Kenya Medical Research Institute (KEMRI) are collaborating with Washington State University under the One Health Research Concept. Their focus spans Marsabit and Kajiado counties, where they are scrutinizing the roles of camels and other livestock in the spread of the disease. This initiative is being spearheaded through the Centre of Virus Research (CVR).

A significant boost to this endeavor came recently when the CVR welcomed esteemed visitors from the Animal and Plant Health Agency (APHA), United Kingdom. As a pivotal player in global Brucellosis research, APHA serves as a designated Reference laboratory by the World Organisation for Animal Health (OIE) and the Food and Agriculture Organization (FAO). Their involvement in the Kenyan study (SERU #4405) ensures crucial technical

support in laboratory diagnostics and the molecular characterization of Brucella.

During their week-long visit from June 17th to 21st, June 2024, the APHA team comprising Dr. Roland Ashford, Jodie Withall, and William Jewers engaged intensively at the CVR Viral Haemorrhagic Fever Laboratory. Their primary mission involved bolstering molecular testing capabilities for Brucellosis, a key aspect of the ongoing collaborative efforts.

This partnership underscores a concerted international effort to deepen understanding and enhance diagnostic capacities regarding Brucellosis in Kenya. The exchange of expertise and technical resources between KEMRI, Washington State University, and APHA holds promise for advancing both research and practical outcomes in combating this significant livestock-borne disease.



Washington State University and KEMRI team led by DD CVR, Dr. Samoel Khamadi pose for a photo

CVR Hosts Students from WSU, Pullman on MERS-CoV & RVFV

BY DR. SAMOEL KHAMADI & ALANDO MOSHE

The Center for Virus Research (CVR) this week hosted three visiting students from the Washington State University (WSU) keen to appreciate a collaborative exploring the transmission dynamics of Middle East Respiratory Syndrome Coronavirus (MERS-CoV) and Rift Valley Fever Virus (RVFV) among livestock and humans.

KEMRI through CVR is collaborating with WSU under the One Health Research Programme on the interface of the two zoonotic diseases. The team focuses on Marsabit and Kajiado counties, examining the roles of camels and other livestock in disease spread. The Centre for Virus Research (CVR) at KEMRI spearheads this initiative.

The visiting students from WSU, Pullman at the Viral Haemorrhagic Fever (VHF) Laboratory are Emma Rager, Androu Luzader, and Makena Spohr have been in Kenya since May 20, 2024, engaging with the WSU-GH Kenya offices and study field sites.

Their primary mission is to understand the molecular testing capabilities for MERS-CoV and RVFV, observing lab processes from sample reception and processing to testing and laboratory data management.

Accompanied by their supervisor, Dr. Martina Ederer, the students also paid a courtesy call to the Deputy Director of the Centre for Virus Research, Dr. Samouel Khamadi. This visit marked an important step in fostering international collaboration and enhancing the understanding of viral transmission in both livestock and human populations.

Such collaborative efforts are vital in addressing the complexities of zoonotic diseases and improving public health outcomes. The partnership between KEMRI and WSU exemplifies the benefits of international cooperation in scientific research and the application of the One Health approach to tackle global health challenges.



Visiting students today from Washington State University led by their supervisor Dr. Martina Ederer (Centre) pose for a photo with the KEMRI CVR Team





PIC 1: Ag. Deputy Director, Centre for Virus Research Dr. Samoel Khamadi in

PIC 2: Dr. Martina Ederer giving her final remarks after the training while her student looks on.

delivering his parting speech during the last day of the training PIC 4:Dr. Khamadi giving his remarks as

one of the trainees looks on





PHOTOS BY LISPER MOKAYA

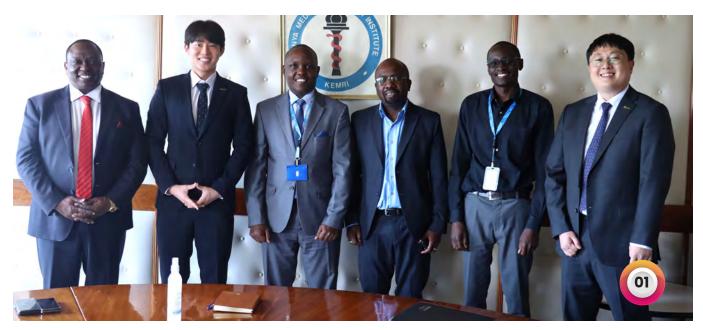
Bioneer Corporation to Sensitize KEMRI Scientists on New Equipment

BY WAMBUI NDIRANGU

The Bioneer Corporation has undertaken to carry out a sensitization for scientists to appreciate some of the new equipment they are introducing to the market.

This was said during a courtesy call to the DG KEMRI on Monday 1st July 2024. The delegation was led by the Regional Managers in charge of International Business Division, Mr. Michael Kim and Roy Kim from Korea.

They were accompanied by the firm's local agency Megascope company headed by Mr. Richard Ngatia. The company is one of the dealers of some of the equipment used in KEMRI facilities. They were received by the Ag. Director Research Capacity Building, Dr. Martin Bundi, the Deputy Director CVR, Dr. Samoel Khamadi and Mr. Samuel Omari from the ITTD department.







PHOTOS BY MARION KATEI



PIC 1: The Delegation pose for a photo with A.g DG shortly after the courtesy call.

PIC 2: Ag.Director General Dr. Martin Bundi giving his welcoming remarks

PIC 3: Mr. Michael Kim (International Business Division/ Regional Manager) gives his comments during the meeting PIC 4: From (L-R), Mr. Roy Kim (International Business Division/ Regional Manager) elaborates a point while Mr. Richard Ngatia (President, Kenya National Chamber of Commerce) and Ag.DG Dr. Martin Bundi listens keenly

Peculiar biting behaviour of Anopheles funestus Mosquito

A recent study revealed a peculiar feeding behaviour by the Anopheles funestus mosquitos in Siaya County, Western Kenya region, catching the attention of the British Broadcasting Corporation (BBC). Dr. Erick Ochomo of KEMRI and his LTSM's colleagues, Prof. Martin James Donnelly and Dr. Daniel McDermott gave perspectives of this rare occurrence.

Questions for Dr. Erick Ochomo (EO)

Q What informed the study that you carried out "Late morning biting behaviour of Anopheles funestus is a risk factor for transmission in schools in Siaya, Western Kenya"? Why did you set to carry it out?

Dr. Ochomo: KEMRI and CDC have been conducting mosquito surveillance in houses in Siaya, particularly the Asembo and Uyoma areas since the 1990s. Our

team observed changes in the populations of malaria vectors since bednets were introduced, with the almost disappearance of the predominantly indoor biting mosquitoes such as Anopheles gambiae and Anopheles funestus around 2003. However, since early 2010, we have been observing increasing numbers of Anopheles funestus mosquitoes, especially in Siaya County. Recently, as part of an ongoing study to evaluate the efficacy of attractive targeted sugar baits for mosquito control, we conducted surveillance in Alego Usonga and Rarieda subcounties. We observed very high densities of Anopheles funestus and even more interestingly, observed that they continued biting in the houses until 11 am. Given that the malaria burden in this country is highest in the 5-15-yearold children, who are also the school-going population, we were curious whether there is additional biting happening in the schools and thus the reason for this study.

Q What was your most important finding?

Dr. Ochomo: We found that Anopheles funestus mosquitoes are biting and continue to bite in primary schools until 11am. This is important because it means that in this setting, even if all the excellent malaria control interventions are placed in the houses, children could still be exposed to malaria parasites while in school

Q Based on your research, can we say that mosquitoes are getting smarter?

Dr. Ochomo: Mosquitoes, like all living organisms are only trying to survive. For this reason, they come up with ways to adapt to interventions we have put in place, in this case, because they are constantly

not able to feed on people late at night due to usage of bednets, they wait to bite them in the morning, but since children are in school at those times, mosquitoes are now adapting to biting them in schools

Q If yes, how then can we become equally smart, or even smarter to control them?

Dr. Ochomo: We must understand that malaria elimination will require a combination of highly effective tools targeted at the mosquitoes and the parasites in a way that is impactful. For this reason, we must continue to conduct surveillance so that we understand the mosquitoes and the parasites alike, and once we do, we must continue to innovate new effective approaches to tackle them. The research must be an ongoing process even if we begin to look like we are winning as mosquitoes and parasites can bounce back!

Q Compared to the Anopheles stephensi mosquito, that is now a species of concern in Africa, how dangerous is the Anopheles funestus mosquito?

Dr. Ochomo: Excellent question, (long answer)

Anopheles stephensi has recently invaded Africa, Kenya included. It is an excellent vector of Plasmodium falciparum and Plasmodium vivax malaria parasites, it breeds

in temporary and permanent water containers, tanks, sewerage systems, septic tanks, and drainage channels and for this reason, has the potential to transmit malaria in urban settings. It is also more adaptable to higher temperatures and thus well-adapted to arid and semiarid environments (thus the detection in Marsabit, Turkana and Mandera). As yet, we do not know how well Anopheles stephensi will contribute to malaria transmission in rural settings. So far, we have not detected Plasmodium-positive Anopheles stephensi in Kenya but we are actively looking, this is important as it is the only way for us to understand whether it is contributing to malaria transmission Positive Anopheles stephensi samples have been seen in Ethiopia and Djibouti. Anopheles stephensi is also an outdoor biting mosquito, rarely found indoors and predominantly bites animals like cows.

Anopheles funestus is quite the opposite, it prefers to breed in permanent water, such as ponds, swamps and along slow-flowing rivers and is therefore mostly confined to rural settings. It prefers to feed on humans and to rest inside human dwellings and thus is an extremely efficient vector of Plasmodium falciparum malaria. So far, we do not have any evidence of its ability to transmit Plasmodium vivax. We believe this vector is the reason we have very high transmission in Western Kenya. Another vector that is just as efficient is Anopheles gambiae s.s. which is predominant in areas like Busia and Bungoma counties.



Questions for The Liverpool Tropical School of Medicine

Why did you collaborate with the Kenya study that you carried out "Late morning biting behaviour of Anopheles funestus is a risk factor for transmission in schools in Siaya, Western Kenya"?

Prof. Donelly: We have been working with colleagues in KEMRI for over 20 years and in this time the collaboration has evolved into one of key institutional partnerships. We worked with the KEMRI team on this specific project as the question arose from conversations about why did malaria burden remain so high in western Kenya despite decades of bednet, indoor residual spraying and improved case management. We had also observed a relative increase in malaria infection prevalence in older age children and we were wondering if they might be getting bitten by infected mosquitoes somewhere away from the home. Where do older children spend a considerable proportion of their time? School. So it seemed an obvious question to address especially as we'd just observed malaria mosquitoes biting in the late morning.

Dr. Daniel McDermott: The collaboration with KEMRI and LSTM in western Kenya is a partnership across a wide range of research areas including infectious diseases, and sexual and maternal health. The partnership with Dr Eric Ochomo focuses primarily on the malaria-transmitting mosquitoes in the region where he leads a fantastic team of researchers assessing new malaria control tools. During the testing of a new malaria control tool in the

area, we observed an interesting trend in the data toward the end of when we would usually collect mosquitoes (6 am). This is because the malaria mosquitoes in this area were considered to be predominantly nighttime biters. This information coupled with an ongoing concern with the high number of high malaria cases in children of schoolgoing age led to the inception of this study to understand whether there were any potential transmission routes we may be overlooking.

Why are the findings important not just for Western Kenya where it was carried out but for a global context?

Prof. Donelly: We don't know as yet whether children being bitten while at school is a major source of disease so we still need to address that question but the importance for malaria control professionals is that the study illustrates that some mosquitoes may be evading our major control tools and we need to think creatively to identify new complementary control strategies and tools.

Dr. Daniel McDermott: Controlling malaria in highburden areas remains an ongoing challenge and there has been increasing recognition that we need to do more to continue building on the substantial malaria control gains we have had since the early 2000s. A large amount of our control efforts on the malaria mosquito has centred around



Professor Martin James Donnelly



Dr. Daniel McDermott

the home with tools such as bed nets or spraying the walls with a long-lasting insecticide. The potential change in our assumptions highlighted by this work would require us to broaden our control efforts to include more places outside the home. As with all problems, once we have identified it is happening, our next job will be to assess how much of a contribution it is making to malaria transmission and where else this trend may be occurring.

We understand that the Anopheles Funestus mosquito's behaviour is already quite unusual. "Its behaviour is very hard to predict and understand .It breeds in stagnant rice paddies in Madagascar but not the paddies in West Africa. It would breed in South Africa's fast moving streams but breed in swamps in Mozambique." What more does its late morning biting behaviour say about this species?

Prof. Donelly: It shows that as a species it is highly adaptable and able to evolve solutions to some of the control tools we currently use

Dr. Daniel McDermott: We often simplify the characteristics of different mosquito species down to useful rules of thumb to describe where they breed,

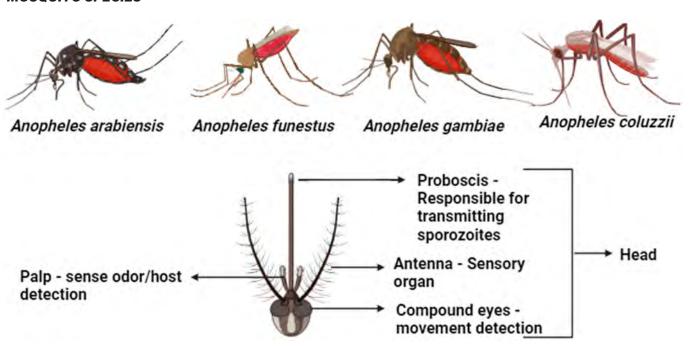
where they bite and when, these are amazingly adaptable creatures that can display flexibility in these traits within the population. Coupled with the pressure we are placing on these mosquitoes by targeting our control at certain places or times, we cannot be surprised that they have been able to exploit a gap in efforts. We need to constantly assess our assumptions and refocus our strategies if we wish to succeed in controlling malaria.

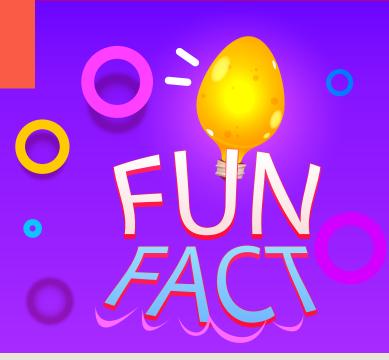
Q Can we say mosquitoes are getting smarter?

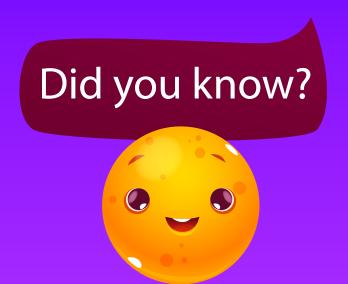
Prof. Donelly: Not smarter as such but from an evolutionary perspective we can marvel at how they apparently overcome the measures we put in place to reduce their numbers.

Dr. Daniel McDermott: I wouldn't say mosquitoes are getting smarter rather I believe they are displaying greater complexity in their behaviour driven by our attempts to control them. I would argue this means we need to be smarter to make sure we don't make the mistake of assuming we are "fighting the last war". It is research like this that will prevent that from happening.

MOSQUITO SPECIES







Explore the Wonders: Fun Facts About Global Tourist Destinations

COMPILED BY WINFRED KATUMBI

Tourist destinations attract visitors from all over the world due to their unique natural, cultural, historical, recreational, or entertainment-based attractions. This week, we journey through some of the most breathtaking spots around the globe, uncovering fascinating facts about each.

We also encourage you to explore these destinations and immerse yourself in the fascinating blend of the fact and fun they offer. From historical landmarks and natural wonders to vibrant cultural scenes, the world is brimming with places waiting to be discovered.

1. Santorini, Greece



Volcanic Origins: Formed by a volcanic eruption around 1600 BC. The Iconic Architecture is that of an island's white buildings with blue domes that reflect the sun, keeping interiors cool.

2. Banff National Park, Canada



Oldest National Park: Established in 1885, it's the oldest in Canada and boosts of stunning Scenery that is famous for its vibrant turquoise lakes and breathtaking mountain views.

3. Venice, Italy



Unique Layout: Built on over 100 small islands connected by canals and bridges. The city has no roads; boats are the main mode of transport.

4. Angkor Wat, Cambodia



World's Largest Religious Monument: Originally a Hindu temple, later transformed into a Buddhist site. It is a very popular pilgrimage site that continues to be a significant place of pilgrimage today.

5. Christ the Redeemer, Brazil



Iconic Statue: Stands 30 meters tall at the peak of the 700-meter Corcovado mountain. Below the statue is the city of Rio de Janeiro's Carnival which is a massive festival with parades, music, and dance.

6. Paris, France



Eiffel Tower: Initially criticized for its design, now one of the most recognizable structures globally. One of the tower's feature is its nightly sparkle which lasts for five minutes every hour on the hour, thanks to 20,000 light bulbs.

7. Tokyo, Japan



Most Populous Metro Area: Home to over 37 million residents with themed cafes standing out as one of the main attractions. These features unique spots like cat cafes, owl cafes, and a robot restaurant.

8. New York City, USA



Central Park: Larger than the principality of Monaco that boasts of a hidden park which is an elevated acre that offers stunning views of the East River and Brooklyn Bridge.

9.Rome, Italy



The Colosseum: Could hold between 50,000 and 80,000 spectators for gladiatorial contests. Also known for fountains galore with over 280 fountains, with the Trevi Fountain being the most famous.

10. Sydney, Australia



Opera House: Its roof is made up of over 1 million tiles and is a UNESCO World Heritage Site. It also home to the Bondi Beach, known for the Bondi Icebergs pool, a saltwater pool on the ocean's edge.

11. Serengeti National Park, Tanzania & Maasai Mara National Reserve, Kenya



Great Migration: This is co-shared with her neighbouring Masaai Mara National Park in Kenya where over 1.5 million wildebeest and hundreds of thousands of zebras and gazelles migrate annually. At both parks, Hot Air Balloon Safaris offer unique views of the wildlife and landscape.

12. Table Mountain, South Africa



Ancient Landmark: Estimated to be around 600 million years old with unique biodiversity that is home to over 2,200 plant species, many of which are endemic.

13. Queen Elizabeth National Park, Uganda



Diverse Ecosystems: Includes savannah, rainforest, and wetlands. It is here that one finds the tree-climbing lions famous for this unique phenomenon in the Ishasha sector.

14. Victoria Falls, Zimbabwe/Zambia



The Smoke That Thunders: One of the largest and most famous waterfalls in the world. The Devil's Pool is a natural rock pool at the edge of the falls.

15. Amboseli National Park



Elephants and Kilimanjaro: Famous for its large herds of elephants with Mount Kilimanjaro as a backdrop providing a photographic paradise that is ideal for capturing stunning images of wildlife.

16. Diani Beach



Pristine Beaches: Known for its white sand and coral reefs and a Water Sports Haven, Popular for kite surfing, snorkeling, and scuba diving.

17. Lamu Island



Cultural Heritage: Kenya's oldest continually inhabited town and a UNESCO World Heritage Site. The town hosts an Annual Festival that features traditional Swahili poetry, music, and dhow races.

18. Nairobi National Park



Urban Wildlife: The only national park within a capital city with a skyline views offering a unique juxtaposition of wildlife against Nairobi's skyline.

19. Lake Nakuru National Park

Flamingo Haven: Famous for its large flocks of flamingos, but is also a Rhino Sanctuary that is critical conservation area for both black and white rhinos...



20. Mount Kenya

Second-Highest in Africa: Peaks include Batian, Nelion, and Lenana. It is a climbing adventure with various routes passing through bamboo forests, moorlands, and glaciers.

21. Tsavo National Parks (East and West)

Massive Parks: Tsavo East and West form one of the largest national park areas in the world. Mzima Springs is within these park where one can view hippos and crocodiles underwater from a special chamber.



22.Bangkok, Thailand

Longest Place Name: Bangkok's official name consists of 168 letters in Thai and has a vibrant markets- Chatuchak Weekend Market has over 15,000 stalls.

The Grand Palace, Bangkok, Thailand is a Royal Residence that is stunning complex of buildings serving as the royal residence and a significant cultural landmark.

Sources

Assorted Internet Source

