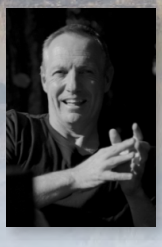
PAPACO

Newsletter from African protected areas

#135, November 2019 — www.papaco.org



Editorial

Geoffroy Mauvais,
Papaco Coordinator

Refute fatalism

The NAPA 129 rejoiced at the emergence of disruptive citizen movements aiming to bring the environment, and its preservation, at the heart of our way of life. Without this growing awareness at all levels, there would be no hope of seeking, finding and particularly implementing adequate solutions to the environmental crisis we are going through.

Yet this evolution does not come without risks. Many are intrinsic to the change we seek out. Changing our modes of production, of consumption, our economic ideals, the way we share goods and services, whether private or public - all these processes will impose sacrifices on those who currently thrive, and should bring additional well-being to those who are deprived.

As always happens in any process of change, there will be winners - the most numerous - and losers - for the most part taken from the pool of current winners. One can easily understand this, and certainly accept it as well. It is at the price of this acceptance that the revolution becomes possible, since current winners are also, whether we like it or not, the power-holders and decision makers of today. This gives us a sense of the importance of the street, the mobilization of citizens, the contribution of relays in traditional and social media. And therefore, of the necessity to be inclusive of everyone's solutions, because we ultimately all share a degree of responsibility on this issue.

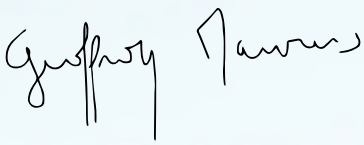
The pessimists, the catastrophists, the declinists or an even more recent category, the proponents of collapse theories... think that this cannot happen. They have lost faith in the human species (rightly or wrongly, to each their opinion) and promote a more radical approach in which taking the time to convince is no longer an option. They are obsessed with urgency and want to settle in the instant issues that were born - at best - a century and a half ago, when we entered the industrial age, or - at worst - from the very moment humans decided to dominate the planet.

Grabbing a microphone, they invade speaking spaces, and as this is a sensationalist time, they have entered a crazy race to seize and especially keep public attention. They do not want a better world, they want a different world. Certainly, many are in all good faith, expressing their anger through an understandable social catharsis in these times of extreme confusion. But to believe that these movements are only expressions of their participants' goodwill would be a mistake.

One of them, very active in certain countries (Extinction Rebellion) theorized its approach. Highlighting the terrible - and no doubt very real - risks humanity is facing, it puts forward the darkest scenarios sketched by scientists, and from there, builds its message: «Conventional approaches of voting, lobbying, petitions and protests have failed because powerful political and economic interests prevent change. Our strategy is therefore one of non-violent, disruptive civil disobedience - a rebellion. «

The 'conventional approaches' mentioned by the movement are, simply put, democracy. We may regret our current situation, we may oppose the young 'innocents' and the elders 'who let it happen', the poor 'who walk' and the rich 'who take the plane', the West 'that pollutes' to the Rest 'that suffers'... but the resulting division and chaos will not bring down the temperature. Change the world, yes, but with its inhabitants, not against them. Otherwise, change is a recourse to totalitarianism - which is, in the end, nothing else than another conventional approach, unfortunately too well-known in our history.

Undoubtedly, all this is exaggerated concern on my part. Yet this movement concludes its manifesto with the following words: 'Historical evidence shows that we need the involvement of 3.5% of the population to succeed.' This is very few to decide in place of all the others.



Our MOOCs - online courses

Onsite courses

Masters' degree in Evironment at Senghor University (French only)

Senghor University has opened up its doors again, and the students from the Master's in Environment have returned to their classes. Among them, 20 have chosen the specialty: Protected Area Management (6th edition of the Master PAM).

MOOCs

New technologies in protected areas

Already 1200+ students have enrolled in the MOOC New Technologies in Protected Areas! And the number of students who completed the MOOC increases everyday.

If you haven't enrolled yet and the topic sparks your interest, you still have some time. Registrations close 1 December, and the session closes 15 December. As usual, the other MOOCs are also available If you have questions, you can contact us via Facebook or send an email to moocs@papaco.org.

If you finished a MOOC with an average over 75%, you can request a certificate of completion by sending an email to moocs@papaco.org..

Registrations: mooc-conservation.org

In addition to PAPACO's page, join the 6,000 members on the Facebook group dedicated to MOOCs. All links and useful information are on papaco.org.

@Papaco_IUCN

facebook/IUCNpapaco

Also read the newsletter of the IUCN programme of protected areas (GPAP)

Word from our students

We've asked a couple of students from differents backgrounds to share their first impressions about the MOOC-Tech. Here is what they shared with us...

Séraphin: 'The introductory part really set the stage. I particularly appreciated the use of these methods (different equipment and management types) in protected area management, as well as the prerequisites for the implementation of a protected area system.'

Dembageo: 'The introduction was interesting, and helped us have a general overview on the benefits of technologies for biodiversity conservation. They give solutions to reach good protected area management while having an inclusive approach for the durability of all actions.'

Prynce: 'I just finished the first module and am very happy to have followed it. The module was well detailed, and helped me have a better understanding when it comes to the role of new technologies for park conservation. This module was of great value, and I hope the others will be too.'

Abdul: 'I just finished the first module, which was very well done. It gave me a good introduction to the course.'

Pierre Lucas: 'Thank you for this very first module, and as my colleagues also said, it clearly set the scene. The example from Goodall Foundation and the use of Google Open Source Application are very interesting. The white book on connected objects in the bibliography is also very good.'

Christell: 'Very informative and easy to understand. I love the quizzes after each section'.

Merlin: 'This part is very interesting and easy to understand.'
Amanin: 'It is with satisfaction that I received my certificate of completion today. I thank the team behind the MOOC for having prepared such clear modules. Once started I couldn't stop as I was eager to discover what was next. Not only have I learnt a lot on protected areas, but also on new technologies, power and blockchain. Please receive my gratitude.'

You can also share your experience by sending an email to moocs@papaco.org

We also asked a few words from the first students to have successfully completed the MOOC !

Moadh Ayari (Tunisia), first student to have successfully completed the MOOC-TECH

My name is Moadh, I am from Tunisia where I have been working as a vet for the past 5 years. I started working in the conservation/threatened species sector while on a trip to Qatar where I worked in a reproduction center for MacQueen's bustard (Chlamydotis maqueenii).

I really loved the concept of Papaco's MOOCs. These courses, open to all, allow professionals to stay updated on protected areas management. Since the first MOOC I passed in 2016 («Protected areas management in Africa») in Coursera I always wanted to be the first to validate one of the courses and now with the MOOC-TECH I am.

I consider this MOOC to be of capital importance: new technologies make protected areas' management more efficient and transparent and all their staff should follow such a course to benefit from technologies use. Poachers use more and more avance method to go around law enforcement (infrared scopes, falsification of documents, interception of signals emitted by tracking collars) and it is therefore very important for PAs managers to stay ahead of them.

In conclusion, I am very proud I passed this MOOC and wish to congratulate the team behind its creation. Thank you very much and see you soon!

Paul Falay Liendo (DRC)

Paul FALAY LIENDO, I am an engineer Forest Ecosystem Planning from the university of Kisangani, and work with the Frankfurt Zoological Society on the Tshuapa-Lomami-Lualaba project in Lomami National Park in DRC.

I followed all of Papaco's MOOCs and find these courses very interesting for my budding career in Conservation. I always try to apply the theory of the MOOCs to the practicality of my work. I just finished the MOOC on New Technologies, and found it to be very innovative as it presents several innovations making everyday life easier. Some of the technologies presented are less expensive and can be used in DRC protected areas to fight against poaching (surveillance, patrolling), for data collection (bio monitoring), for research and inventories.

MOOC New-Tech

Mooc New technologies in protected areas

On 14 October, we launched the MOOC New-Techs. Many of you are already enrolled, but to give an idea of the MOOC content, we decided to add a couple of sequences to this NAPA.

Goal: knowing the context of new technologies applied to conservation, existing techniques, prerequisites for their implementation, their scientific and / or technical basis, their opportunities and limitations, their uses in the field etc.

Sequence 1.2 New technologies: definition

Technology: the branch of knowledge that deals with the creation and use of technical means. It is therefore a science.

New technologies: the innovation of techniques, processes and tools, generally in the field of communication and information.

Basically, these new technologies gather innovations in terms of data collection, flow, processing, usage and storage.

USES OF NEW TECHNOLOGIES

New technologies enable the acquisition and the flow of information at volumes and speed never seen before, thereby transforming our behaviors and ways of life. They change the way we learn by enabling instant and equal access to all available knowledge. They also generate a new digital economy that accounts for an increasing part of all countries' GDP. Artificial intelligence means that some products stemming from new technologies have the ability to learn autonomously, and thus to improve their performances by themselves.

OPPORTUNITIES AND THREATS

Opportunities. They make our life more efficient. They free us from repetitive tasks that can be robotized, they allow us to go faster, to act with more precision.

Threat. They alter some jobs that we know, which must either adapt or disappear.

APPLICATION TO PARKS

Parks are concerned by new technologies. Example: in the fight against poaching, it is relevant to continue to carry out patrols like we used to, but we need to adapt if the poachers have adopted new technologies and increased their effectiveness.

Goal of this MOOC. The goal of this MOOC is not to promote new technologies for conservation or in the contrary to discourage anyone from using them. It simply aims at helping all PA stakeholders know these new tools which usage will certainly increase in the future.

Sequence 1.4 New technologies and protected areas

TECHNOLOGICAL ADVANCES

Connectivity. Connectivity is increasing, even in the most remote parks, using different techniques that can either be very cost-effective (radios), or very expensive (satellite transmitters).

Power. The power that is required to make these technologies work is no longer that much of a problem either, and there are solutions to avoiding supply networks that may or may not exist in parks.

Data storage. It is now possible to store data in great quantity at a lower cost, onsite or externally. Data processing. The automation of data processing also reduces the time needed to valorize these technologies, and user-friendly applications abound.

NEW TECHNOLOGIES: FIELDS OF APPLICATION

Law enforcement. Drones, radars, visual, acoustic or seismic sensors enable to automatically detect intrusions in parks.

Microchips on animal or plant species help monitoring their traffic when they are captured or moved. Virtual fences made of radars can scan who enters and exits parks. Genetic coding helps tracing products along illegal channels, and thereby tracing them back to the source and to the traffickers.

Ecological monitoring. Sensors and transmitters are fitted to collars, bracelets, tags, or they are directly placed under the animal's skin to monitor its movements, its physical condition and so on. When they are used at strategic points of the park, in camera traps or sound sensors, they can automatically and effortlessly sample the territory. Then, the collected data is transmitted and automatically processed by image and sound recognition systems. Sometimes, data is processed directly at the level of the sensor to limit the amount of data being transmitted. Basically, the manager isn't overwhelmed with data and only receives the relevant information which he has selected himself.

Human/wildlife conflict. There are acoustic or seismic detectors that automatically warn villagers when an elephant is approaching field crops. Collars can also be fitted to animals and trigger the opening of hives near villages as soon as they get too close, which will result in their retreat as they are faced with annoyed bees. Lions wear collars sending an SMS to the farmer as soon as they get too close to the cattle etc.

Visitor and ranger safety. Thanks to the GPS receiver fitted to vehicles or trackers, one can move around more precisely. These technologies also enable quick notification in case of emergency, or even the generation of automatic responses which helps saving precious time. Phone applications facilitate rangers' missions by automating certain tasks and by optimizing data transfers to where they will be of use.

Visitor experience. Other applications improve tourist experience in parks by simplifying plant or animal visual or sound recognition. Specific interfaces are developed to improve education or raise awareness among local populations, schools and visitors.

Research. Technologies help analyzing species' DNA and working closely on the selection or tracing of animal or plant products. Genetic sequencing is the foundation of cloning projects which could bring back to life several extinct species.

Sequence 2.2 camera traps

DEFINITION

Camera trap: device that takes a picture or a video when it is triggered by the presence of an animal. It is hardly a new technology as it has been used for over a century. It has however greatly evolved.

TECHNICAL SPECIFICATIONS

Flash. Most cameras are equipped with a day/night sensor that simply detects lighting condition and defines if the use of a flash. White flashes (Xenon or white LED flashes) allow for full-colour image and very little motion blur. This is particularly useful when studying pelage patterns for example. The drawback of these flashes, however, is that they can disturb animals This is not the case with infrared flashes, which may produce lower quality images but are invisible to most animal species.

Sensors. Infrared sensors cover 3 different directions. Although some particular circumstances and species call for the use of direct triggers, nowadays most camera traps use indirect triggers.

How it works: a picture is taken when a moving object with a different surface temperature compared to the background temperature enters the detection area. This method is particularly effective with vertebrate species generating body heat, such as birds and mammals. But it can miss species with weak signals such as small bird and mammals or no signal such as reptiles, amphibians and invertebrates.

Commands and screen. Inside the camera, you'll find the commands and often a small screen that allow you to watch the footages that have been recorded.

DETECTION ZONE

How it works. The detection zone is a triangular area in front of the camera. If an animal with a different body temperature passes this area, then a picture is taken. Only changes are detected so if the animal stops moving in the detection area, no more pics will be taken.

Detection conditions. The detection zone of a camera trap depends on the model and settings, on environmental conditions and animal characteristics. Typically, denser vegetation and warmer ambient temperature have a negative impact on detectability. And the same goes for smaller and

faster species.

OTHER DETECTION METHODS

Although less common, there are other methods (direct and indirect) to detect the presence of animals and trigger the camera: acoustic, seismic and magnetic sensors, pressure pads, etc.

DATA COLLECTION

The choice of data collection will depend on the accessibility of the camera traps and the connectivity available in the protected area. In most cases, cameras are not checked every day and one must guess when the ideal time is to go collect the data and service the camera trap before it stops working if the battery is empty, the SD card is full, etc.

OTHER FEATURES

Battery life, memory capacity, locks camouflage, protection, price and so on are important aspects to consider depending on your needs. Price can vary a lot, from 50$ for the basic models to more than a thousand for high quality cameras with embedded connectivity devices.

Sequence 2.3 camera traps uses

SPECIES DIVERSITY, COCCUPANCY AND ABUNDANCE

Camera traps can be used to monitor different variables and in particular:

- Species diversity: describes the number of species found in an area. It is easily measurable with camera traps that will prove the existence of a given species in an area, even shy or rare species that are harder to monitor otherwise.
- Occupancy: is also an easy parameter to measure with a camera trap as it only requires detection versus non-detection for each site.
- Abundance: but this is more complicated than detecting the presence of a species somewhere or measuring diversity.

INDIVIDUAL IDENTIFICATION

Camera traps offer excellent opportunities for individual IDs as they are constantly running and capture an image every time an animal is detected. IDing individual specimen is, in general, difficult work, but camera traps and special features like the flashes mentioned in the previous sequence can be very useful, in particular when it comes to felid individual identification.

OTHER PARAMETERS

It is worth mentioning that camera traps can be used to measure other parameters such as animal behaviours. They can be used as a tool by scientists to study the interactions of the animals captured in picture or movie but also as a communication tool when these images are shared with the public. And they can also be used for surveillance, including when it comes to fight against poaching.

SETTING UP A SURVEY BASED ON CAMERA TRAPS

Camera traps are only a tool helping you to collect data and it is up to you to organise how this data is collected and how you'll use it according to your needs and interests.

Whether or not to use camera traps, what model, how many cameras, where to place them, all that depends on the following:

- What you want to study,
- What aspects you want to measure (presence or abundance for example)
- The length of your study.

Sequence 3.2 types of drones

DEFINITION

Drone: "small aircraft with no pilot on board and which is controlled from a distance. It can be used for different tasks such as tactical reconnaissance, surveillance etc." The word "drone" is usually used in a military context, although it has now entered everyday language. In order to avoid any confusion, the expression UAV for Unmanned Aerial Vehicle is sometimes used in civilian contexts.

CATEGORIES OF DRONES

Size.

Nano-drones: they fit in the palm of your hand and are mostly used for recreational purposes or to get familiarised with flying modes.

Small drones: the most common ones on the civilian market and don't require much assistance. They have different uses, including video-making. They are frequently used in ads or

movies and can also be used for park surveillance.

Medium-sized drones: can weigh over a hundred kilograms. Most of the time, more than one person is required to set them up. They are mostly used for professional surveillance activities or photography, and often, for longer-term missions.

Drones the size of small aircrafts: they are generally more expensive and are mostly used for the military.

Range. Range: the maximum distance a drone can cover including its return to the home point. This distance can vary from a few meters to several hundreds of kilometers. Drones with shorter ranges can be set up quickly and can be used for surveillance missions on the ground. Some drones are more independent from the person who flies them and can be used for longer missions. This requires more planning efforts. Two elements influence the range:

- Flight autonomy. Autonomy is the ability of a drone to fly a certain amount of time.
- Speed. Drones can go as fast as several hundreds of km/hour. But a drone is always sensitive to the wind which can be an important limitation for its use.

Propulsion method. Generally, only bigger drones use combustion engines, and nowadays, most are equipped with electric engines. They can sometimes even use solar power.

Type of wing. Another way of classifying a drone is based on its type of wing: fixed or rotary. The structure of a fixed-wing drone is similar to that of a plane, and it can usually fly longer than rotary-wing drones. Rotary-wing drones on the other hand have the ability to hover. This can of course be very useful for surveillance missions.

Aptitude and uses. Specialised drones: there are delivery drones, firefighting drones that are able to enter a flame-consumed building to spot possible victims…

Level of sophistication. Some are equipped with a security system that, when there is something wrong with a component, will allow the drone to land by itself or automatically return to its home base.

Sequence 3.5 SENSORS PLACED ON ANIMALS

Sensors can be placed directly on the target animal. This makes it possible to collect very different information in very different conditions. When it comes to fitting sensors to animals, everything is a matter of size: the size of the animal carrying the sensor, and size of the equipment to carry. If the animal is lighter or fragile, it won't be able to carry as much, and solutions adapted to this situation must be found

SMALL ANIMALS

Backpack system. Equip animals weighing only a couple of grams (e.g. insects). These tags are hardly heavier than a single gram, they are called nano tags. Generally, these systems are fitted to the animal. They include a very small battery and thus have a fairly reduced battery life. Collected data is transmitted through the radio using VHF, necessarily over a limited distance which is further reduced given the obstacles between transmitters and receivers. The balance must be found between the number of connections wanted, the transmission distance and the battery life required for the sensors to meet all the needs.

Collars or implants. Small animals can also be equipped with small collars or implants placed under the skin.

Tags. A 50-gram tag carries a GPS system and has two sim cards: a local one to transmit the animal's location through the local telephone network, thereby greatly reducing costs, and an international one to transfer information through roaming if the local card is no longer active. Tags can recharge using solar energy, so they can last for a relatively long time, and can transmit hundreds of thousands of data in the course of their lifetime. Other forms of tags:

- Tags added to an earring have the same functionalities and ease-of-use.
- Tags with radio-transmitters: costs and weight are reduced; they sometimes include GPS receivers, so triangulation isn't required to determine the location. Sometimes, for extremely small species, the tag's only feature would be a beeping sound emitted at a regular interval to monitor the bird. These tags can be placed in a ring around the bird's leg for example.
- Satellite tags: used when the radio or the GSM network cannot be used. In this case, data is transmitted to a satellite (Argos for example) which usually stores and only transmits the information on request to reduce costs. Limitations: costs of satellite communication, and battery life. However, there are now tags with solar chargers included.

LARGER ANIMALS

The field of possibilities also grows as the size of the animal to monitor increases.

Collars. Large species are frequently equipped with collars, and bigger transceivers can be fixed to them securely. Some are even equipped with a metal plate protecting the animal against snares set by poachers. Weight: collars can weigh from a couple of grams to several kilograms (if the collar's weight nears a kilogram, its lifetime can reach up to several years).

Data transmission: the collar will transmit collected data in different ways, based on the user's choice (e.g. text message using the local network or a cellphone, radio transmission if the animal remains close enough to a receiver, satellite connection thanks to which the animal can be located precisely at a frequency determined by the study requirements).

Data: it is possible to store data in the collar, which enables delayed retrieval of a lot of information. Some collars involve a quickrelease opening mechanism through a timer or a radio, which avoids having to recapture the animal to retrieve the information. This also enables later and ultimate retrieval of information, which eliminates transmission costs.

Bracelets and microchips. Some species such as rhinos can be equipped with bracelets having the same features as collars. A microchip can also be directly placed in the horn.

Aquatic versions. Aquatic versions of most of this equipment are available, making it is possible to monitor fishes and other aquatic animals through VHF-transmissions at a low distance or satellite transmissions if the animal frequently comes up to the surface. Another approach consists in retrieving the data only after having recaptured the fish, sometimes several years after placing the sensor. ● Registrations: mooc-conservation.org. Registration deadline: 1 December. End of session: 15 December.

Announcements

PANORAMA
SOLUTIONS FOR A HEALTHY PLANET

Spreading and sharing knowledge on organic farming in Burkina Faso

Burkina Faso is experiencing climate change related impacts like droughts, floods, strong winds and high temperatures, which are combined with pressure put on ecosystems by land use change and exploitation of forest resources. This is leading to land degradation, and therefore loss of soil fertility, productivity, income, and food security. Using participatory analysis of causes and effects of climate hazards, commuities chose reforestation, organic gardening and riverbank protection to address these challenges. Training programmes and exchange trips were used to build capacity among project beneficiaries. This solution is published as part of the project on Ecosystem-based approaches to adaptation: strengthening the evidence and informing policy.

Full article here.
More info on Panorama, here.

Project beneficiaries in Burkina Faso
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EPI

Elephant Protection Initiative

Programme Officer

Where? Anywhere in Africa

Application deadline: 25 Nov.

>> Click here for more info <<

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