2018 ANNUAL REPORT

apopo
SAVES LIVES

APOPO

APOPO is a non-profit organization with roots in Belgium. For 20 years we have trained African giant pouched rats to detect landmines and tuberculosis around the world. APOPO trains the 'HeroRATs' using positive reinforcement – they receive tasty treats when they identify a target scent. HeroRATs are at the core of the organization and this is reflected in the way we protect them and provide loving care and attention.

The main hub of the organization, the Training and R&D center, is located in Tanzania, where all the HeroRATs are trained before being sent to global operations. This is where all the rats are trained before being sent to global operations. APOPO has mine action programs in Angola and Cambodia and has a presence in Zimbabwe and Colombia. APOPO also detects tuberculosis in Tanzania, Mozambique and Ethiopia.

APOPO always seeks innovative approaches to tackling global humanitarian problems. In 2018, APOPO expanded research into developing various unique applications for its scent detection animals.

CORE VALUES

QUALITY Demonstrating and promoting high standards in research, design, training, and implementation of detection rat technology

INNOVATION Pioneering creative research and innovative solutions within a participatory learning culture

SOCIAL TRANSFORMATION Developing skills, creating jobs, improving socio-economic and environmental conditions, releasing land for development, and combating public health issues

DIVERSITY Embracing diversity in all facets of the organization with respect to age, gender, religion, sexual orientation, physical abilities, nationality and ethnicity

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INTRODUCTION

Herwig Leirs
Chairman of the APOPO vzw Board

"As I begin my first year as Chairman of APO-PO's Board of Directors, I would like to start by thanking my predecessor, Diane Verstraeten, whose tenure oversaw a period of progress and growth at APOPO.

Let's go back a few decades, to the year 1997. I was in Tanzania after obtaining my PhD in Rodent Biology, doing a research project. My Tanzanian colleague Dr. Robert Machang'u and I received a fax from Prof. Ron Verhagen in Antwerp explaining that Bart and Christophe, two product developers, wanted to train rats to sniff out landmines! He had suggested they use the African giant pouched rat. Ron asked us to safely trap some of these rats, which are indigenous to Tanzania, and ship them to Antwerp so that they could test whether the rats could easily be trained.

Twenty-one years later and APOPO has developed into a mature organization. 2018 was marked by great progress – not only expanding our existing landmine detection program in Cambodia and securing independent registration in Angola but also enabling us to reach even more tuberculosis patients in Africa with the incredible expansion from 73 partner hospitals in two countries at the beginning of the year to 142 hospitals in three countries today.

Victims of conflict take risks we cannot imagine, trying to rebuild their lives on land that is not safe. At best they will live in fear of injury or death from a landmine. At worst they step on a landmine and lose a limb or die.

In the coming years, APOPO will continue working diligently to restore safety and bring hope to local communities living in danger of landmines and tuberculosis. APOPO's impact demonstrates the quality of the science, the innovation, and the heart of our organization which remain centered on our mission: to provide solutions for global problems and inspire positive social change.

Finally, I would like to express my sincerest gratitude to all our partners and donors for their continued support, and for the tireless commitment and achievements of our dedicated staff around the globe.

ENABLED IMPACT SINCE APOPO BEGAN TO END 2018

Landmines and other explosives destroyed	107,757
Land given back to communities	24,132,324 m2
People freed from the terror of landmines	964,940
TB samples screened	549,534
Additional TB patients detected	14,691
Potential infections halted	117,690

apopo
TB DETECTION

Tuberculosis detection

A Global Public Health Threat

Tuberculosis (TB) remains the world's deadliest infectious disease. The World Health Organization (WHO) estimated that in 2017 about 10 million people fell ill with tuberculosis, and 1.6 million died, three people every minute. Symptoms of TB commonly include weight loss, a persistent cough, fever, and weakness. TB is treatable and curable, yet, in 2017 3.6 million cases were globally 'missed' by health systems. Left undiagnosed and untreated, TB patients can pass on the pathogen to up to 15 other people per year, and about two thirds of TB patients will eventually die.

How APOPO Helps

Since beginning to train African giant pouched rats to detect TB in 2002, APOPO strives to improve and speed up TB diagnostics. Today, our TB detection programs work with over 100 partner clinics in Tanzania, Mozambique and Ethiopia and support them to find and treat more TB patients. For this, human sputum samples are collected from partner clinics that have already tested them for TB, mostly using sputum smear microscopy. At APOPO's labs the samples are made safe and rapidly rechecked by trained TB detection followed by WHO-endorsed confirmation tests. Confirmed results are instantly sent back to the clinics that oversee patient counselling and treatment. APOPO raises partner clinic TB detection rates by 40%.

Who Benefits?

APOPO serves populations who typically have low income and limited access to quality healthcare. By now, APOPO has retested samples from over a quarter of a million patients with signs and symptoms of TB in Tanzania, Mozambique and Ethiopia and provided over 14,700 patients who were initially tested TB-negative with a confirmed TB diagnosis.

Naima George
Age 10, Dar es Salaam, Tanzania

I fell very ill and my clinic was unable to find the cause. Which meant I couldn't receive treatment. One day the clinic called and told me that APOPO had found my TB. APOPO uses giant rats to check samples that have already been tested by clinics like mine, and the rats are so good at smelling TB that they find quite a few cases that the clinics were unable to detect. After the rats find the TB, the sample is then confirmed in APOPO's own lab using advanced microscopy. I was soon put on treatment and now already I feel much better."

Dr. Lena Fiebig
Head of APOPO TB

2018 was a special year for TB. The United Nations (UN) put the infectious killer in the global spotlight at the first ever High-Level Meeting on TB. The UN member states agreed on a political declaration and committed to 'Find.Treat.All #EndTB', a new global initiative to reach 40 million people with TB care from by 2022.

2018 was also a special year for APOPO. Our TB detection work took off in Addis Ababa, Ethiopia. So we are now operative in four labs in three countries. Our Tanzanian team published findings showing that we raised TB detection in young children by 68%, meaning that this vulnerable group benefited well above average from APOPO's approach. Our Mozambican team moved to using molecular tests as a confirmation method. APOPO pursued its research on volatile organic compounds of *Mycobacterium tuberculosis* together with the Max Planck Institute for Infection Biology in Berlin and the Technical University of Braunschweig (Germany) to gain deeper insights into what the rats actually smell in human sputum samples.

And we were thrilled to welcome a special visitor, Mrs. Joy Milne,

better known as *The woman who can smell Parkinson's*. She shared her insights on 'scent detection of diseases' with our Innovation and TB Detection teams in Tanzania, opening an avenue to joint research with the University of Manchester (UK).

When it comes to service, our rapid TB testing and patient tracking by community health workers helped more patients start TB treatment. Our efforts were recognized at the World Union Conference on Lung Health. The Stop TB Partnership gave an honorary award to MKUTA, our community partner in Tanzania, for their outstanding community leadership and mobilization.

In 2018, across sites, APOPO evaluated 86,850 samples from 52,622 presumptive TB patients and found 2,009 new TB cases. Considering the magnitude of the problem, a 3.6 million global TB case detection gap, one might be tempted to consider this as a drop in the ocean. In contrast, we are encouraged to see what is possible to achieve with a small team and modest budget through strong partnerships, creativity and endurance.

Joy Milne
The Woman who can smell Parkinson's Disease

My experience at APOPO in Tanzania was wonderful. Learning what they did and how they trained the rats was amazing. Their dedication and planning to help people, both the medical staff in the clinics and the people with tuberculosis is uplifting, in some incredibly hard conditions."

TB Detection Tanzania

2018 was another year of results and growth for APOPO's TB detection program in Tanzania. We expanded our collaboration from 57 to now 69 public and private clinics in Dar es Salaam and Dodoma, and in the Morogoro and Coastal regions. The growth was possible thanks to confidence in our work and continued support by Tanzanian health officials – also reflected by our research being listed in the Tanzanian National TB Operational Research Agenda 2015-2020.

We evaluated 57,202 samples from 36,412 individuals with signs and symptoms of TB. On top of 4,159 TB cases already detected at the local clinics, we found an additional 1,414 patients to be positive for TB, who were initially tested negative, with help of our HeroRATs and confirmation tests. This is an increase by 34%.

In our Dar es Salaam laboratory, we pursued our 24-hour model,

in which we collect samples from clinics by motorbike (about 250 per day!), have our rats and our laboratory technicians rechecking them the same evening, and report confirmed results back by early next morning. Community health workers who contact patients to return to clinics for treatment. In 2018, 77% of the patients started their TB treatment, a far greater number than was achieved before speeding up the service. We continue however looking into what may prevent patients from accessing the free TB care. In Temeke district, MUKIKUTE and APOPO assess how well TB patients adhere to their 6-month TB treatment when at home, using Operation Asha's eCompliance technology. By end 2018, we had enrolled 2,558 TB patients and achieved an adherence rate of 86%.

Close cooperation with our key partners, the National Tuberculosis and Leprosy Program (NTLP), the National Institute for Medical Research (NIMR) and the community-based organizations MKUTA with its Temeke branch MUKIKUTE, and PASADA have greatly helped to provide such integrated service to the patients.

We presented our work at a variety of prestigious local and international events including the European Society for Pediatric Infectious Diseases conference in Malmo, Sweden, the Union World Conference on Lung Health in the Netherlands, the European Clinical Microbiology congress in London, UK, and the Tanzania Health Summit in Dar es Salaam that awarded APOPO the 'best oral presentation'.

Dr. Georgies Mgode
Program Manager TB Tanzania

Impact 2018	
Samples evaluated	57,202
Patients evaluated	36,412
Additional patients diagnosed	1,414
% increase in case detection	34%

Dickens Bwana
MKUTA Program Director

" *Mkuta is made up of TB-survivors, we understand the pain of TB and share this when raising awareness about the disease and encouraging patients to complete treatment. To acknowledge and celebrate our work in the communities, the Stop TB Partnership together with the National TB and Leprosy Control Program and National TB Caucus Tanzania, awarded us a prize for outstanding community mobilization. I cannot feel prouder of our teams.*"

TB Detection Mozambique

Robert Burny
Program Manager TB Mozambique

I n 2018, the Mozambique APOPO TB program maintained its collaboration with 19 partnering clinics in the city of Maputo and expanded its project facilities on the campus of the Veterinary School of the Eduardo Mondlane University.

The goal of construction was, amongst others, to create space for a new acquisition, a 16-module diagnostic GeneXpert platform. This allows us to measure the rats against molecular TB tests and offer even more comprehensive diagnostic service to our partners in line with Mozambique's move towards better TB diagnostics.

APOPO, renowned not only for the TB detection rat research, but also for its motorbike sample collection network and rapid result delivery, has embarked on a new 'track': in return for (costly) Xpert test cartridges provided by the Maputo City Health Direc-

torate and Doctors without Borders, APOPO offers its logistics and testing capacity where partners have a need. Our GeneXpert platforms are linked to a nationwide network, called GX Alert, that automatically reports detected drug resistant TB cases to the health authorities.

In 2018, we evaluated 10,799 samples from 6,545 individuals with signs and symptoms of TB. In the new 'track' 82 patients tested positive for TB. In our traditional track, rechecking samples from partner clinics that use sputum smear microscopy, our eight TB detection rats followed by confirmation tests found 298 additional TB cases that were initially tested negative.

Of all 380 newly diagnosed TB patients 300 (79%) started treatment. This is thanks to our partner, the community-based organization Associação Kenguelekezé, whose community health workers locate and support patients in returning to clinics to begin immediate TB treatment. This 'Find&Treat' work was also enabled by the continued support of the National Tuberculosis Program (NTP) and the National Institute for Health (INS).

Finally, our planned study to find out whether TB detection rats can detect TB early, was approved by the National Bioethics Committee and started in December 2018. This study offers a 2-year follow-up to patients from 5 partner clinics, who tested negative by standard test. The study investigates whether a rat-positive result is predictive for a later confirmation of TB.

Impact 2018	
Samples evaluated	10,799
Patients evaluated	6,543
TB patients diagnosed	380
% increase in case detection	79%

Stigma

Stigma associated with TB may also place certain populations at higher risk. Stigma can keep people from seeking medical care or follow-up care for TB. As a result, the disease continues to progress, becoming serious while infecting others and challenging control of the disease. APOPO works with volunteers groups to help sentitise communities and fight against stigma.

TB Detection Ethiopia

Dr. Negussie Beyene
Program Manager TB Ethiopia

In Ethiopia, our research is hosted by the Armauer Hansen Research Institute (AHRI), a government research institute, forming the AHRI-APOPO Tuberculosis Research Project. We have two aims: first, to enhance TB case detection in Addis Ababa and contribute to global, ambitious plans to accelerate the TB response, ensure access to care as part of the endeavor for Universal Health Coverage, and leave no one behind; and second, to explore the speed and detection ability of the TB detection rats when compared to molecular tests for TB screening of inmates and staff in prisons.

Our operational research began in March 2018. The enhanced case-finding project, which is being conducted in collaboration with the Addis Ababa City Administration Health Bureau and the National TB Control Program (NTP), originally planned to collaborate with 30 health centers in the first year, but by the end of 2018 had already partnered with 55 health centers in Addis Ababa. APOPO and the HeroRATs screened a total of 18,849 sputum samples collected from 9,667 presumptive TB patients. The NTP's technical working group assessed the project output, found that APOPO's confirmatory method meets national standards and advised that additional patients found through the project should receive treatment promptly. Since then the project has found an additional 215 patients that tested positive for TB, who initially tested negative, on top of 243 TB patients diagnosed by the clinics.

The Prison Screening Project is being implemented in partnership with the German Leprosy and Tuberculosis Relief Association (GLRA), the Federal Prison Administration and the NTP. It targets TB and HIV screening in 35 Ethiopian prisons. In 2018 we completed the preparation phase to start the mass screening phase in the first quarter of 2019. To this effect, a sensitization and advocacy workshop selected, 10 prisons, and created the baseline assessment. We trained health personnel from the 10 prisons on the national guidelines and the project protocol, and APOPO staff successfully completed the Training of Trainers program and received certification from the National Authorities. We are ready for a busy year ahead to end TB in 10 Ethiopian prisons!

Mr. Ben Tegegn
TB & MDR-TB coordinator Addis Ababa City Administration Health Bureau

The AHRI-APOPO Project covered 55 health centers in Addis Ababa in a very short time. We have already started feeling the impact of the project in terms of the additional cases APOPO finds. We look forward to continuing our work together and amplifying the impact of the project in the years to come."

Impact 2018	
Samples evaluated	18,849
Patients evaluated	9,667
Additional patients diagnosed	215
% increase in case detection	88%

HeroRats

One TB detection rat can screen 100 sputum samples for tuberculosis in just 20 minutes – a job that would take a lab technician using conventional microscopy about four days. The speed of the HeroRATs is a crucial factor in reducing costs and getting people treatment as soon as possible.

Innovation

Dr. Cindy Fast
Head of Training and Behavioral Research

At APOPO, we train rats to save lives and our team of innovators make all of this happen at our Training and Research Headquarters in Morogoro, Tanzania. Rising to this challenge, our team employs a multi-pronged approach to address the primary objectives of optimizing performance of our existing scent detection applications and exploring innovative new applications for them, while continually evaluating and assessing animal health and welfare and building local and global scientific capacity.


Training

In 2018, APOPO's training teams worked with more young rats than in any previous year, with a combined total of 126 rats participating in training activities. This included more than 75 young rats enrolled in our mine detection training program and 51 new rats contributing to our TB detection research program. A total of 10 mine detection rats (MDR) earned internal accreditation and were deployed to operations in Angola, while another 10 suc-cessfully completed training late in the year and were exported to Cambodia in early 2019. Finally, a combined total of 18 TB detection rats were sent to our TB programs in Ethiopia and Dar es Salaam, Tanzania. To meet these training needs and build internal capacity, our training headquarters also welcomed 9 new rodent trainers/handlers in 2018 that were selected from a highly competitive pool of applicants.
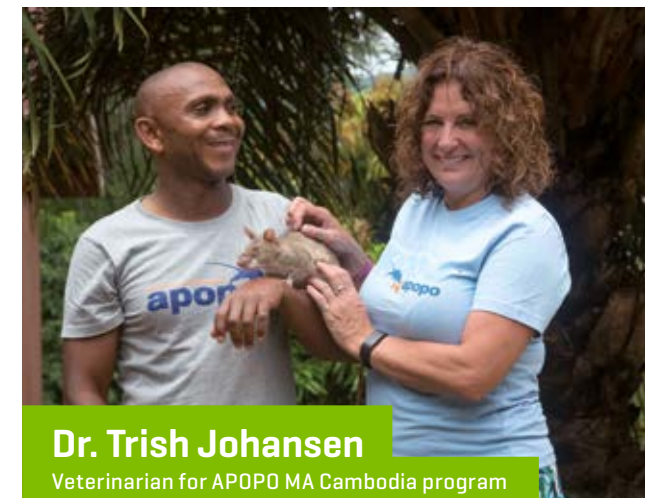
Dr. Trish Johansen
Veterinarian for APOPO MA Cambodia program

I started working with the Cambodian team in 2016. Immediately I was impressed by the individuals involved, the objectives of APOPO and the work they are doing in multiple countries. When visiting the APOPO headquarters in Morogoro in 2018, I was delighted to find the work ethos in Cambodia was a reflection of the whole organization. Meticulous care is shown from the breeding and training of the young rats through to the safety of the human staff working in the minefields. The APOPO projects make an impact on so many human lives while never losing sight of the welfare of the HeroRATs. This is an organization I am proud to be a part of."

Optimizing existing applications

One of our top priorities is to continually monitor, evaluate, and enhance existing training and operational protocols. This is accomplished by exploring alternative training strategies; developing hardware and software solutions; and conducting both basic and applied behavioral research. Thanks to the meticulous work of our dedicated research team, 2018 brought many new innovations from activities that fell into three broad categories including 1) sniff training strategies, 2) creating super sniffers, and 3) developing sniffer tools.

Sniff Training Strategies
Some of these strategies involved promising new line cage procedures for rapidly retraining and maintaining multiple odor targets and a technique for training the rats to match-to-sample, wherein the rat is taught to search out an odor target that matches an exemplar. These procedures hold great potential for existing and future rat scent detection applications. Other projects explored ways of shifting the rat's natural detection threshold for odor compounds by training on various combinations of odor mixtures.

Creating Super Sniffers
A new project exploring the natural reproductive behaviors of the African giant pouched rat began in collaboration with a Ph.D. student from our partner Sokoine University of Agriculture. This project aims to determine if and how the reproductive cycle of the pouched rat contributes to scent detection performance and may even inform future breeding strategies to selectively breeding 'super sniffers'. Another collaborating Ph.D. student from the University of Antwerp in Belgium collected data to objectively quantify the personality of our HeroRATs, with an aim to use this information in pre-selection of rats for specific scent detection programs.

Developing Sniffer Tools
Additional research focused on developing interfacing technologies to augment the rat's keen scent detection abilities, including a wearable micro-switch device that allows the rat to unambiguously signal when it has found a target by pulling a small ball on its harness. Future versions of the micro-switch could conceivably transmit additional signals or information regarding what the rat has found and where. In another experiment, APOPO examined if the exact time a rat spends sniffing an odor sample will reveal the rat's certainty when screening samples from presumptive TB patients. Finally, an apparatus was refined that allows our rats to press one of two levers in response to an odor sample to allow the rat to clearly communicate what it is smelling.

Novel scent detection services

Applying lessons learned, rats that had been previously trained to find a surrogate citrus scent were rapidly retrained to identify the unique odor-profile of pangolin derivatives and hardwood samples in a controlled research environment as part of ongoing collaboration with the Endangered Wildlife Trust (EWT) of South Africa. Importantly, this successful proof-of-principle with wildlife products sets the stage for additional phases of the project designed to assess the feasibility of deploying rats to help combat illegal wildlife trade. In collaboration with search and rescue experts, APOPO developed the concept of RescueRATs, to train rats equipped with a miniature high tech back pack to locate survivors in collapsed buildings.

Building empirical foundation and scientific capacity

Our team of innovators work to constantly strengthen and broaden our scientific network by actively engaging in the broader scientific community while contributing to local capacity building efforts that also support program longevity. In 2018 APOPO developed an MDR train-the-trainer and internal accreditation package and successfully applied it to refresh training and accreditation renewal of existing rat handlers.

David Robertson
Faculty member of the MIT Sloan School of Management

I visited APOPO in Tanzania and was impressed not just by the capability of the HeroRATs, but also by the professionalism of the organization. Cindy, Christophe, and the team have developed a thorough and disciplined process to train and care for the HeroRATs. One little detail that impressed me was when they put sunscreen on the ears and tails of the rats. Being nocturnal, the rats have no natural protection to sunlight. So now every rat, every day, gets protected."

The Hero Treatment

Each of our HeroRATs is very well cared for, receiving an excellent diet, regular exercise, stimulation and loving attention from our expert rat handlers as well as weekly health inspections from a vet. APOPO refined its Animal Welfare practices following an Animal Health and Welfare Symposium held in Morogoro, with trainers, veterinarians, welfare officers, and researchers from different sites. Other activities in 2018 were centered on determining how various nutrition and exercise regimes of the HeroRATs interact to provide enrichment and motivation for the rat's scent detection work.

Pendo Msegu
Animal Welfare Officer and Training Supervisor

The kennels are lined with sets of spacious and ventilated interconnected cages with plenty of litter to absorb ammonia from urine and droppings. Each cage has a clay pot with bedding to simulate their natural underground nest and a wooden tripod to gnaw on. To stimulate and enrich our rats' lives they also get time every day outside of their kennels in a series of large shaded play enclosures containing elevated platforms with ramps, climbing branches, climbing ropes and little hiding places. A stimulating environment helps to prevent boredom, stress and aggression, improving our little heroes' health and performance."

APOPO's Global Impact

CURBING TUBERCULOSIS

86,850
SUSPECT TB SAMPLES SCREENED

2,009
ADDITIONAL TB CASES DETECTED

30,135
POTENTIAL INFECTIONS HALTED

2018 in Numbers

CLEARING LANDMINES

532

LANDMINES AND OTHER EXPLOSIVES DESTROYED

1,786,781 M²

LAND GIVEN BACK TO COMMUNITIES

4,012

PEOPLE FREED FROM THE TERROR OF LANDMINES

Landmine Detection

HAWK ROCK FOUNDATION

CRH Charitable trust

Supported by players of
PEOPLE'S POSTCODE LOTTERY

Awarded funds from
POSTCODE PLANET TRUST

THE JTI FOUNDATION

TRAFIGURA FOUNDATION

STANLEY THOMAS JOHNSON STIFTUNG

GOVERNMENT PRINCIPALITY OF LIECHTENSTEIN

Goldman Sachs Gives

CAMPAÑA COLOMBIANA CONTRA MINAS

International CAMPAIGN TO BAN LANDMINES

CLUSTER MUNITION COALITION CMC

Norwegian People's Aid

KINGDOM OF BELGIUM Federal Public Service Foreign Affairs, Foreign Trade and Development Cooperation

Arison

PICTET Fondation de bienfaisance du groupe Pictet

culturesofresistance

basmati authentic help

GICHD

Australian Aid

NATIONALE POSTCODE LOTERIJ

The people

APOPO is a humanitarian demining organization, which means people are the focus of our work. Protecting lives of men, women, and children and working to help vulnerable communities back on their feet following conflict. Thanks to this work close to a million people can safely cultivate land, raise livestock, and feed their families and communities, but there still remains much to do.

The Tragedy of Landmines

60 countries worldwide suffer from the tragedy of hidden land-mines and explosives. Landmines are planted during conflicts to protect strategic locations, block enemy travel routes and slow down adversaries by physically maiming them. Landmines remain hidden, active and dangerous long after the conflict ends; causing accidents, inflicting terror, and hampering the development of vulnerable communities. In 2017, landmines and explosive remnants of war caused 7,239 casualties, of which 87% were civilians and 47% of those children.

Landmines and explosive remnants of war (ERW) also obstruct economic recovery and development in war damaged areas. Villages are cut off from basic necessities such as water sources and essential travel routes and are prevented from using fertile land for cultivating crops, grazing livestock, and development. Global support for humanitarian mine action is declining. It is widely known that clearing landmines and explosives is painstaking, time-consuming, and costly. However, this is where APOPO can help.

How APOPO Helps

APOPO's landmine detection rats, nicknamed HeroRATs, ignore scrap metal and only detect the scent of explosives, making them much faster at finding landmines than humans with metal detectors. HeroRATs are too light to set off landmines, making them a perfect tool to speed up detection. When integrated into conventional mine clearance methods, such vegetation-cutting machines, and manual deminers with metal detectors, the rats are proven to significantly accelerate operations, helping return safe land to vulnerable communities as quickly and cost-effectively as possible. This prevents accidents and quickly returns land to communities for development and sustenance, at a fraction of the cost, leaving funds to address yet more areas.

Håvard Bach
Head of Mine Action

APOPO symbolizes innovation – we aim to improve the condition of millions of people who suffer from landmines and explosive remnants (ERW) of war. We pioneered the use of African giant pouched rats for increased land release rates. The success of these efforts is notable in countries like Angola, Cambodia, and Mozambique. We have engaged in developing unique land release methodologies, in order to release more land by technical survey and less by clearance. We embrace innovative solutions - rats and dogs strategically integrated with manual deminers and machines. In brief, landmine suspected areas are mostly mine free with just a few landmine contaminated pockets. Clearing all suspected land is costly, and yet, remains the predominant global practice. Traditional approaches stall progress.

The first step toward change is awareness. 2018 marked a notable change toward deeper engagement with more and stronger mine action partners. We have successfully demonstrated that rats provide consistent and reliable detection and dogs are key assets for technical survey. We also want to prove that partnership amplifies efficiency. APOPO can excel when working with partners that offer complementary skills.

Funding remains a major concern. We have accepted a request from the Zimbabwean Government to clear a 37 linear kilometer minefield along the Mozambican border. A lack of funds has stalled implementation. Our program in Angola is likewise underfunded, and we lack funding to combat landmines in Colombia. In contrast, APOPO's mine action program in Cambodia is expanding and we deploy mine detection rats in three different provinces with two different partners while also deploying technical survey dogs in one province.

In 2019, we will continue developing of more efficient land release methods, including contamination from cluster munition remnants (CMR), a major problem in Laos, Vietnam and several other countries. Our focus on amplified partnership will remain high in 2019 and we welcome initiatives from other mine action stakeholders to work with us.

I thank those who supported us in 2018 and I ask for your continued support. The international campaign for a mine-free world by 2025 is extremely ambitious, yet adequate financial support, improved operational methods, and strategic partnerships could bring us closer toward achieving this goal.

Mine action is about people. Children who cannot play freely outside their doorstep. Women fearing constantly for the lives of their children. Men and women who cannot cultivate land, herd their animals, and feed their families. Landmines also impact wildlife, and it is tragic to think of our wild creatures also affected by the seeds of our wars.

Angola Mine Action

Manuel Agostinho
Head of Mine Action Angola

In 2012 APOPO engaged with Norwegian People's Aid (NPA) in a strategic partnership to support ongoing countrywide humanitarian demining in Angola which began even before peace in 2002. Over the course of 2018, APOPO deployed its mine detection rats supported by manual deminers with metal detectors and an armoured brush cutting machine to three minefields in the municipality of Quitexe, Uíge Province, Angola. This year marked APOPO's strongest operational year to date with 640,645 square metres of land cleared and released and a total of 247 hazardous items found and destroyed.

Other highlights included growth of the team with the addition of two female manual deminers and an additional 16 mine detection rats that sailed through external accreditation to begin work on their first active minefield in August. On the APOPO cleared land, communities have already begun expanding their *lavaras* (farms), with cultivation well underway in the formerly hazardous areas. There are 330 people or 66 families living in direct proximity to the former minefields, with 7,920 individuals or 1,584 families as indirect beneficiaries comprising the wider Quitexe Village.

With all of Angola's 18 provinces contaminated by landmines and other unexploded ordnance (UXO) following nearly three decades of civil war, together APOPO and NPA have taken on the task of clearing four provinces in northwest Angola namely, Kwanza-Norte, Malanje, Uíge and Zaire. Talks with the Angolan Government are ongoing to handover the province of Malanje as 'free of all known minefields' and APOPO is pleased to have contributed to clearing Malanje, the first of hopefully a series of "mine-free" provinces.

Finally, in August, APOPO received its registration from Angola's Ministry of Justice which allows APOPO to conduct its humanitarian demining activities independently in Angola. This credential is the first step toward independent registration which will make way for APOPO's access to new funding streams and a range of potential partnerships.

My family and friends told me this is not work for women, but I believe we can do anything that men can do, we just need to believe in ourselves and be strong - this is what I am doing. Yes, it might seem dangerous, but we follow strict procedures that keep us safe! I am proud to be able to contribute to my country by removing these landmines. "

Yolanda Bartolomeo
Manual Deminer, Quitexe, Angola

Women in Demining

APOPO is an organization that embraces diversity and engages the best possible candidate for the job, regardless of gender. Even in a male-oriented profession like demining APOPO strives to achieve balanced employment of women and men. Meet Sozinha, at just 25 years old she's the youngest employee of APOPO mine action in Angola. And she is determined to make her own future. Financial security allows her to meet day-to-day needs and be a good role model for her daughter.

Impact 2018	
Landmines and UXO destroyed	247
Safe land given back to communities	640,645m2
People directly affected	330
People indirectly affected	7,920

Zimbabwe Mine Action

Ashley Fitzpatrick
Mine Action Advisor

For APOPO's start-up program in Zimbabwe, 2018 welcomed a positive changing tide with the largest global mine action donor, namely the United States Department of State Office of Weapons Abatement and Removal (WRA). For the first time, APOPO was encouraged to submit a concept note for funding, which was finalized in late October, and remains under review. Likewise, APOPO welcomed the WRA Southern Africa Program Manager to visit our tasked area, which in itself is a big commitment due to time and logistics. APOPO is pleased to report that following the visit, APOPO's program was formally recommended for funding. In parallel, APOPO has engaged with the European Union (EU) both in Harare and from Europe and is currently involved in developing a cost-benefit analysis (CBA) at the request of the EU Delegation in Harare which APOPO hopes will lead to a substantial funding proposal for the lifecycle of the program (2025). Various other donors and fundraising options are being actively pursued with the hope of securing funds to start-up operations in 2019.

APOPO has been tasked by the Zimbabwean Government with clearing a dense minefield (estimated 5,500 landmines per kilometer) inside what is now the Great Limpopo Transfrontier Park (GLTP), the largest conservation area in the world, spanning South Africa, Mozambique and Zimbabwe. The GLTP is a critical region for the global population of African Elephants. Only elephant fatalities have been documented, but the area is rich in other endangered mammal species (wild dog, lion, leopard, pangolin), which are undoubtedly affected.

Apart from fundraising efforts, this year saw a number of impact assessments carried out by APOPO, as well as by an independent consultant to inform proposal development. These assessments have provided APOPO with a solid pre-clearance understanding of what is at stake for the people, livestock, and wildlife living in and around the task area.

Animals

Concealed landmines cause accidents and injury to local communities and their precious livestock. They also kill and injure endangered wildlife, impact wildlife migration patterns and pose an obvious barrier to the development of ecotourism.

Cambodia Mine Action

Michael Heiman
Program Manager MA Cambodia

APOPO continued its operations throughout 2018 in Preah Vihear and Siem Reap provinces alongside our partner the Cambodian Mine Action Centre (CMAC). Together the teams cleared 1,146,136 m2 (equal to 161 soccer fields) of land, destroying 285 mines and other hazardous items. Returning this land to village communities for agriculture and infrastructure development.

In 2018 APOPO developed innovative working techniques using the mine detection rats (MDR) alongside machines and manual deminers. This enabled a 25% rise in the operational efficiency of the program over 2017. With a strong focus on technical survey, APOPO developed new methods with the mine detection rats (MDR) reducing the amount of the manual complementary assets. These new methods will have an even stronger impact in 2019.

APOPO also started working in Preah Vihear province. These operations are freeing up land for agriculture as well as removing the minefields around the famous Preah Vihear Temple, in Choam Khsant district. The temple area has a long history of minefields around it as it was in the middle of a border dispute between Cambodia and Thailand. Choam Khsant is one of the most vulnerable places in Cambodia and it was ranked as the most mine affected district, with 16 accidents in 2017.

2018 clearance directly benefitted 3,682 people. APOPO's planning accords with the 2030 UN Sustainable Development Goals, the Strategy of the Cambodian Mine Action and Victim Assistance Authority, and in accordance with a comprehensive CMAC survey at the village, commune and district level. The main focus in 2018 was on clearing areas in extreme poverty where the cleared land will be used for agriculture, roads, and resettlement of families that previously had no land to cultivate.

Technical Survey Dogs

APOPO leases trained detection dogs to partners to integrate into their demining toolbox. This new application involves specially equipped Technical Survey dogs (TSD) that search freely with no need for overlap between lanes in heavily overgrown areas and there is no need for vegetation cutting beforehand. The backpack the TSD carries consists of a GPS for recording the search pattern, microphone to give commands and video camera to give a live feed to the handler. Many minefields are in thick bush and so TSD trained in this method are able to work in heavily overgrown areas without the need for time consuming and expensive ground preparation methods with no loss of detection rates.

Impact 2018	
Landmines and UXO destroyed	285
Safe land given back to communities	1,146,136 m2
People directly affected	3,682

Visitor Center Cambodia

Benjamin Carrichon
Public Relations and Fundraising Manager

Since the start of the APOPO Cambodia Mine Action program in 2015, the public has shown a strong interest in the use of rats to detect landmines. In 2018, APOPO opened a Visitor Center (VC) in Siem Reap Cambodia, to highlight our work and raise public awareness about the global issue of landmines without the risk of a real minefield. The Center provides background to APOPO's work, giving our visitors a better understanding of mine action and how landmines affect local communities, and also introducing and demonstrating the work of the mine detection rats.

Welcoming more than 12,000 visitors from all over the world in its first year, the VC has raised awareness of the global landmine problem and given a better understanding of APOPO's work in Cambodia. It currently stands as #4 of 150 things to do in Siem Reap. The VC has been privileged to host a number of remarkable visitors including His Royal Highness Prince Sisowath Tesso, Her Excellency Eva Nguyen Binh-French Ambassador, the European Chamber of Commerce of Cambodia (EUROCHAM) and other delegates from both the public and private sector. In 2019 the VC will work closely with more than 600 partners: Hotels, tour operators and guides, airline magazines, restaurants and more.

Sister Srey Café

APOPO also increased its visibility and activities in Siem Reap with the acquisition of the very popular Sister Srey Café located in the heart of Siem Reap. Established in 2012, Sister Srey started as a place for "Good Coffee" whilst creating a supportive space to educate and empower Cambodians. 100% of Sister Srey's profits go to supporting APOPO's landmine clearance efforts in the country.

Colombia Mine Action

For decades, Colombia suffered a devastating conflict as illegal armed groups engaged in guerrilla warfare with the government. Improvised landmines have been laid throughout rural areas, threatening local communities. These improvised landmines do not just endanger lives, they also affect livelihoods by restricting land use and access to basic services such as education and health care. These landmines are predominately built from plastic and glass bottles filled with explosives and often contain very little metal making it unsafe to use metal detectors to find them.

Manual deminers therefore excavate their way through each minefield, slowly and carefully digging trenches of only 2 to 10 square meters per day. If mine detection animals and more efficient methods are not introduced the country will remain contaminated well after its 2021 deadline. In order to improve this situation APOPO is working to increase the efficiency of local operators by improving procedures and providing detection animals.

Since registering as a local NGO in 2016, APOPO partnered with Campagña Colombiana Control Las Minas (CCCM) to train their demining teams, monitor their demining operations, and provide an animal detection capacity. While funding has not yet been secured to introduce animals, capacity building proved instrumental in positioning CCCM as one of the most efficient demining organizations in the country. APOPO primarily trained CCCM staff in Algeciras, a beautiful mountainous region in Colombia that had been held hostage by guerrillas and the presence of landmines for decades. APOPO and CCCM's work there is spurring a boom of produce, grenadine and coffee, which has already improved the economy of the region.

In addition, APOPO continued developing mine detection animal projects with the Colombian Navy, Army, and Police. The Army has shown great interested in deploying APOPO's new technical survey dog technology in country, pending successful pilots in Cambodia. APOPO continues to work with each entity to establish national protocols and project plans to provide animals.

Cause Marketing

Chris Frantz
Public Fundraising

Our work would be impossible without the generous support of tens of thousands of APOPO donors from all around the world.

Thank you!

Media appearances	
Facebook followers	78,227
Twitter followers	7,341
Instagram followers	20,600
Website sessions	166,000 /year
Newsletter subscribers	25,422

L In 2018 the Marketing Department set out to take on a more structured approach towards website and social media conversion as we continue to grow and reach newer audiences. The teams' biggest challenge is still in marketing two very technical, but diverse activities, Tuberculosis and Mine Action, to an engaged but varied audience consisting of lay publics, social issue aware publics, technicians, scientists, donors, and animal lovers.

APOPO appeared over 360 times in online and traditional media channels throughout the year. In the past year many of the world's leading publications have featured APOPO including the BBC, the Wall Street Journal and ABC news. APOPO kept its ranking as a Top Nonprofit by GreatNonProfits and we gained Superstar status with GlobalGiving, which allows APOPO to continue ranking high in GlobalGivings charity ratings. Another big success was achieved with GuideStar platinum certification which demonstrates our commitment to transparency while telling our stories. This year both Facebook and Google approved APOPO as a nonprofit on their platform, allowing us to raise funds directly through these channels.

In 2018 APOPO raised € 728,545, the highest in our history to date.

Rebranding

Over the last two decades APOPO has developed: it expanded into several new countries and grew the Training and R&D into a department in its own right. APOPO's rebranding should concisely convey everything that the organization stands for and be able to work in different contexts. The new logos still reflect the APOPO spirit and family representing the three main departments: Mine Action, TB Detection and Innovation.

APOPO Swiss Fou

Anna Bouchier
Swiss Director

A POPO Swiss foundation supports the organization's overall global activities by strengthening its network and financial resources. The foundation facilitates direct tax-deductible donations for Swiss donors and aims to further engage its local audiences in support of APOPO's life-saving activities worldwide. Based in Geneva, at the forefront of international mine action efforts and international health, the foundation pursues a role of liaison with both existing and potential partners and donors in Switzerland, and further in Europe.

Global Fundraising effort and visibility

In 2018, the APOPO Foundation continued supporting APOPO's activities worldwide, with over CHF 600'000 of additional funds raised. The Foundation was especially dedicated to the strengthening of APOPO's relationships with long-lasting donors and the extension of multiple partnerships for APOPO's Innovation, Cambodia and Angola programs. Equally committed to increasing APOPO's visibility in Europe, the foundation represented APOPO at numerous international conferences through the Ashoka, Skoll Foundation, European

...undation

Venture Philanthropy Association (EVPA) and Ecole polytechnique fédérale de Lausanne (EPFL) networks, promoting APOPO's innovative scent detection solution to global issues.

Education Initiative partnership with Eduki

The City of Geneva renewed their support to the Swiss Foundation's Education Initiative, launched in 2016, aimed at raising awareness of the global landmine problem and showcasing the detection rats as an innovative solution. In 2018, the initiative partnered with a local education organization, the Eduki Foundation and evolved into a scientific workshop reaching over 300 high school students aged 14-18 and building a lasting link between young people and humanitarian solutions.

I was delighted to hear about APOPO joining the Swiss Board allows me to support the Foundation in reinforcing its network and raising awareness of the vital work APOPO does. As a vet I feel very proud to be involved in such an innovative and unique organization, which uses rats to create cost-effective and sustainable solutions to real global challenges. I find APOPO's collaborative, multi-sectoral and transdisciplinary approach particularly inspiring."

**Dr. Jennifer Saurina,
APOPO Swiss Board**

APOPO U.S. Office

Charlie Richter
U.S. Director

APOPO U.S. supports the organization's overall global activities by strengthening collaboration with U.S. donors and operational partners. The office facilitates direct tax-deductible donations for the U.S. public, which makes up over 50% of the organization's global public supporters. In 2018 APOPO U.S. continued to engage with institutional and public donors in the country. Based in Washington D.C. the office played a leading role in actively engaging with USAID and the U.S. State Department, the two largest U.S. government donors for Mine Action and TB Control respectively. APOPO feels much more confident in its prospects of receiving support from these key donors in 2019 and beyond. In addition to major donor engagement, the US office was key in coordinating activities that should place APOPO in a stronger position to raise its public profile in the US and abroad so that APOPO's scent detection technology can impact more communities across the globe.

Chief among them was the hiring of a U.S. based Director of Digital Marketing and development of a U.S. Zoo HeroRAT mine detection demonstration program, which will launch at the Point Defiance Zoo in Seattle and the San Diego Zoo in 2019. APOPO U.S. also con-

tracted with Galapagos Pex Productions in Miami to produce a HeroRAT animation that it hopes to distribute through major global media channels.

I have been a huge APOPO fan since I adopted a birthday HeroRAT for my father. It is an honor to be chosen as Chairwoman of the APOPO U.S. Board from 2019. With decades of experience in the media and innovation, I really look forward to helping APOPO leverage its growing brand and adapting its animal detection technologies and service offerings so that it can save even more lives."

**Kristen Davis,
Chairwoman APOPO U.S. Board**

Sokoine University of Agriculture
Successful collaboration

APOPO's innovation in landmine and tuberculosis detection is recognized worldwide as a successful and ground-breaking collaboration with Sokoine University of Agriculture (SUA) in Morogoro, Tanzania. I am proud of this innovative technology and pleased to see that the detection rat technology is based on empirical and published scientific research which is very much in line with my background.

Rats are widely seen as pests in Africa, loathed for the damage they cause to crops and food stocks. But APOPO is changing perceptions of these rodents by training them to detect two lethal dangers with their incredible noses: landmines and tuberculosis. To date, APOPO has in collaboration with our University trained more than 850 rats for scent detection since its inception.

The long-standing relationship and efforts between APOPO and SUA's Pest Management Centre led to a milestone we all remain proud of when we were chosen by the World Bank as an 'Africa Centre of Excellence for Innovative Rodent Pest Management and Biosensor Technology Development'. In May this year, his Excellency Dr. John Pombe Joseph Magufuli, president of the United Republic of Tanzania, visited SUA and commended SUA-APOPO for pioneering the landmark research that enables the TB detection rats to find 68% more children with tuberculosis than conventional microscopy in local clinics.

Looking back over the years, I believe SUA's support has played an important part in allowing APOPO to evolve from a small research project, to an organization with operations in 7 different countries. This has generated a positive impact on the lives of hundreds of thousands of people around the globe and we look forward to achieving many more milestones in the years to come.

Prof. Raphael Tihelwa Chibunda
Vice Chancellor of Sokoine University
of Agriculture

Carbon offset

Two years ago, APOPO partnered with Sustainable Agriculture Tanzania (SAT) to begin a tree planting project that will help offset APOPO's carbon dioxide emissions caused mainly by transport. Sequestering carbon by planting trees uses photosynthesis to remove carbon from the atmosphere as the trees absorb and store carbon in their stems and roots, and release oxygen back into the atmosphere.

A mature tree can contribute roughly to the sequestration of 1 ton of carbon dioxide per year. To ensure that the new trees that are planted are not cut down, SAT trains small-holder farmers, teaching them new sustainable methods to revitalize their land - planting trees alongside their crops and smart organic agriculture skills that produce natural fertilizers - leading to higher crop yields, increased income and food security, resilience to a changing climate and sharing their experiences with their communities.

In 2018, SAT trained 100 farmers to set up tree nurseries for 19 different species and successfully planted over 10,000 trees for the project. 50 SAT-trained farmers that joined the program in 2016 were rewarded for successfully looking after over 3,000 trees they had planted on their farms in 2017. The project attracted high level interest from the Tanzanian Forestry Sector as well as Swiss-based Emmentaler Forest Cooperative (EFCO) to develop new partnerships and opportunities to scale this carbon sequestration approach to other regions in Tanzania.

Impact 2018	
Types of trees planted	19
Farmers trained by SAT	100
Trees successfully planted	10,483

Dismas Marko
Smallholder Farmer, Morogoro

"The APOPO-SAT tree planting scheme will improve all of our lives, as well as the environment we live in. It will stop the demand on Morogoro's existing indigenous forests and change the way our community thinks about our natural environment and the destructive and unsustainable actions which are causing deforestation. I feel very proud that these trees will help put my child through secondary school improve our standard of living. A group of us that underwent training together have decided we want all the open public areas in our village to be lined with trees as we now understand the benefits of using trees to control groundwater recharge."

Transforming
Lives Together

Christophe Cox
CEO APOPO

apopo
SAVES LIVES

Last year was marked by tremendous progress for APOPO. Most importantly in 2018 APOPO developed new skills and capacities, supported many families and brought hope to communities living in danger of landmines and tuberculosis. Yet time is of the essence if we are to ensure the global campaigns for a landmine free world by 2025 and an end to TB by 2035 are realized. And to this end, the support of our donors and partners is critical. For its part, APOPO continues to advance its life saving projects, and expertise to strengthen existing programs, and deliver transformative, positive change to people and wildlife alike.

In 2018, people like you directly helped us achieve many breakthroughs in our work. We are grateful for the worldwide good-will and compassion which have allowed us to serve our mission and affect the health and safety of so much of humanity. The tireless work and achievements of our dedicated staff are a direct result of the support of all of you. Our success is your success, and I take this opportunity to thank each and every one of you for the difference you have made to APOPO this past year.

In a global society which is year by year increasingly challenged by growing inequalities, tendencies of tyranny and spreading insecurity for the vulnerable, APOPO stays positive and truthful to its core values promoting quality and innovation to transform and support the lives of the communities we serve. Together with our HeroRATs, we are working hard to build new solutions which benefit people in need, wildlife, the environment and society as a whole. To our supporters, partners and donors – you honor APOPO with your continued generosity.

Thank you for staying with us on our journey.

APOPO WOULD LIKE TO GRATEFULLY ACKNOWLEDGE THE FOLLOWING MARKETING PARTNERS AND DONORS:

Facebook	EMBRA Group	Jewish Communal Fund
Google	Maticus Family	The Woods and Gil Family Foundation
Global Development Group	Hugo Fund Services	The Swift Foundation
GlobalGiving	Bloomberg	The James J. Colt Foundation
Maecenata	Teach A Man To Fish Foundation	Skoll Foundation
King Baudouin Foundation	Lidstad Family Fund	City of Geneva
Triodos Foundation	Communities Foundation of Texas	Roviralta Foundatio

The Dutch Postcode Lottery has supported APOPO with two grants over the period 2016-2020 totaling 2.5 million euros and makes our life-saving work possible in various countries and projects around the world.

Supported by players of

Awarded funds from

Since 2014, players of People's Postcode Lottery (UK) have raised £2,875,000 in unrestricted funds for APOPO. This support directly helps communities across the globe who every day suffer from the terror of landmines or who are debilitated by TB, allowing them to heal and get their lives back on track.

FINANCIAL STATEMENT
BALANCE SHEET IN EURO *

ASSETS	2018	2017
Current assets	**2,986,980**	**3,146,237**
Current receivables	297,659	302,771
Other assets	609,017	507,000
Cash and equivalents	2,080,305	2,336,465
TOTAL ASSETS	**2,986,980**	**3,146,237**
LIABILITIES		
Net capital	**1,004,191**	**1,337,927**
Funds of the organization	328,046	328,046
Retained Earnings	676,145	1,009,881
Long term liabilities	**1,924,842**	**1,804,397**
Deferred Income (Grants)	1,924,842	1,804,397
Curent liabilities	**8,565**	**3,913**
Current payables	8,565	3,913
Accrued expenses	**49,381**	
TOTAL LIABILITIES	**2,986,980**	**3,146,237**

PROFIT&LOSS STATEMENT (EURO)

|	2018	2017
Total Income	4,482,425	4,074,245
Total Operational Expenses	3,421,021	3,317,556
Total Personnel Expenses	1,317,219	1,291,100
Depreciation	12,207	-
Other costs	4,054	5,270
Operating Result	(272,075)	(539,681)
Financial Result	(86,257)	(159,032)
Extraordinary Result	24,596	8,921
Net Income	(333,736)	(689,793)

* annual accounts audited by BDO

DONATIONS & SUBSIDIES 2018

- Public fundraising...728,545
- Government grants 882,023
- Foundations grants...2,485,616
- Corporate grants...255,179
- Research grants..100,988
- Miscellaneous operating income 30,075

TOTAL
4,482,424
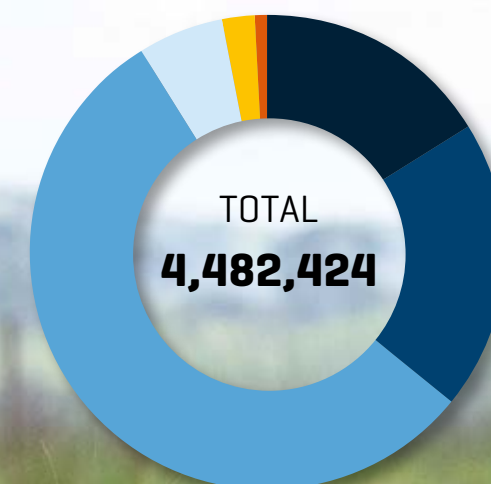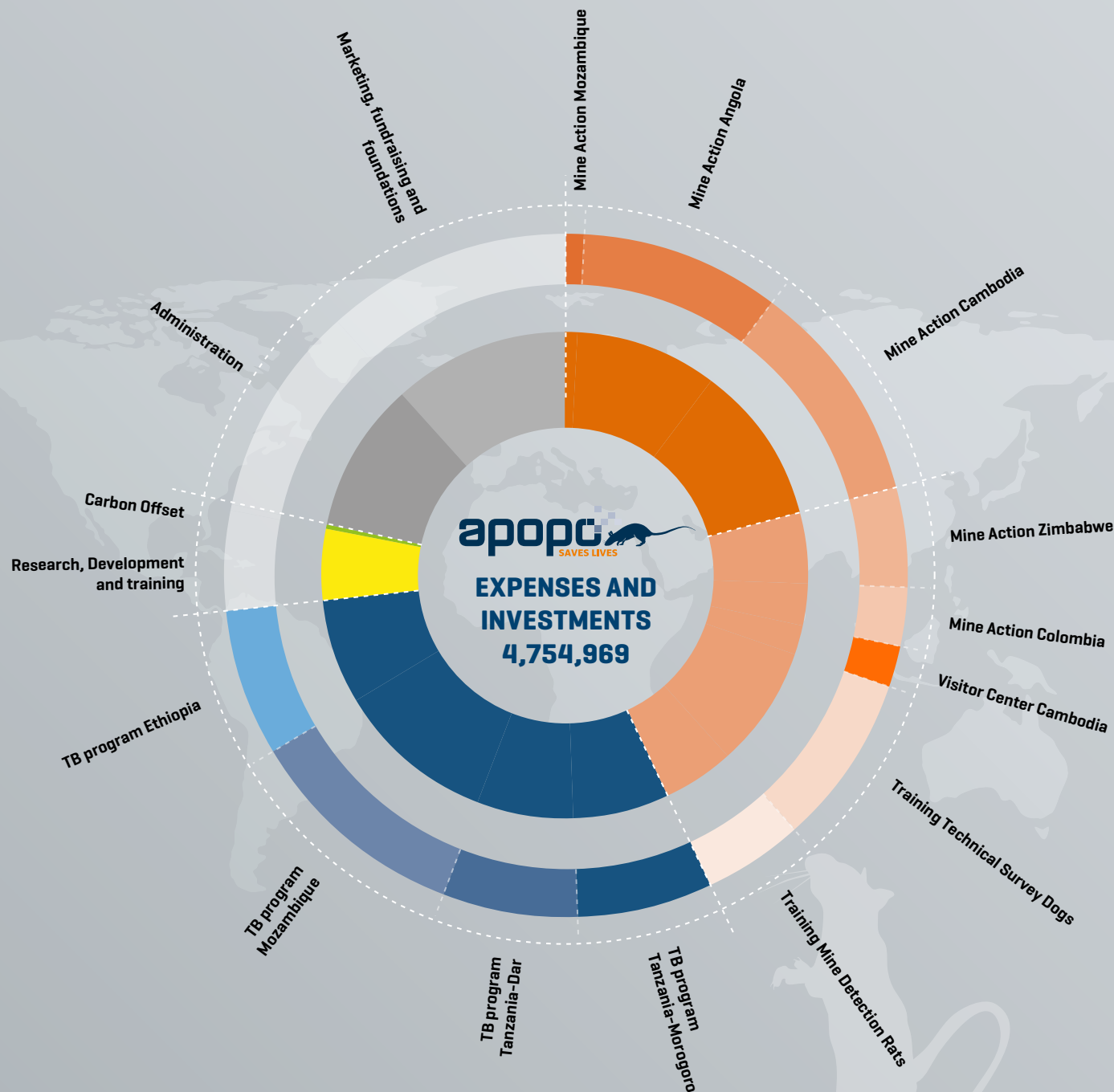
IN EURO

EXPENSES AND INVESTMENTS 2018 PER ACTIVITY

Mine Action Mozambique	51.005
Mine Action Angola	441.865
Mine Action Cambodia	508.735
Mine Action Zimbabwe	224.518
Mine Action Colombia	130.653
Visitor Centre Cambodia	85.938
Training Technical Survey Dogs	381.574
Training Mine Detection Rats	223.616
TB program Tanzania, Morogoro	312.989
TB program Tanzania, Dar Es Salaam	302.080
TB program Mozambique	492.749
TB program Ethiopia	331.142
Research and Development	243.308
Administration	475.974
Marketing, fundraising and foundations	543.823
Carbon Offset	5.000
Total	**4.754.969**

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Apart from:
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HeroRAT Adoption Program
For 6€ per month or more you can contribute to
APOPO's life saving mission and receive updates
of your own HeroRAT
www.apopo.org/en/adopt

You can also make a donation at:
www.apopo.org/en/support-us

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