

ANNUAL REPORT

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ABOUT APOPO

APOPO was founded in response to growing awareness that landmines kill and maim people and hamper development in post-conflict areas. Methods to rid affected countries of landmines were slow so a small team in Belgium founded APOPO to develop a fast, simple and cost-efficient mine clearance technology that could be sustained within national mine action programs in low-income countries. APOPO developed a unique method using trained rats, and now, over 20 years later, APOPO is a global leader in scent detection animals.

As a research organization, APOPO is always at the forefront in developing new humanitarian and environmental scent detection applications. Our core operational activities are in the fields of mine action and tuberculosis (TB) control.



APOPO was founded in response to growing awareness that landmines kill and maim people and hamper development in post-conflict areas.



APOPO is supported by a large international network of diverse partners and donors as well as the general public, and has foundations in Switzerland and the United States.

ABOUT APOPO

The innovative training and research center is based at the Sokoine University of Agriculture in Tanzania. APOPO has Mine Action operations in Cambodia, Angola, Zimbabwe and Mozambique, South Sudan and Turkey. APOPO's tuberculosis (TB) detection laboratories in Tanzania and Ethiopia use trained rats in combination with confirmatory technology to stop TB. In Mozambique, APOPO adapted to include molecular testing for TB and other infectious diseases such as human papillomavirus (HPV).



VISION AND MISSION

MISSION

Our mission is to protect people and the planet with innovative solutions using trained rats and other scent detection animals.

VISION

Our vision is to create a better world as a global leader in scent detection animals.



APOPO contributes to 13 of the 17 Sustainable Development Goals (SDGs) that are aligned with our work and values, and commits to the principle of leaving no-one behind.

CORE VALUES



QUALITY

Demonstrating and promoting high standards in research, design, training and implementation of scent detection animals' technology.

INNOVATION

Pioneering creative research and innovative solutions within a participatory learning culture to maximize social impact.

DIVERSITY

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

SOCIAL TRANSFORMATION

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

SOLIDARITY

APOPO commits itself to the common good and shares responsibility toward the protection of the people, communities and the planet.

Introduction

Pendo Msegu

Training & Animal Welfare Supervisor



For the past two years, we have all faced the unprecedented challenge of a global pandemic that has not spared any country, community or family.

A semblance of normal life has resumed at a time when the world is facing more armed conflict than ever before, and when the undeniable effects of climate change can be seen around the world. These effects have prompted us to expand and diversify our HeroTREEs project.

Yet, through great uncertainty, we have also seen bright rays of hope in the places where APOPO works. That is something of which all of us here at the Tanzania Training Center are truly proud of. We consider each rat a highly valued member of our team, making their health and welfare one of my focus areas. The training of our rats has evolved over the years, and it has been an interesting journey for me to see and be involved in. Last year, 30 detection rats left Tanzania as experts in their field. As Magawa went into retirement I felt proud of all that he managed to achieve. I have fond memories from training him up from a pup to seeing him off at the airport as he began his new journey in Cambodia!

This year has also been a break-through year for APOPO Dogs. While our colleagues in Cambodia successfully completed two pilot projects that proved the concept of our highly-driven Technical Survey Dogs, the fact that we now have over 50 dogs detecting landmines and other explosives in various countries, makes us the largest dog training organization in the Mine Action sector!

APOPO is a progressive organization and our studies and data collection inform the science that has improved not only the performance of our animals but also our understanding of how best to cost-effectively integrate them into existing systems. To achieve our goals, we grow and support a culture in which we work together to embrace an evidence-based, innovative, and sustainable approach to our work, while never losing sight of the people. By hiring staff from local communities as much as possible, APOPO gives us and our extended families stability while contributing to peace-building and sustainable futures.

I am proud to share with you our 2021 achievements and milestones in this report and I am excited to see what this will bring for the future. It remains a privilege to be a part of the amazing team that trains these gentle giants, working alongside the caring staff, partners, and supporters who have helped us through a couple of the toughest years we have known. We owe a debt of gratitude to all of you who have supported us in our mission – Thank you!”



I am proud to share with you our 2021 achievements and milestones in this report and I am excited to see what this will bring for the future.

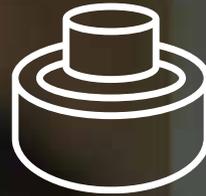
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ENABLED IMPACT

Since APOPO began until the end of 2021



151,267

Landmines and other explosives destroyed



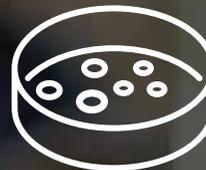
70,999,370 m²

Safe land given back to communities



1,801,697

People freed from the terror of landmines



805,263

Suspect TB samples screened



23,298

Additional TB Patients detected



231,675

Potential infections halted

MINE ACTION



APOPO is a humanitarian demining organization, which means the focus of our work is protecting the lives of men, women, and children, as well as animals and wildlife. Mine Action is about protecting people and their livelihoods from weapons that have little to do with them. Allowing communities to safely cultivate land, raise livestock, educate children and feed their families. Day-to-day activities we all too often take for granted. Thanks to the dedication and tireless hard work of our mine action teams, and the generous support of APOPO's partners and donors, over 1.7 million people feel the impact of our work.





Landmines, cluster bombs and other explosives inflict horrific injuries that have a devastating impact on lives. In **2020**, over **7,000 people were killed** or injured by landmines and other explosives across **54 countries**. Despite help from our detection animals and innovative technology, the number of victims has only increased in recent years. These cruel weapons are designed to act as a barrier to opposition forces during conflict. Sadly, it is ordinary civilians, especially children, who pay the heaviest price - accounting for half of all civilian casualties.

APOPO offers innovative solutions that integrate detection animals into traditional methods that allows us to clear landmines and other explosives more efficiently. In **2021**, APOPO continued clearing landmines and other explosives in **Cambodia, Angola, and Zimbabwe**. We also deployed animals to our partner in **South Sudan and Turkey**.



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APOPO's animals ignore scrap metal and only detect the scent of explosives, making landmine detection rats much faster at finding landmines than humans with metal detectors. Using **technical survey dogs** beforehand, to confirm the presence of landmines, creates a more accurate picture of which areas are actually contaminated. Results show, that by integrating both these detection animals, the overall efficiency of the landmine clearance process can be doubled on some tasks and even tripled on others, compared to using conventional methods alone.

The international community remains committed to ridding the world of landmines by 2025. 164 nations have signed the Mine Ban Treaty, which bans the production, use, storage, and distribution of landmines. APOPO maintains its commitment to support landmine-affected communities, and with increased funding and strategic partnerships, we hope to expand our efforts in 2022.



Technical Survey Dogs use their natural tracking ability to find the boundaries of the minefield. Mine Detection Rats use their natural scavenger behavior to find mines within a minefield. Neither animal is hurt in the process.

LAND RELEASE

Integration of animal detection systems



WHERE WE WORK

ZIMBABWE

APOPO began clearance in Zimbabwe in 2020 along the border with Mozambique in the Sengwe Wildlife Corridor. The project aims to free the movement of endangered wildlife between South Africa's Kruger, Mozambique's Limpopo and Zimbabwe's Gonarezhou National Parks.

ANGOLA

APOPO has been a Mine Action operator in Angola since 2012, where it has been operating in the provinces of Malanje, Zaire, and Uige. APOPO is the only mine action operator with scent detection animals in the country and is now clearing Cuanza Sul province.

SOUTH SUDAN

APOPO works in South Sudan in partnership with The Development Initiative (TDI), providing trained dogs (TSD, MDD) and skilled personnel for an UNMAS project, surveying and clearing roads leading to different remote areas across the country. APOPO expanded this dog service contract in South Sudan and as of 2021 there are a total of 16 dogs in the project.



MOZAMBIQUE

APOPO's Mine Action program has been active in Mozambique since 2004 and contributed greatly to the landmine-free declaration of Mozambique in 2015. Since then, APOPO has been helping with residual tasks clearing ammunition dumps and is now a partner in the disarmament of the RENAMO forces.



TANZANIA

Since 2000, APOPO has developed its operational headquarters and training center at the Sokoine University of Agriculture where all the Mine Detection Rats are born and trained. This is also home to APOPO's Innovation department that researches and develops the innovative applications and advanced techniques used in existing operations.



TURKEY

APOPO provides 16 Mine Detection Dogs and personnel to partner The Development Initiative (TDI), working on the UNDP landmine clearance project along Turkey's eastern border with Georgia, Armenia and Iran.



CAMBODIA

APOPO has been clearing minefields in Cambodia since 2014 in partnership with the Cambodian Mine Action Center. APOPO works on several sites: in the province of Siem Reap; clearing around the UNESCO world heritage temple site in Preah Vihear and Battambang province. In addition to deploying HeroRATs, APOPO trains and deploys Technical Survey Dogs in Cambodia.

THE APOPO MINE ACTION PROGRAMS ARE MADE POSSIBLE BY OUR PARTNERS AND DONORS



CAMBODIA



Michael Heiman

Asia Regional
Manager



Decades after war and conflict ravaged Cambodia, it is still recovering from **millions of hidden landmines** left behind. They do not discriminate, and continue to kill men, women, and children even today. As Cambodia's population increases and land becomes scarcer, farmers are moving into uncultivated areas, exposing themselves to the dangers of landmines.

APOPO primarily works in collaboration with **Cambodian Mine Action Center (CMAC)**, removing landmines and other explosives in Cambodia since 2015. APOPO employs over 100 people in the country, most of whom were recruited and trained from mine-affected areas. In this way APOPO supports some of the poorest people in Cambodia and directly benefits their local communities. In 2020 APOPO entered into collaboration with **Mines Advisory Group (MAG)**, who began piloting APOPO's animal teams within their capacity. In 2021, APOPO signed an additional cooperation agreement with **Humanity & Inclusion (HI, formerly Handicap International)**, to assist in the treatment of landmine victims in areas APOPO works.

Landmine-free Cambodia

In Cambodia APOPO is integrating a mix of scent detection animals to speed things up: landmine detection rats to speed up landmine clearance, technical survey dogs (TSD) to release large areas ahead of clearance when there is no evidence of landmines and finally manual deminers and machines to support the animals. The program currently has **60+ animals working in 4 provinces – Siem Reap, Preah Vihear, Battambang and Ratanakiri.**

With their powerful noses, the rats and the dogs continue to make APOPO a reliable and more cost-efficient solution compared to traditional manual landmine clearance techniques. Our animals only go for the scent of explosives whilst ignoring any scrap metal lying around. In 2021, the program achieved considerably more than its yearly target, releasing a record **7,035,966 m²** over the course of the year despite the Covid-19 pandemic and challenges it created. This enabled land to be freed up for agriculture and development, and allowed a better access to national cultural heritage sites. APOPO has high hopes for 2022, yet there is still much to do to realize a landmine-free Cambodia.

IMPACT IN 2021

Landmines and explosives found and destroyed	740
Cluster munitions found and destroyed	491
Safe land given back to communities	7,035,966 m ²
People benefitting from our work	27,302
People attended Risk Education	5,056



TRAGIC ACCIDENT



When I was 9 years old, I was running toward my father at a neighbor's farm when I stepped on a landmine. It exploded instantly. I don't remember what happened, just waking up in the hospital the next day. They told my father they had to amputate my leg, I cried. It's hard missing one leg. I can't play football with my friends like before. Mostly I watch them play. Sometimes they let me play as goalkeeper. But it's not the same."

Cho Chandarak, Cambodia



EXPLOSIVE ORDNANCE RISK EDUCATION (EORE)

APOPO works meticulously to make land safe by clearing landmines and cluster munitions, so families living near minefields can rebuild their lives and children can go to school in safety. However, clearing minefields takes time. For families living surrounded by hidden dangers, risk education is the best way to prevent casualties. It is important that nearby communities are taught how to stay safe. Risk education

sets out to inform as many people as possible with life-saving information on how to recognize, avoid and report threats. The project is ongoing in collaboration with Cambodian Mine Action Center (CMAC), in coordination with the provincial education units and under the auspices of the Cambodian Mine Action and Victim Assistance Authority (CMAA)

Teaching people how to stay safe until the explosives can be removed is crucial to prevent people from getting hurt. Children are particularly at high risk. An unexploded landmine can look like a toy to a curious child.



Landmine accidents can mean children miss out on their right to an education as they may get pulled out of school to take care of an injured family member. They may even have to work to contribute to the household's income. By clearing minefields and releasing safe land back to these impacted communities, APOPO actively participates in keeping children in school.

Alongside clearance efforts in the Province of Preah Vihear, APOPO provides Risk Education in the neighboring communities. APOPO's efforts are currently concentrated in **Choam Khsant District**, one of the most mine affected areas in Cambodia, that has suffered from numerous accidents in recent years. In 2021 APOPO developed new materials that in-

clude additional posters and leaflets designed for the school-aged children. These informational sessions prove to be very effective so far, the number of attendants is growing, and the teams receive more and more information about items found following the lessons... In 2021, 4,266 children attended risk education lessons.



VICTIM ASSISTANCE (VA)



APOPO has always conducted **Risk Education** in its area of operations. However, in 2021, additional funding allowed us to expand our efforts and establish a specific team that also includes **Victim Assistance**.

APOPO has encountered many landmine victims living in affected communities, particularly in **Preah Vihear province**. Most of them require additional assistance which are not being met. APOPO approached **Humanity & Inclusion** and learned that there is a necessity to provide better access for victims from remote areas such as Preah Vihear, in the fields of prosthetics, physiotherapy, mental health counseling and more. Although the services provided by the Government and HI are free of charge, for many of them the distance to the nearest rehabilitation center is too far, and they have no means to reach it, as most of them have little income and struggle to get by.

The Risk Education and Victims Assistance team was tasked to identify all landmine victims within the districts of APOPO's operations, assess their needs and provide transport to HI's rehabilitation center to get the treatment they need. With a special focus on helping children, the team was equipped with a large vehicle. Moving from district to district, APOPO shuttles victims to the HI rehabilitation center, where they get their treatment and taking them back home. Since the beginning of the initiative in August 2021, the team accessed 172 victims, from which 51 were taken for additional treatment. This initiative proves to be having a very positive impact on these landmine victims and the relevant authorities are supportive of the APOPO team, seeing this assistance as a blessing to the survivors and their communities.

APOPO DOGS



Ibro Tinjak
Head Dog Trainer

With 20 years of experience in training rats for scent detection, APOPO has become a leader in developing scent detection animals and is uniquely positioned to train other animals.





Since 2017, APOPO began training **traditional mine detection dogs**, and later on, the **state-of-the-art Technical Survey Dogs (TSD)**.

Technical survey is a process that is principally applied to prove that large areas of minefields are in fact landmine free, and to narrowly identify boundaries for contaminated areas.

Currently APOPO combines an effective use of **rats and dogs** to achieve the best possible land release rates that exceed any other known methodology or approach.

The animals play complementary roles for optimal efficiency: **rats** are used for **clearing large** areas while the **dogs** are for their initial investigation, the **technical survey** phase.



Currently APOPO combines an effective use of rats and dogs to achieve the best possible land release rates.



A TSD is a highly-driven search dog, equipped with a track & trace system, that can conduct a long search and detect buried explosive ordnance.

50 Operational Dogs

This new detection animal became operational in Cambodia in 2019 and has achieved remarkable results since. The TSDs allow APOPO to survey suspected hazardous areas very quickly, defining whether they should be cleared or not. By integrating TSDs, suspected areas that do not contain any evidence of explosives can be returned to the local communities and the expensive and intrusive clearance methods are restricted to areas where they are actually needed. This avoids spending major resources on areas that do not contain any landmines.

APOPO's Dog Training Center is based in Cambodia, where the climate allows for training all year round and where it is possible to establish large training areas with buried explosive items. APOPO currently has over 50 operational dogs in **Cambodia, Angola, South Sudan and Turkey.**



PROVEN TECHNOLOGY

 APOPO continues to strive for recognition through published research studies and proven operational results. This year the **Geneva International Centre for Humanitarian Demining** (GICHD), published the results of the 2019-2020 SMART TSD evaluation pilot project carried out in Cambodia. The positive outcomes of the project and the field results are creating additional opportunities for APOPO in new post-conflict areas around the world.



Beyond Landmines

In November 2020, APOPO began a pilot project to prove the concept of using our Technical Survey Dog teams for a Cluster Munition Remnant Survey (CMRS) in East Cambodia, where bombs that were dropped during the Vietnam War still threaten the rural communities living there.

The team successfully proved the concept and completed surveying over 3,800,00 m² of former strike areas by end of July 2021, saving huge amounts of time and funds. The dogs found 476 cluster bombs and 12 other explosive remnants of war and are preparing for a new 18-month pilot project with Mines Advisory Group (MAG) in Ratanakiri Province, starting in January 2022.

SOUTH SUDAN

Decades of war drastically impacted the population of South Sudan and nourished a dramatic humanitarian crisis. The Landmine Monitor estimates that over 85 million square meters of land is still contaminated. In 2017 the United Nations Mine Action Service (UNMAS) has requested to enhance its landmine clearance capacity with mine detection dogs, in order to speed up the clearance of essential roads across the country. APOPO works in South Sudan in collaboration with The Development Initi-

ative (TDI), providing trained dogs and personnel. The project is managed by UNMAS. APOPO started working in South Sudan in 2018 with 8 mine detection dogs and expanded the service contract in 2020 with 4 additional technical survey dogs. The dog teams are deployed in different parts of the country, searching for landmines along roads and for cluster munitions around affected villages.



TURKEY

In 2021 APOPO expanded the collaboration with The Development Initiative (TDI), with 16 Mine Detection Dogs and personnel. The project is managed by UNDP and TURMAC, concentrating on clearing all the landmines from Turkey's Eastern Border with Armenia, Iran and Nakhichevan.

The project was planned to start in early 2021, but due to the pandemic

restrictions the working teams could enter Turkey only at the end of 2021. The main camp is situated in the foothills of the famous Mount Ararat, a dry and windy area, where during the winter temperatures can drop below zero. TDI has built large tents for indoor training, which proved to be very effective, allowing APOPO to keep the dogs in shape during the winter and be ready for accreditation and operations as early as possible.



2022 will see the dogs go through accreditation and begin operations.

ANGOLA



Manuel João Agostinho
Program Manager



Landmines still contaminate large tracts of Angola, hindering development and causing injury and death. APOPO has been working in Angola since 2012 and is currently operational in the west of the country in Cuanza Sul. According to the **National Mine Action Agency (ANAM)**, Cuanza Sul is the fourth most contaminated province in Angola with 110 minefields that are estimated to be around 8.7 million m² in size. Until people have safe access to their homes, communities, and land, rebuilding and development will not be possible.



To support a peaceful and secure Angola, APOPO is maintaining a strong demining capacity that boosts land release rates at significantly reduced costs. APOPO's landmine detection rats are too light to detonate landmines and are very quick at finding them, making them an excellent tool for accelerating landmine clearance. In 2021, APOPO added a **Technical Survey Dog component** to the toolbox to further reduce areas suspected to contain landmines and other explosives and guiding more effective use of the rats.

This year saw APOPO begin a new partnership with **Instituto Nacional de Desminagem (INAD)** - the national mine action institute and main public demining operator in Angola. INAD's machine has been integrated into APOPO's operational capacity for ground preparation, thus increasing our activities and outputs. The second aspect of this new partnership involves carrying out joint activities in Risk Education which allows APOPO to help keep people safe by teaching them how to minimize risks and what to do when they come across dangerous explosives.



APOPO's landmine detection rats are too light to detonate landmines and are very quick at finding them, making them an excellent tool for accelerating landmine clearance.

Empowering Women



By hiring women from landmine impacted communities, APOPO raises us, our families and our communities out of poverty while contributing to building peace. When I heard about APOPO's program, that they were looking for deminers I was fascinated, and I knew I had to try and do something to improve my life. My job allows me to provide for my two young children and I want to be a positive role model for my daughter - showing her that girls can make a difference!". **Sozinha Pedro, APOPO deminer**

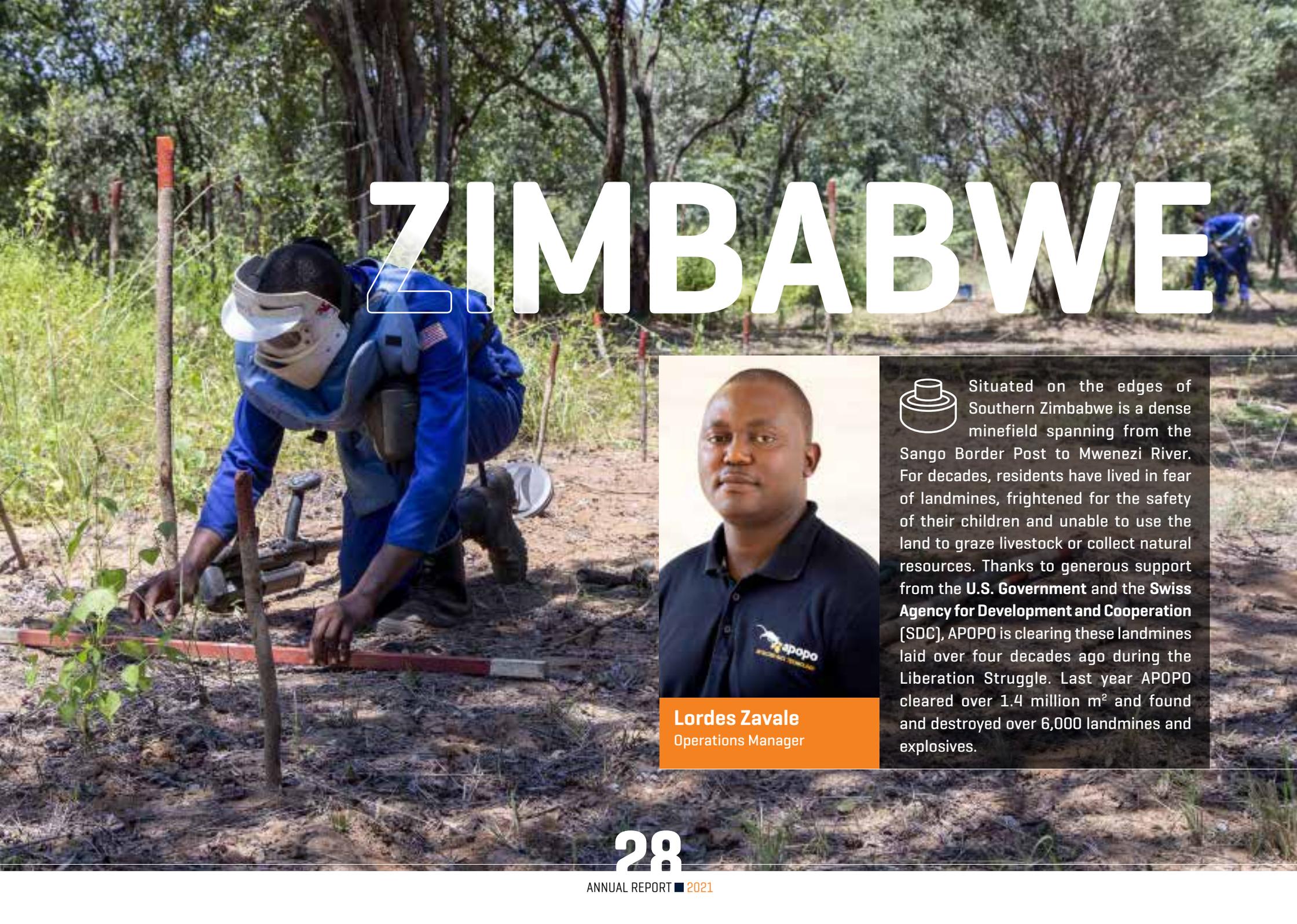
Targets

APOPO surpassed its annual targets in 2021, clearing and releasing 2,644,461 m² back to local communities directly benefiting nearly 7,200 and indirectly benefiting 47,800 people. The teams found and destroying 54 landmines and 155 other explosive remnants of war and 4,144 small arms and items of ammunition. In 2022 APOPO aims to clear about 1.2 million m², providing safe access to vital farmland and bringing back transport routes and trade for the community.

IMPACT IN 2021

Landmines and explosives found and destroyed	209
Small arms and ammunition	4,144
Safe land given back to communities	2,644,461 m ²
People benefitting from our work	7,200
People attended Risk Education	1,161

ZIMBABWE



Lordes Zavale
Operations Manager



Situated on the edges of Southern Zimbabwe is a dense minefield spanning from the Sango Border Post to Mwenezi River. For decades, residents have lived in fear of landmines, frightened for the safety of their children and unable to use the land to graze livestock or collect natural resources. Thanks to generous support from the **U.S. Government** and the **Swiss Agency for Development and Cooperation (SDC)**, APOPO is clearing these landmines laid over four decades ago during the Liberation Struggle. Last year APOPO cleared over 1.4 million m² and found and destroyed over 6,000 landmines and explosives.

APOPO's area of responsibility is an important corridor for wildlife migration, including elephants. Sadly, landmines are preventing animals from naturally migrating out of **Gonarezhou Park** to neighboring **Limpopo Park** in Mozambique or **Kruger Park** in South Africa. This is leading to overpopulation and habitat destruction, preventing gene flow necessary to maintain genetic diversity.

By clearing the landmines, APOPO is opening up the area for development, agriculture and eco-tourism to thrive, bringing many benefits for local communities. It will enable conservation authorities to reconnect ecological systems, as well as develop wildlife conservation as a land-use option that not only improve people's livelihoods but also the wellbeing of wildlife in the area. This project supports Zimbabwe's efforts of becoming **landmine free by 2025**.

Fighting poverty

For vulnerable communities living next to the minefields, poverty and lack of food security have posed a challenge for many years. APOPO empowers communities with access to safe land and hope that grows from it for a better future.



ZIMBABWE

Mine Risk Education

Mine Risk Education is vital to ensuring that everyone, especially children, can spot explosive dangers and know how to respond safely. Clearing the explosives is painstaking work and takes time. While communities along the minefield wait, APOPO teaches people to recognize, avoid and report these explosives. Children are particularly at high-risk, so the risk education focuses on schools to maximize its reach.

IMPACT IN 2021

Landmines and explosives found and destroyed	6,260
Safe land given back to communities	1,471,365 m ²
People benefitting from our work	7,116
People attended Risk Education	6,169

Lifting Communities



I am from Chilotlela, a village near APOPO’s tasked minefield. I have seen both human and livestock victims of the minefield and witnessed how the threat of landmines blocked farming activities and devastated livelihoods. I am proud to be working alongside other deminers from the community to stop this from ever happening again.”

Trust Masiya, APOPO deminer



MOZAMBIQUE



John Sörbö

Program Manager
[incoming] for MA Zim-
babwe and Mozambique



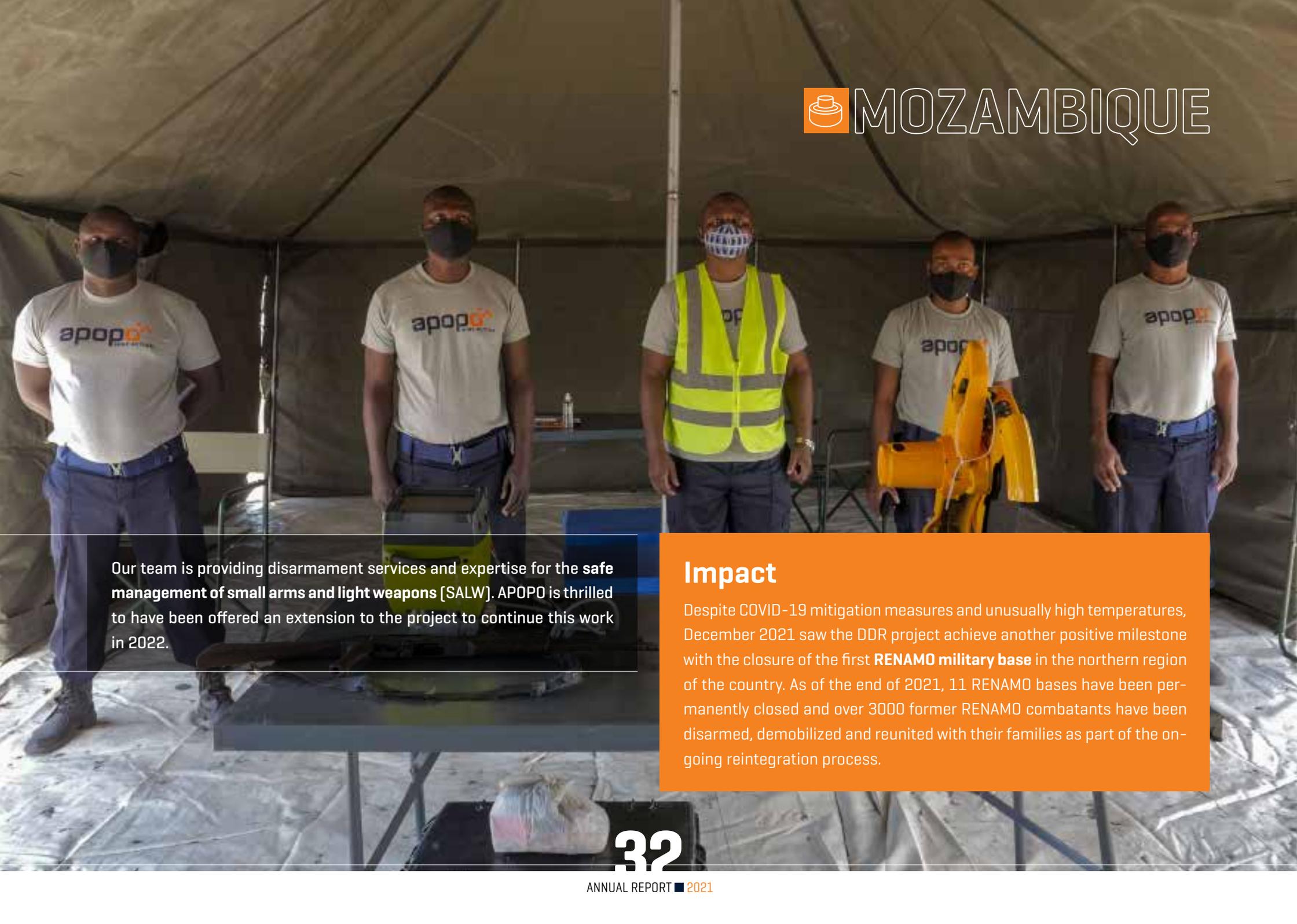
APOPO's Mine Action program has been active in Mozambique since 2004 and contributed proudly to the landmine free declaration of the country in September 2015.

APOPO stayed on to help with residual tasks such as clearing ammunition dumps and over the last few years committed to supporting the nationally owned Peace Process.

A partnership between the **United Nations Office for Project Services (UNOPS)** and the **Peace Process Secretariat** is supporting the

implementation of the Maputo Accord for Peace and National Reconciliation. APOPO has had the honor of being involved in this ongoing peace process through the disarmament of former **Mozambican National Resistance (RENAMO)** combatants.





Our team is providing disarmament services and expertise for the **safe management of small arms and light weapons (SALW)**. APOPO is thrilled to have been offered an extension to the project to continue this work in 2022.

Impact

Despite COVID-19 mitigation measures and unusually high temperatures, December 2021 saw the DDR project achieve another positive milestone with the closure of the first **RENAMO military base** in the northern region of the country. As of the end of 2021, 11 RENAMO bases have been permanently closed and over 3000 former RENAMO combatants have been disarmed, demobilized and reunited with their families as part of the ongoing reintegration process.

TUBERCULOSIS DETECTION



TB DETECTION SUMMARY

The tuberculosis epidemic

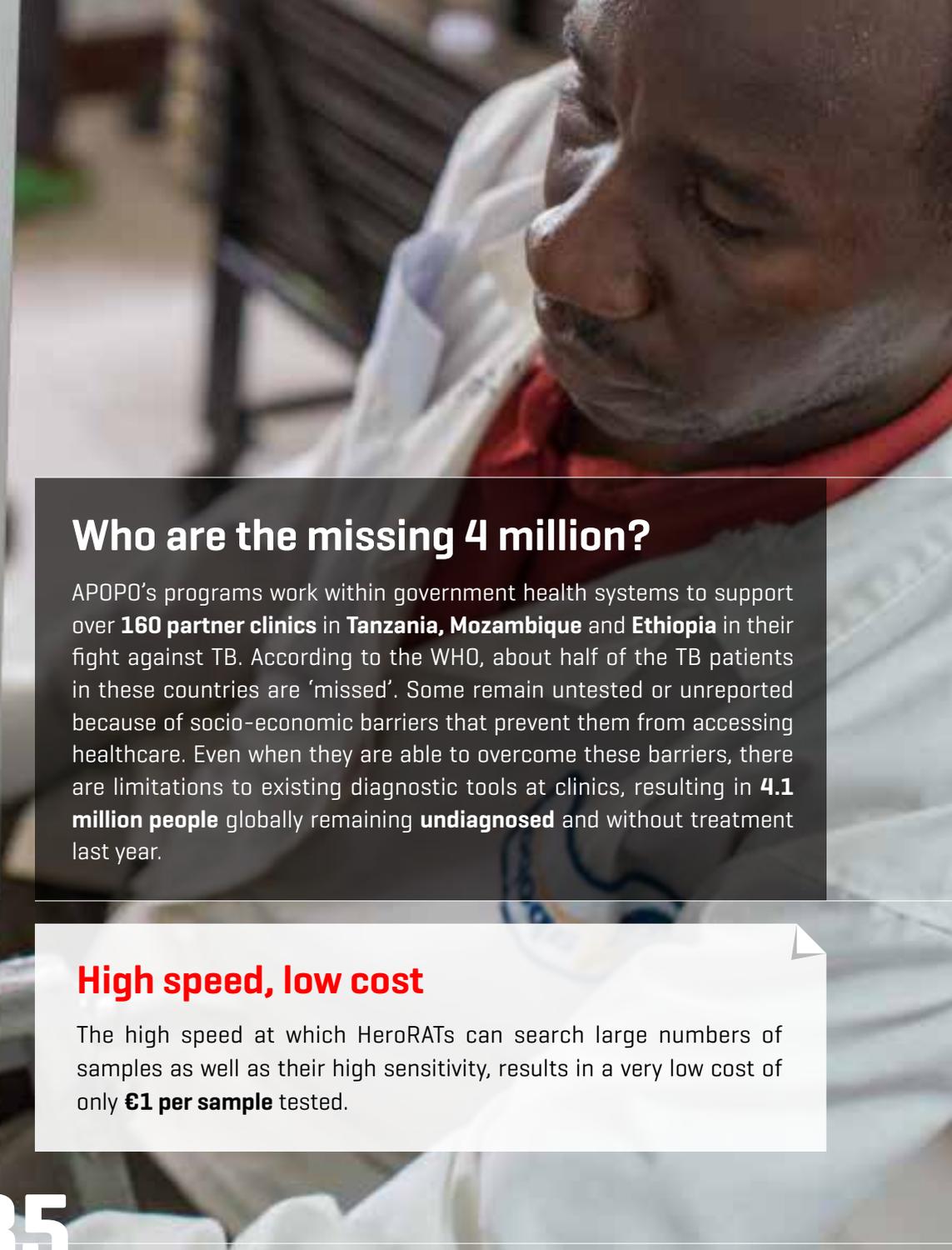


Tuberculosis (TB) remains one of the world's deadliest infectious killers. Until the coronavirus (COVID-19) pandemic, TB was the leading cause of death from an infectious disease, ranking above HIV/AIDS. **The World Health Organization (WHO)** estimates global efforts to tackle TB have saved 66 million lives since the year 2000. However, the COVID-19 pandemic reversed years of progress made to end TB. For the first time in over a decade, TB deaths increased in 2020. Not only does the virus pose an increased risk to people with TB, it has also caused severe disruption to services as they both depend on similar staff, resources and facilities.

Symptoms of TB commonly include weight loss, a persistent cough, fever, and weakness. Left untreated, two thirds of patients will die and can spread the disease to up to 15 other people within a year causing a vicious cycle that is difficult to break. The WHO estimates that in 2020, 10 million people developed TB, and 1.5 million died. This translates to over 4,100 people losing their lives to TB daily and close to 28,000 people falling sick each day with this preventable and curable disease.



The WHO estimates that in 2020, 10 million people developed TB, and 1.5 million died.



Who are the missing 4 million?

APOPO's programs work within government health systems to support over **160 partner clinics** in **Tanzania, Mozambique** and **Ethiopia** in their fight against TB. According to the WHO, about half of the TB patients in these countries are 'missed'. Some remain untested or unreported because of socio-economic barriers that prevent them from accessing healthcare. Even when they are able to overcome these barriers, there are limitations to existing diagnostic tools at clinics, resulting in **4.1 million people** globally remaining **undiagnosed** and without treatment last year.

High speed, low cost

The high speed at which HeroRATs can search large numbers of samples as well as their high sensitivity, results in a very low cost of only **€1 per sample** tested.

How APOPO helps

Since 2002, APOPO has been carrying out innovative research into using TB-detection rats (nicknamed HeroRATs) as a cost-efficient, rapid diagnostic tool. One rat can check **100 sputum samples** for TB in as little as **20 minutes**. Typically, it would take a lab technician up to 4 days using smear microscopy.

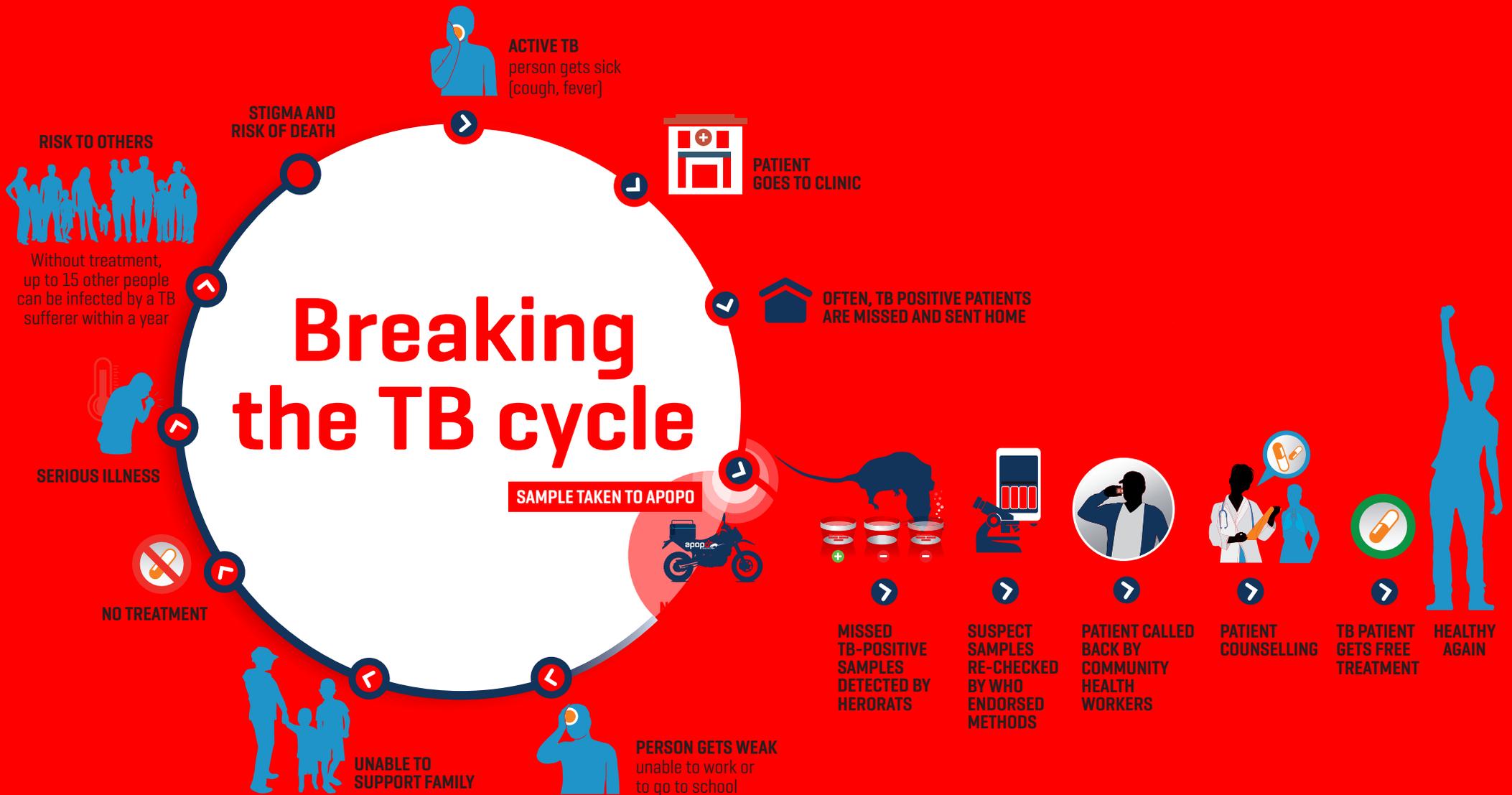
This allows APOPO to recheck samples collected from partner clinics very quickly and still confirm the presence of TB in the rat-positives using globally endorsed confirmation methods. Within 24 hours, confirmed results are sent back to the clinics who oversee patient counseling and treatment.

In **2021**, this approach increased detection rates in partner clinics by 47% on average, as we evaluated samples from over **72,000 patients** with signs and symptoms of TB and found 2,661 new TB patients that had been initially missed.



Since 2002, APOPO has been carrying out innovative research into using TB-detection rats (nicknamed HeroRATs) as a cost-efficient, rapid diagnostic tool.

Breaking the TB cycle



Hosted by the Armauer Hansen Research Institute since 2018, APOPO runs a TB-detection research lab contributing towards the national TB control effort by finding missed cases among patients in Addis Ababa and additional efforts to test samples from elderly patients (65+) and pediatrics (<15).



Situated at the Veterinary School of Eduardo Mondlane University, APOPO runs a TB detection lab in the capital city of Maputo and since 2012 has contributed to the National TB program with additional case finding. APOPO collaborates with Population Services International [PSI] testing samples from health clinics for human papillomavirus [HPV].

Since 2000, APOPO has developed its operational headquarters and training center at the Sokoine University of Agriculture. This is home to APOPO's Innovation department that researches and develops the innovative applications and advanced techniques used in existing operations. APOPO runs two TB-detection labs, one in Morogoro and one in Dar es Salaam.

THE APOPO TB RESEARCH PROGRAMS ARE MADE POSSIBLE BY OUR PARTNERS AND DONORS.



TANZANIA



Dr. Joseph Soka
Program Manager



The tuberculosis (TB) detection research program in Tanzania was launched in 2007 as a partnership with just four government clinics. APOPO has since added a testing facility in Dar es Salaam with a 24-hour result turnaround to get to the heart of TB response. With the addition of three new partner clinics in 2021, APOPO has expanded to 78 collaborating clinics in the country.

A high TB-burden

Tanzania is one of the top 30 countries in the world with a high TB-burden. Like many sub-Saharan countries, Tanzania's health clinics rely mainly on smear microscopy that has a low sensitivity of 20-60%, meaning around half of Tanzania's TB-positive patients go undetected.



Despite challenges that arose from the third wave of the **COVID-19 pandemic** and a dependency on the same services, similar resources, and supplies; APOPO was still able to maintain its TB-detection and linkage-to-care services in Tanzania. APOPO tested samples from collaborating hospitals as consistently as possible, while ensuring the safety of both our staff and the TB communities we serve.



Dr. Georgies Mgode

Sadly 2021 was a difficult year for APOPO. The unexpected, tragic death of our dear friend and colleague, **Dr. Georgies Mgode** in July shook the team to its core. Dr. Mgode was active with rodent research before APOPO began. He joined APOPO as a researcher and became TB Program Manager for Tanzania in 2015. Dr. Mgode worked tirelessly to expand APOPO's reach in TB-diagnosis and build strong and trusted relationships within the health sector. He was highly respected by colleagues, partners and the Ministry of Health and is missed immensely by all those who had the pleasure of knowing and working with him.

His understudy, **Dr. Joseph Soka** accepted the challenge of managing the program mid-year with excellent results. The program achieved 99% of its annual target to test **50,000 samples** in 2021. The program surpassed all other annual targets: **testing 36,122 patients** with signs and symptoms of TB [103% of the target]; and finding 1,600 new TB patients that had been undiagnosed by their clinic [107% of the target].



The program surpassed all other annual targets: testing 36,122 patients with signs and symptoms of TB and finding 1,600 new TB patients that went undiagnosed by their clinic

Partner MKUTA

APOPO's partnership with community-based organization **MKUTA** greatly improves patient tracking and treatment of patients once they have been diagnosed. MKUTA is made up of volunteer community healthcare workers who have all survived TB and are helping track and monitor new patients which greatly encourages them through their course of treatment. MKUTA also plays a key role in advocacy, educating the public and reaching out to vulnerable communities.

In **2022** our teams will be placing an additional focus on pediatric TB in Tanzania, with the goal of evaluating **more than 3,000 children**, for a 66% increase in case-detection for pediatric patients.

IMPACT IN 2021

Samples evaluated	49,459
Patients evaluated	36,122
Additional patients diagnosed	1,600
% increase in detection rate	42%

I gave my baby TB



I was so relieved APOPO found our TB so we could begin treatment. It's been a tough six months, staying isolated and taking medication that sometimes makes you feel worse than the disease. I had to stay home and couldn't work. With no husband to support me I had to rely on friends. But MKUTA health care workers looked out for me and gave hope that I would get better. Now it's up to me to rebuild our lives again."

Esther, Recovering TB-patient, Tanzania



MOZAMBIQUE



Robert Burny
Program Manager



Despite having one of the highest burdens of tuberculosis (TB) in the world, Mozambique is among 33 countries that achieved the 2020 milestone of **reducing the number of deaths** from TB by 35% over a five-year period. Situated at the Veterinary School of Eduardo Mondlane University [UEM], APOPO has been diagnosing TB in Mozambique since 2013. Our TB-detection operations contribute to the **Mozambican National TB Control Program** by increasing the number of TB patients diagnosed and linked to care.



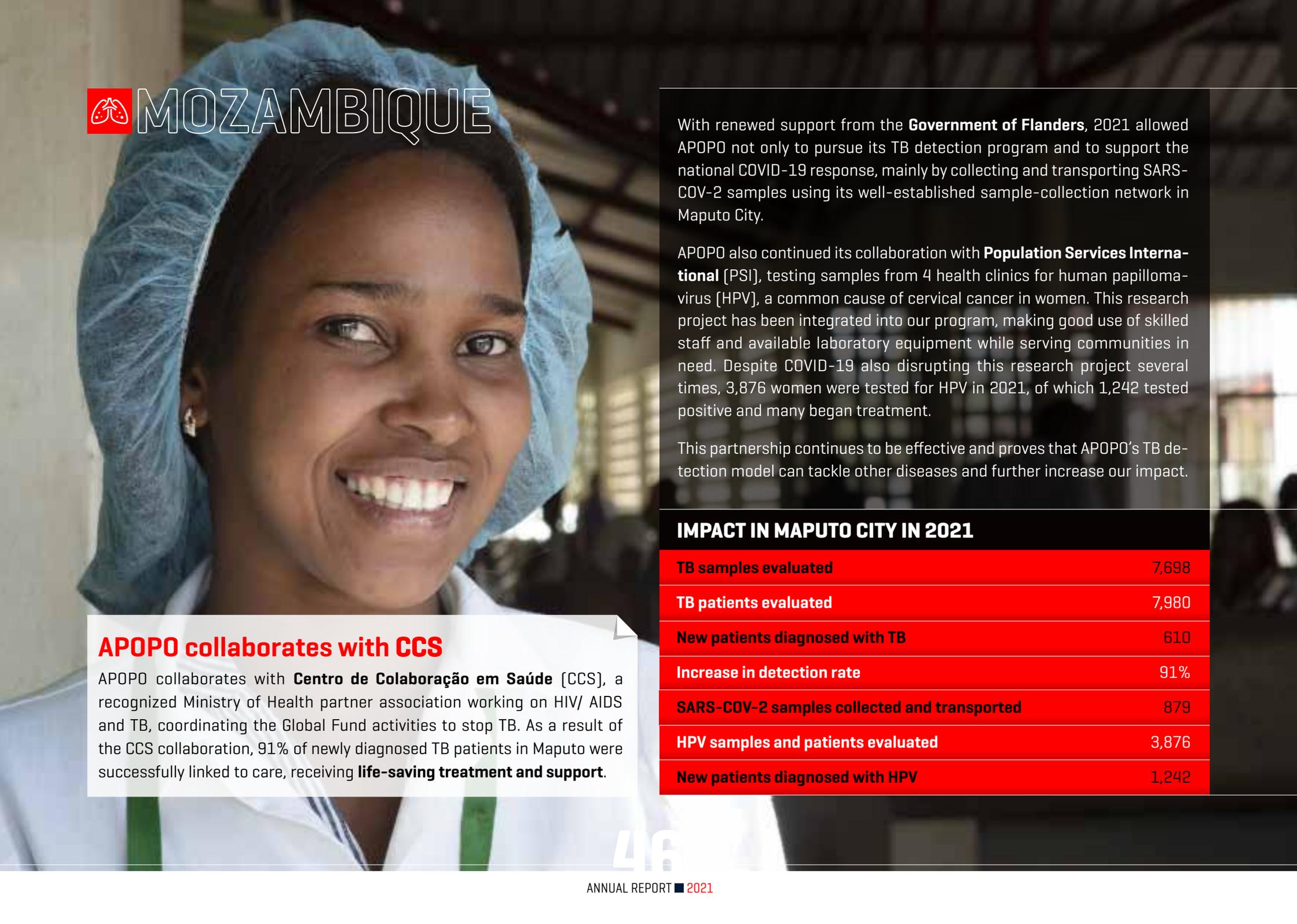


The national roll-out of molecular testing for any new patient with signs and symptoms of TB in 2018 required a switch for **many health clinics in Maputo**. APOPO adapted its strategy to include molecular testing with **Xpert MTB/RIF®** that can detect drug-resistant strains of TB, a serious concern in Mozambique.

Due to the interruption of microscopy samples since April 2020, APOPO decided to pause using the rats for detecting TB. However, APOPO continued to provide TB-diagnosis using molecular testing of samples from partner health clinics in Maputo city. In 2021, APOPO's TB detection activities expanded to Matola city, adding **9 new partnerships with clinics** and bringing the country total to 20.

Over the course of the year and various waves of COVID-19, APOPO screened **7,698 samples** from 7,980 patients with signs and symptoms of TB in Maputo and diagnosed 610 new TB-patients. Following diagnosis, clinics were notified of newly confirmed TB-patients and in Maputo City, partner organization CCS was notified so their community health care workers could begin tracking down patients and supporting them through their course of treatment. An additional 955 samples from patients with signs and symptoms of TB in Matola city were collected and tested, resulting in 65 additional TB patients being diagnosed and referred to health clinics for treatment.





MOZAMBIQUE

APOPO collaborates with CCS

APOPO collaborates with **Centro de Colaboração em Saúde (CCS)**, a recognized Ministry of Health partner association working on HIV/ AIDS and TB, coordinating the Global Fund activities to stop TB. As a result of the CCS collaboration, 91% of newly diagnosed TB patients in Maputo were successfully linked to care, receiving **life-saving treatment and support**.

With renewed support from the **Government of Flanders**, 2021 allowed APOPO not only to pursue its TB detection program and to support the national COVID-19 response, mainly by collecting and transporting SARS-COV-2 samples using its well-established sample-collection network in Maputo City.

APOPO also continued its collaboration with **Population Services International (PSI)**, testing samples from 4 health clinics for human papillomavirus (HPV), a common cause of cervical cancer in women. This research project has been integrated into our program, making good use of skilled staff and available laboratory equipment while serving communities in need. Despite COVID-19 also disrupting this research project several times, 3,876 women were tested for HPV in 2021, of which 1,242 tested positive and many began treatment.

This partnership continues to be effective and proves that APOPO's TB detection model can tackle other diseases and further increase our impact.

IMPACT IN MAPUTO CITY IN 2021

TB samples evaluated	7,698
TB patients evaluated	7,980
New patients diagnosed with TB	610
Increase in detection rate	91%
SARS-COV-2 samples collected and transported	879
HPV samples and patients evaluated	3,876
New patients diagnosed with HPV	1,242



MOZAMBIQUE

Final Day of Treatment



Today marks the last stretch of my TB treatment! I am so happy! Relieved that I was able to receive treatment once APOPO found my TB. I feel stronger and healthier than I have in a very long time, and I can enjoy my grandson's visits now that I am not contagious. The community health care workers have encouraged me from my lowest point, bringing me medicine and teaching me how to look after my health."

Caterina, recovered TB-patient, Mozambique

ETHIOPIA



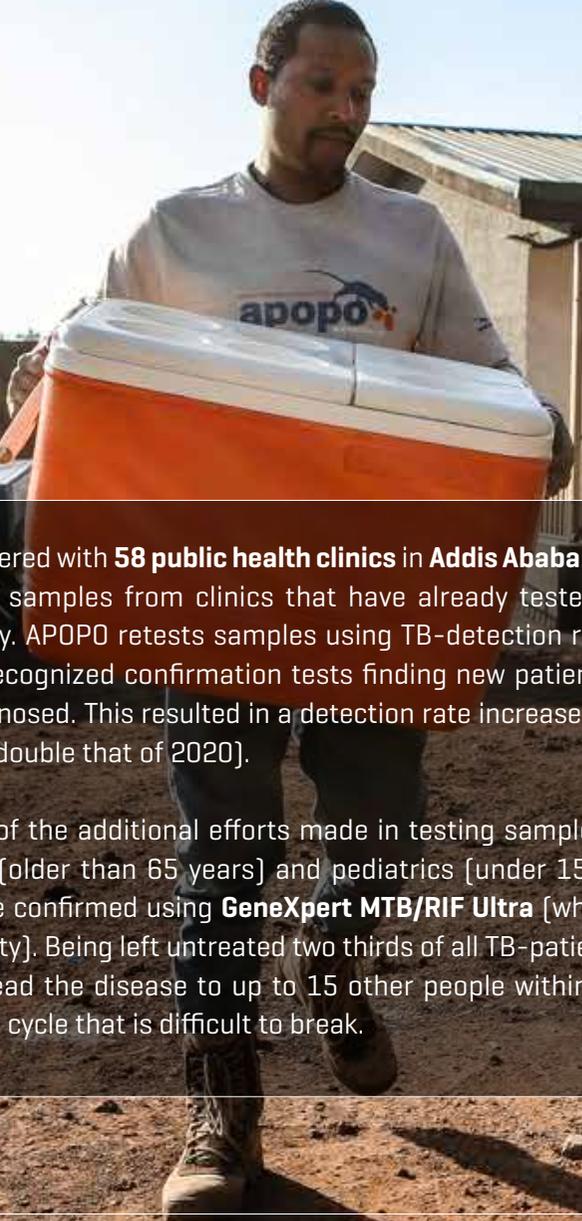
Dr. Negussie Beyene
Program Manager



The conflict in northern Ethiopia, which began in November 2020, took multiple turns throughout 2021 as government forces battled rebel forces in the Tigray region. In addition, the ongoing COVID-19 related challenges that diverted resources, staff time and funding away from routine health services made 2021 our most challenging year yet.

APOPO's Tuberculosis (TB) Research Program in Ethiopia runs in partnership with the **Armauer Hansen Research Institute (AHRI)**. The program began in 2018 in collaboration with the **Addis Ababa City Administration Health Bureau** and the **National TB Control Program (NTP)**. APOPO contributes towards the national TB control effort by finding the missed cases among patients showing signs and symptoms of TB in Addis Ababa.



A man wearing a white t-shirt with the APOPO logo is carrying a large orange and white cooler. He is walking on a dirt path next to a building. In the background, a motorcycle is parked with a sign that reads 'Tuberculosis Research Project' and 'Ahri' logo. The sign also features the APOPO logo and the text 'apopo' with a rat icon.

APOPO has partnered with **58 public health clinics in Addis Ababa**. APOPO collects sputum samples from clinics that have already tested them using microscopy. APOPO retests samples using TB-detection rats and internationally recognized confirmation tests finding new patients that had been undiagnosed. This resulted in a detection rate increase of 94% in 2021 [almost double that of 2020].

This is because of the additional efforts made in testing samples from elderly patients [older than 65 years] and pediatrics [under 15 years] and having these confirmed using **GeneXpert MTB/RIF Ultra** [which has a higher sensitivity]. Being left untreated two thirds of all TB-patients will die and can spread the disease to up to 15 other people within a year causing a vicious cycle that is difficult to break.

Reaching the Community



I appreciate and acknowledge the gap being filled by the AHRI-APOPO project in detecting missed TB cases. If it was not for this initiative, hundreds of TB patients would have suffered from improper treatments and served as a source of infection to others. The new initiative to reach the community at large living in overcrowded urban settings to be started in 2022 will further enhance TB case detection and reduce the transmission. Such initiatives help us move closer to the “end TB” goal.

Dr. Kidist Bobosha, Director of Mycobacterium Diseases Research Directorate, AHRI



APOPO Ethiopia is preparing various manuscripts for publication around our operational research results in peer-reviewed journals.

Innovative technology

This year APOPO Ethiopia collected and retested **15,750 samples** from 8,097 patients and found 430 additional TB cases contributing to a 94% increase in detection rates of partner clinics. The results show a **positive impact**, as the relatively young project continues to gain credibility.

APOPO's innovative technology using trained rats is based on empirical and published scientific research. As APOPO continues to strive for more recognition, APOPO Ethiopia is preparing various manuscripts for publication around our operational research results in **peer-reviewed journals**.

IMPACT IN 2021

Samples evaluated	15,750
Patients evaluated	8,097
Additional patients diagnosed	430
% increase in detection rate	94%

TANZANIA TRAINING CENTER



Dr. Cindy Fast
Head of Training
and Innovation

What Rat?

APOPO's HeroRATs are **African giant pouched rats** [*Cricetomys ansorgei*]. They get their name from their large size, which is roughly equal to a small cat, and cheek pouches [similar to hamsters] that they use to store and carry food. They are omnivorous and mainly nocturnal and can be found throughout most of sub-Saharan Africa. The fur coats of HeroRATs range from grey to ginger-colored, with pale underparts and they have a bare, white-tipped, body-length tail. These little heroes weigh about a kilo, which is too light to set off landmines.



Breeding

All HeroRATs begin their lives at our Training Center on the campus of the **Sokoine University of Agriculture [SUA] in Morogoro, Tanzania**. Rat pups are born in litters of three to six pups who remain undisturbed with their mother for four weeks before they begin training. As soon as their eyes open, the rat pups begin learning all about the world around them and what it takes to become a hero. In 2021, our family of HeroRATs rapidly grew with the addition of 57 rat pups born and raised.

Socialization and habituation

During Initial training, rat pups complete a process called habituation where they learn to stay calm and relaxed around various noises and settings. They are also socialized to humans through gentle handling sessions. Habituation and socialization minimize stress for the rat during the rest of its training and operational activities so it can focus on the task at hand.

HOW TO TRAIN A HERORAT



SOCIALIZATION

to humans and habituation to various environments – this training begins when young rat pups first open their eyes around 4 weeks of age and continues well after they are weaned from their mother.



CLICKER TRAINING

begins shortly after the pups are weaned from their mother at 10 weeks. This training establishes the sound ['CLICK'] of a handheld device as a signal that tasty food reward is available.



INDICATION TRAINING

teaches the rat that it can cause the 'CLICK' sound (and resulting food treat) by performing a particular behavior. This behavior will later allow the rats to communicate to its human handler when it has found a target scent.



TARGET SCENT TRAINING

introduces the primary odor the rat will be tasked with finding throughout its career as a HeroRAT. For example, TNT or TB-positive sputum samples.



DISCRIMINATION TRAINING

teaches the rat subtle differences between the target odor and numerous other scents that might be present. The rat's indication response is only rewarded when it occurs in the presence of the target scent.



DEPLOYMENT SYSTEM TRAINING

progressively prepares the rat for working in the operational environment of its career path. For a landmine detection rat this involves learning to systematically search a designated area where it may encounter a variety of different [deactivated] landmines buried beneath the surface. For a TB detection rat, the rat must learn to navigate APOPO's line cage to screen 100 sputum samples quickly and reliably in under 20 minutes!



IMPACT 2021

10 expert rats joined the TB-detection team in Ethiopia, while **20 mine detection rats** were internally and externally accredited to join the mine action program in Cambodia.

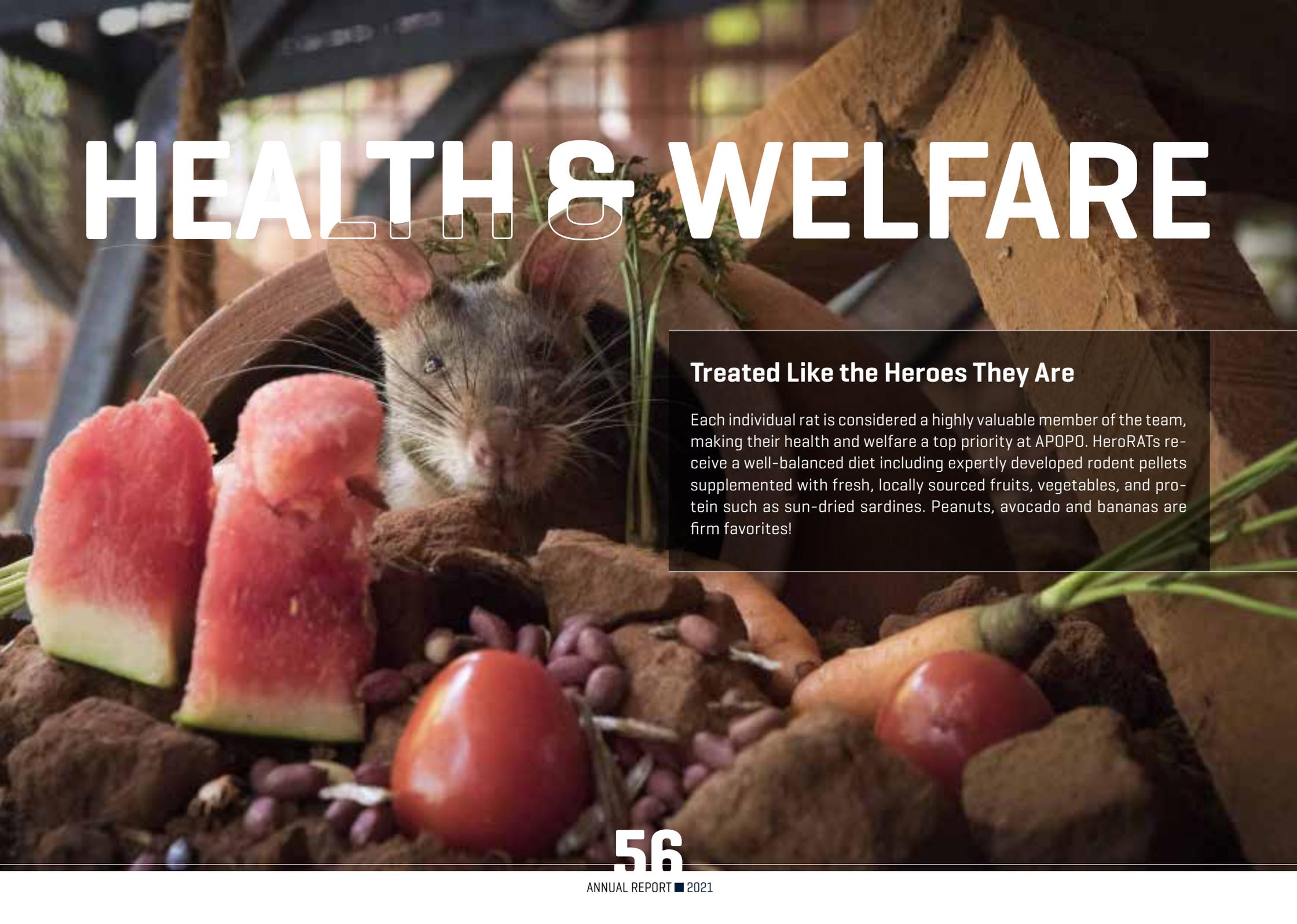
Another 20 mine detection rats are being readied to join the same program in the new year. Attrition reached a record low with just 3.5% of rats in training failing to make the cut.

The new year will see many new rat pups born and an influx of new rodent trainers to support their training and program expansions.

Fun Fact

Collectively, the mine detection rats in training successfully earned **8,481 banana rewards** in 2021!

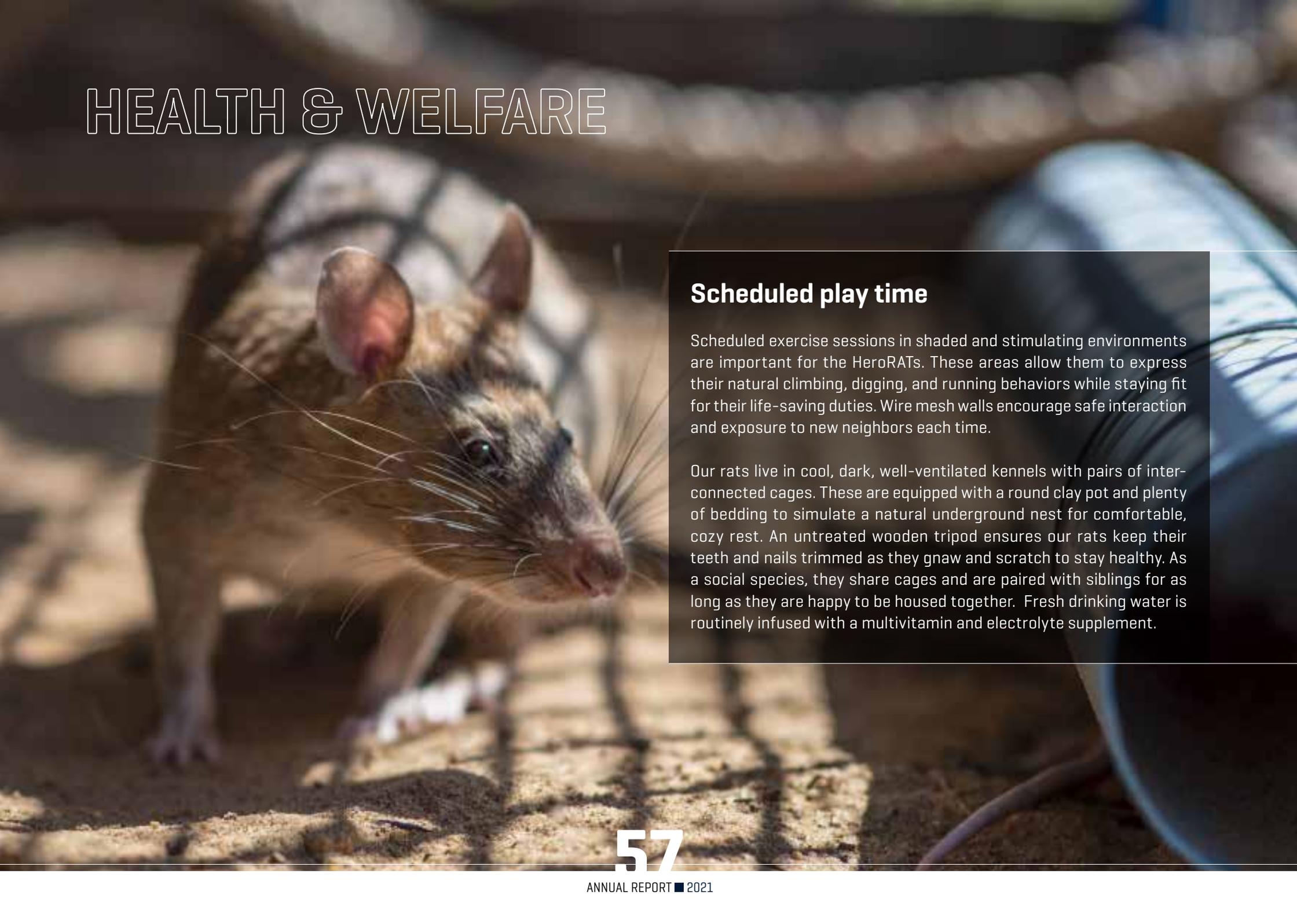
HEALTH & WELFARE



Treated Like the Heroes They Are

Each individual rat is considered a highly valuable member of the team, making their health and welfare a top priority at APOPO. HeroRATs receive a well-balanced diet including expertly developed rodent pellets supplemented with fresh, locally sourced fruits, vegetables, and protein such as sun-dried sardines. Peanuts, avocado and bananas are firm favorites!

HEALTH & WELFARE



Scheduled play time

Scheduled exercise sessions in shaded and stimulating environments are important for the HeroRATs. These areas allow them to express their natural climbing, digging, and running behaviors while staying fit for their life-saving duties. Wire mesh walls encourage safe interaction and exposure to new neighbors each time.

Our rats live in cool, dark, well-ventilated kennels with pairs of interconnected cages. These are equipped with a round clay pot and plenty of bedding to simulate a natural underground nest for comfortable, cozy rest. An untreated wooden tripod ensures our rats keep their teeth and nails trimmed as they gnaw and scratch to stay healthy. As a social species, they share cages and are paired with siblings for as long as they are happy to be housed together. Fresh drinking water is routinely infused with a multivitamin and electrolyte supplement.

HEALTH & WELFARE



Routine preventative care

All APOPO's rats receive routine preventative veterinary care, including regular **health check-ups** and **vaccinations**. Daily health and welfare checks from our expert staff ensure any signs of illness or discomfort are caught early. Mine detection rats have sunscreen applied to their ears and tails when working outdoors.

The typical **retirement age** for HeroRATs is between **7 and 8 years** old. We allow them to work as long as they are performing well, still feel enthusiastic about their jobs, and pass weekly health checks. When a rat is healthy but their performance declines, they show signs of aging, or they don't feel like getting out of their cage to go to work anymore, the rat is moved to a **retirement kennel**. They will continue to live out their days at APOPO enjoying all of the perks and loving attention from our handlers.

INNOVATION



Dr. Cindy Fast
Head of Training
and Innovation

The Innovation team is based at APOPO's Training and Research Center in Tanzania, hosted by the **Sokoine University of Agriculture (SUA)** in Morogoro. The main objective of our innovative research is to **empirically inform training and operational protocols for new and existing applications**. This is accomplished through multi-faceted research into the variables that influence learning and scent detection performance of our HeroRATs. Basic research helps expand our knowledge about this species and provides the firm foundation APOPO needs to excel as a global leader in scent detection rat technology.

INNOVATION



These heroes were also trained to remotely signal when they had found a target by pulling a small ball on their harness which to trigger a microswitch.



APOPO's HeroRATs have been saving human lives for two decades but now their noses have turned to saving the lives of fellow animals. APOPO established proof-of-principle in a controlled laboratory environment that our rats can reliably **sniff out the scent of commonly trafficked wildlife**, including scales from the most widely trafficked and endangered mammal, **the pangolin**. With additional project support in 2021, APOPO began training rats to apply what they had learned within the lab to a new search strategy that could position them for deployment. Envisioning potential for the rats to work within **seaport environments** where large volumes of illicit material is often smuggled within **shipping containers**, the rats were trained to search inside a shipping container for wildlife targets that had been hidden within metal boxes. To aid future deployment where the rats may need to work in tightly packed containers beyond the sight of their handler, these heroes were also trained to remotely signal when they had found a target by pulling a small ball on their harness which triggers a microswitch. In **2022**, APOPO aims to build on these promising preliminary results to further develop the search system needed for working in a real port environment. To this end, a **Wildlife Detection Workshop** with partners and **Tanzanian Port and Wildlife Authorities** has been scheduled in early 2022 to provide critical insight into where and how the rats could complement existing screening methods within a port environment.



Ground-breaking research



Wildlife Crime threatens endangered species and jeopardizes the economic basis and security of the affected communities and countries. **Smuggling routes** are a key bottleneck in the illegal trade chain, and therefore important in bringing these criminal networks to justice. Over the last years, **APOPO's Hero-RATs** have proven their abilities in detecting wildlife contraband.

The GIZ 'Partnership against Wildlife Crime [in Africa and Asia]', commissioned by the **German Government**, is proud to be supporting this ground-breaking research. We are excited to continue on in this successful collaboration and to support the next important steps in transitioning from experimental to a working environment."

Flora Mueller, Deutsche Gesellschaft für Internationale Zusammenarbeit [GIZ]



INNOVATION

INNOVATION

Search & Rescue

Natural disasters often cause buildings to collapse, trapping human in the debris. The greatest challenge for Search and Rescue teams is quickly locating where survivors are trapped. Existing technologies are limited by their ability to either penetrate the debris or perform a guided search. **HeroRATs are small and can crawl through tight spaces** and their excellent sense of smell equips them **to search for humans**. Outfitted with a **tech backpack** capable of tracking rat position, mapping their location when they indicate they have found a **survivor**, and **live streaming** or recording audiovisual information from the rat's position, the rats could be a huge asset to rescue operations.

2021 saw the construction of a **mock debris site at our training center**: a building with multiple rooms and various entry points for the rats. The rats are learning to navigate the rooms to locate and indicate a **'trapped' human** and return to where they had been released when signaled. Training complexity will be gradually expanded in 2022, increasing both the distance to the 'survivor' and volume of debris obstacles between.



INNOVATION



Conventional methods of **environmental clean-up efforts** rely on laboratory analysis of soil samples to identify the presence and level of contamination. These methods are not only slow and expensive when applied to petroleum products, they also generate a high number of false positives due to their inability to differentiate hydrocarbon sources. APOPO proved the concept that **HeroRATs** could support environmental remediation by successfully **training them to reliably delineate petroleum contamination levels across a variety of soils** while ignoring other sources of hydrocarbons, such as grass. Importantly, the rats readily generalized to impacted field samples collected from a remediation site. Next year will further explore if the rats can apply what they have learned to other crude oil sources.



APOPO proved the concept that HeroRATs could support environmental remediation by successfully training them to detection varying levels of petroleum contamination in soil.

Detecting *Brucella*

Our team of innovators also completed a second project as part of the proof of principle that the disease-causing **bacteria *brucella*** emits a unique odor profile the rats can be trained to detect by spiking milk samples with cultured samples of the bacteria. Although milk can only be collected by lactating females (e.g. cows or goats), it is the most common vehicle for zoonotic transmission to humans. With existing tools capable of detecting brucella within milk, it also provides a platform for comparing rat scent detection to existing diagnostics.



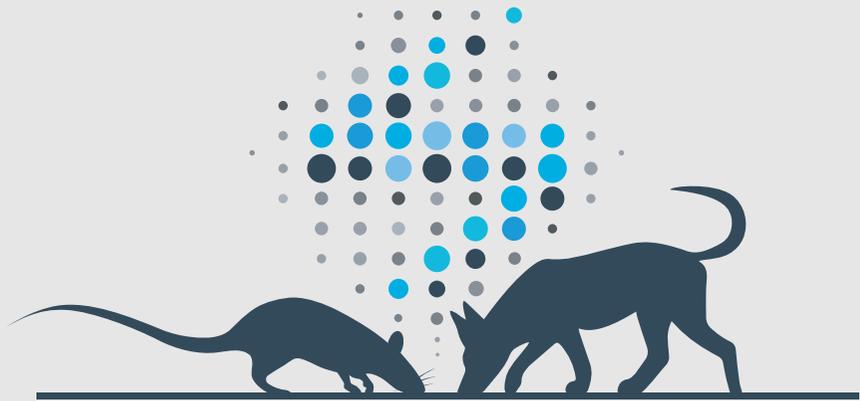
In **2022**, we aim to continue this line of research in collaboration with **SUA's College of Veterinary Medicine and Biomedical Sciences** to introduce additional strains of the *brucella* bacteria and explore the rat's ability to detect the pathogen within sample media that is more readily available for all animals, such as feces.



INNOVATION



Although milk can only be collected by lactating females (e.g. cows or goats), it is the most common vehicle for zoonotic transmission to humans.



THE POWER OF SCENTS

Innovation • Application • Validation

The Innovation Team

In addition to running all these research projects, the innovation team participated in **several workshops and capacity building exercises** including an exclusive live Animalia event raising awareness about APOPO's work.

The Innovation team delivered the keynote Mackintosh Memorial Lecture at the **25th Associative Learning Symposium**, presented at the Global Animal Behavior Management Alliance meeting and the **Association for the Study of Animal Behavior** (ASAB) Winter Meeting 2021, which prompted the prestigious Science Magazine to write about our research!

2022 will see the innovation team hosting its first APOPO Animal Welfare Symposium and Olfaction Workshop - **'The Power of Scents'** - in June.

APOPO INNOVATION PROJECTS ARE MADE POSSIBLE BY OUR PARTNERS AND DONORS





MARKETING & VISIBILITY

MARKETING & VISIBILITY



Javier Castillo
Head of Marketing

2021 was another **strong year** for profile-raising with more than 3400 global online and traditional press articles about APOPO. This was spurred on by the mid-year retirement announcement of APOPO's **Award-winning**, Guinness World Record-holding HeroRat **Magawa**. Media coverage creates support not just for APOPO but for the many other organizations and civil societies that are trying to bring an end to the major global problems we face including landmines, tuberculosis and climate change.

As our public profile grows, so too does a loyal online community that our marketing team works hard to engage, support and develop. By the end of 2021, over **170,000 supporters** across social

media, online giving channels and mailing lists are regularly sharing our news, donating, fundraising, adopting our animals and generally spreading the word about APOPO. As COVID-19 restrictions relax, more and more opportunities for **VIP** and **media visits** arise as well as presentations and participation in **fundraising events** organized to make noise about APOPO.

This year the Marketing Team welcomed a **new Head of Marketing** who brings core marketing principles that will allow the team to learn from and lead with data, generating growth through innovative strategies and data-based insights into our audiences.

2022 promises to be another exciting year as we invest in building capacity and skills to keep up with the organization's rapid growth. A revamped, **more user-friendly website** and initiatives to further improve **donor care**, content from the field and legacy giving are just the tip of the iceberg. Our work would not be possible without the **generous support of donors** from all around the world. Thank you all for your trust and continued commitment to APOPO!



ONLINE COMMUNITY



Facebook followers: 89,412



Twitter followers: 10,000



Instagram followers: 34,200



YouTube subscribers: 2,350



Website sessions: 215,685/year



Newsletter subscribers: 31,036



Global Giving Donors: 5,466

APOPO WOULD LIKE TO GRATEFULLY ACKNOWLEDGE PARTNERS AND DONORS

Agneta Sandelin	California Community Foundation	Communities Foundation of Texas	Dude Wolverine Foundation	Facebook	Global Giving
K9 Nose	Global Development Group	Google	Gregory Rowling, NZH Management	DonorBox	James C Colt Foundation
Jewish Community Foundation	King Baudouin Foundation	Lee and George Foundation	Long Family Foundation	Maecenata	Marriott Daughters Foundation
SD Worx	Talem Foundation	The Golden Bottle Trust	The Murray Family Foundation	 <p>Universiteit Antwerpen</p> <p>APOPO thanks the University of Antwerp for always having been a most trusted partner, hosting APOPO's Head Office, Board Meetings and providing valued scientific and networking support.</p>	
Seattle Foundation	Schwab Charitable	Vanguard charitable	XKBB Foundation		
The Woods and Gil Family Foundation	Triodos Foundation	Zoological Society of San Diego	Frank McHugh-O'Donovan Foundation		

APOPO is extremely grateful for the continued Pro Bono support of the Belgian Law firm **Liedekerke Wolters Waelbroeck Kirkpatrick** and the US law firm **Foley Hoag LLP**. Your work has proven incredibly valuable to our innovative life-saving efforts!

APOPO RAT ADOPTIONS

MEET OUR HERORATS



APOPO's animal adoptions give you the chance to join one of three HeroRATs or HeroDOGS on a life-saving adventure. Every adoption comes complete with a 10-page welcome pack, adoption certificate, and regular impact updates with the latest news, pictures, and statistics from the field. For as little as US\$9 a month (HeroRAT) or US\$19 (HeroDOG), you can adopt or gift an animal and help save lives. Visit our website to find out more!



Ronin

is a gentle and social landmine detection rat. On the minefield he is focused and hardworking. Based in Cambodia where a legacy of the 30-year internal conflict still hurts people today, Ronin sniffs out deadly explosives much faster than conventional solutions.



Shuri

is a staff favorite with a cheeky personality who brings a smile to the face of everyone she meets. She graduated from APOPO mine detection training with flying colors. With a flash of her whiskers, Shuri will help sniff out landmines in Angola, one of the most mine-affected places in the world.



Carolina

is a boisterous, young HeroRAT based in Dar es Salaam, a mega-city in Tanzania. Carolina can search 100 sputum samples for tuberculosis in under 20 minutes. She enjoys play time in the mornings where she can expend all her excess energy climbing her favorite platforms.

SYMBOLIC ANIMAL ADOPTIONS

MEET OUR HERODOGS

THANK YOU!
Our HeroDOGS to detect landmines and save lives by adopting Cyklon.

Cyklon is a highly trained Technical Survey Dog, or "HeroDOG" for short. Like Cyklon use their remarkable sense of smell to safely sniff out explosives across difficult terrain.

You're part of a remarkable community of people who are supporting APOPO to save lives. This information pack will introduce you to Cyklon's world and show you how to follow his life-saving adventure.

THANK YOU

apopo
MINE ACTION

THANK YOU!

CYKLON
TECHNICAL SURVEY DOG
CAMBODIA

apopo
MINE ACTION

Cyklon (SIGH-CLON)

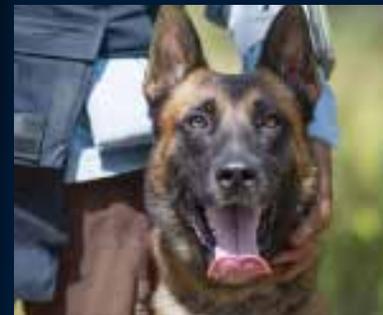
Sex	Male
Breed	Belgian Shepherd
Date of Birth	28 May 2016
Country of Birth	Germany
Job Title	Technical Survey Dog
Location	Cambodia
Colour	Brown
Favourite Pastime	Sunbathing
Personality	Focussed and hardworking

Cyklon is a highly trained Technical Survey Dog, or HeroDOG.



Mannes

Mannes is strong-minded and a hard worker. Based in Siem Reap, Cambodia, he's known for his tenacity, high-levels of concentration, and loyalty when he's out in the field.



Cyklon

Cyklon is a Belgian Malinois with a nose for landmines and unexploded remnants of war. He's energetic, fast, and thoroughly enjoys lazing in the sun after a hard day's work.



Gizmo

Gizmo has incredible energy at work. She's always wagging her tail but don't be fooled by her playfulness - she's serious when it comes to detecting landmines.



SUSTAINABLE DEVELOPMENT GOALS

The Sustainable Development Goals or SDGs are a collection of **17 interlinked commitments** designed to achieve a better and more sustainable future for all. The SDGs were set up in 2015 at the **United Nations General Assembly** and are intended to be achieved by 2030. They are a bold plan of action agreed to by 193 world leaders to build a greener, fairer, better world by 2030, and everyone has a role in achieving them.

APOPO takes **positive action** across the fields of Mine Action, Tuberculosis Detection and Innovation. The SDGs provide a measure of how well APOPO is delivering on its mission and offer the opportunity to quantify and demonstrate effectiveness and impact. APOPO's ability to inspire positive social change, although not purely innovative technology, provides another way for APOPO to act in line with the SDG ethos.

APOPO CONTRIBUTES TO 13 OF THE 17 SDG'S



SWISS FOUNDATION



**Anna
Bouchier**
Swiss Director

2021 was a ground-breaking year for the Swiss Foundation. It was at the forefront of securing long-term, diversified support for the organization while navigating a renewed philanthropic ecosystem reshaped by the pandemic. The Foundation led discussions with multiple partners who are instrumental to establishing stronger and more sustainable programs.

The Swiss Foundation contributed to ensuring substantial funding for APOPO's Mine Action activities in Cambodia, enabling the addition of a Victim Assistance component to the program, while strengthening its Risk Education activities alongside operations. In Zimbabwe, the Foundation was able to count on generous support from the Swiss Development Cooperation (SDC), which allowed for a productive second year, mainly focusing on safety and food security for local communities.



While remaining dedicated to coordinating APOPO's overall grant management effort, the Foundation additionally took on a leading role in ensuring long-term support for APOPO's tuberculosis (TB) detection programs.

While remaining dedicated to coordinating APOPO's overall grant management effort, the Foundation additionally took on a leading role in ensuring long-term support for APOPO's tuberculosis (TB) detection programs. In Ethiopia, it was involved in successful discussions with the French government to support finding TB within unreached populations of Addis Ababa. In Tanzania, additional support notably allowed a special emphasis to be put on the detection of pediatric TB. Childhood TB remains a challenging area of TB control, illustrating further, APOPO's dedication in supporting traditionally neglected and vulnerable communities.



The Government of Switzerland is proud to support APOPO's demining activities in the Sengwe Wildlife Corridor as this is helping the local community regain their economic footing through accessing previously contaminated land for agricultural production – something that they have not been able to do for the past 40 years. The process is also supporting greater opportunities for transnational tourism between Zimbabwe, Mozambique and South Africa.

**Mr. Niculin Jäger,
Swiss Ambassador to Zimbabwe**

UNITED STATES OFFICE



2021 was another productive year for APOPO US as the organization maintained its momentum with the US State Department, securing an additional \$750K grant for APOPO's important demining project in the Sengwe Wildlife Corridor. The project has now secured funding from both the US and Swiss governments and has enough funding to work through the end of 2023. APOPO is increasingly hopeful this funding will be extended in order to complete the project close to Zimbabwe's Landmine Free 2025 deadline. APOPO US hopes to continue to build the organization's relationship with the agency moving forward as it could be a crucial funding partner across demining projects in coming years.



APOPO US's office also played a major role in securing several small and mid-size grants from US based foundations, supported the development and writing of APOPO's 5-year program plan for the Belgian government, as well as supporting the US Zoo program. With COVID 19 restrictions slowly lifting, this program will feature regular mock HeroRAT demonstrations at the San Diego, Indianapolis, and Point Defiance Zoos. APOPO US hopes the program will raise the exposure of the organization across the US, as people witness the amazing detection



VISITOR CENTER CAMBODIA



75



Sambat Meas
Visitor Center Manager

APOPO's Visitor Center (VC) in Siem Reap, Cambodia, organizes informative group tours that delve into the global landmine problem, Cambodia's turbulent history and showcases live demos of our landmine detection rats. It allows our work in Cambodia to reach a wider audience while generating an additional source of income for our program. Sadly, the center took a hard hit along with the rest of Cambodia's tourist economy due to the coronavirus pandemic. Where it had once been a popular stop for tourists and visiting dignitaries, the VC struggled to stay open, registering hardly 1,000 visitors over the course of 2021.

Local tourism has kept the VC afloat and in the second half of the year numbers began to pick up again when travel restrictions eased. 2022 forecasts to be a better year and we hope to see the Visitor Center return to its top spot as a tourist attraction for a good cause.



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Sister Srey Café

Sister Srey is a little café with a big heart nestled amongst the trees on the edge of the Siem Reap River in Cambodia. Not only is it a place to find good food and coffee, but it **empowers local Khmer students and supports our Cambodian demining program**. Like the VC, Sister Srey largely depends on tourism and had to close its doors for much of 2021, missing out on vital income.

APOPO committed to financially supporting every member of staff during this difficult period. As borders open and people start to travel again Sister Srey looks forward to welcoming new visitors. Although it may take years for Cambodia's tourism industry to get back on its feet, the first recovery is likely to happen in 2022 as a gradual process and a popular place like Siem Reap, is already registering a change.

AFRICAN CENTER OF EXCELLENCE

‘The potential to address a multitude of complex problems’

Sokoine University of Agriculture [SUA] in Morogoro is a top-ranking academic institution in East Africa. One of SUA’s main research objectives is to lead in basic and applied research to generate scientific knowledge, technologies and innovations that respond to contemporary and emerging needs. The University focuses on research that is linked to development and societal issues.

APOPO strives to solve some of the most pressing humanitarian problems affecting vulnerable populations and its innovations in landmine and tuberculosis detection are known worldwide, as is their most successful Ambassador – HeroRAT Magawa. Over the past two years, HeroRAT Magawa has brought not only APOPO and SUA recognition, but it has raised Tanzania’s profile in the news as well. Magawa is an African hero and has touched every-day Tanzanians who are proudly getting excited about a rat!

Institute of Pest Management (IPM) at SUA enjoys a successful and productive research collaboration with APOPO which places us in a strong position to address

global challenges in the fields of Mine Action, Health and climate change. This collaboration established an African Centre of Excellence in Innovative Rodent Pest Management and Biosensor Technology development. The use of the African giant pouched rats as a biosensor tool is a scientific innovation that has great potential application outside of landmine and tuberculosis detection, such as in Search and Rescue operations, anti-wildlife trafficking, detection of soil contaminants and further disease control. IPM supports APOPO in refining this technology and promoting new applications in unexplored fields.

We look forward to more APOPO-IPM collaborations, the HeroRATs lend themselves very well as local, practical and environmentally friendly technology that has the potential to address a multitude of complex problems!

Professor Loth Mulungu

Acting Director of Institute of Pest Management, SUA





HEROTREES

PROTECTING BIODIVERSITY



The montane forests of the Uluguru Mountains are of critical importance to local village communities, large neighboring cities.

Of critical importance

APOPO directly participates in the global efforts to preserve biodiversity and indigenous forests in Tanzania near the Training and Innovation Center in Morogoro. The montane forests of the Uluguru Mountains are of critical importance to local village communities, large neighboring cities of Morogoro and Dar es Salaam, and the survival of endemic plants, birds and animals found nowhere else in the world. Unfortunately, this area, like so many around the globe, is losing biodiversity - the rich variety of life on Earth.

Despite its relatively small size, this forest has long been known for its unique biodiversity and is considered to be one of the top priorities for the conservation of biodiversity in Africa.



Sustainable Agriculture Tanzania

The communities living in these **mountain villages** earn just a fraction of the national average and the demand on the forests for fuel and timber is unsustainable as the population grows. **Unsustainable farming** practices result in the deterioration of both water quantity and quality and increase water run-off and soil erosion. APOPO's proximity means we have the **unique opportunity to take action** at a local level to help communities.

This project, which is managed by partner **Sustainable Agriculture Tanzania (SAT)** in collaboration with the **village communities**, introduced a sustainable organic farming program, which **reduce greenhouse gases** through [1] planting trees on eroded hill slopes which helps re-establish the habitats needed for the **wildlife** that live there, [2] preservation of the existing **tropical forest**, [3] increasing **water** quality and quantity, [4] elimination of slash and burn agriculture and [5] increasing the **carbon content in the soil**. In addition, this project contributes to **food security, poverty reduction** and **socio-economic development** of the participating farmers' communities and beyond.



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HeroTREEs

The project, nicknamed 'HeroTREEs', is more than just another tree planting project, but instead part of an **agro-ecological project** turning farming into a **climate-smart solution**. Since 2017, APOPO has successfully planted **18,922 HeroTREEs of 35 different species by 100 farmers**. The species were selected to provide soil stabilization, shade, fruits, spices, medicine, soil fertility and improvements to water quality and quantity.

To ensure that the new trees that are planted are not cut down, the small-holder farmers are taught sustainable methods to revitalize their land - planting trees alongside their crops - and smart organic agriculture skills that produce natural fertilizers. This leads to higher crop yields and increased income, building resilience to a changing climate and sharing their experiences with their wider communities. The HeroTREEs project hopes to plant 50,000 trees over a ten-year period in this area.

Improving Accuracy!



The future of the biodiversity of the Uluguru mountains relies on conserving the flora and fauna. This project is a practical and effective way to address climate change and encourage the growth of renewable energy. I came on board to liaise between SAT, APOPO and the farmer groups. I am promoting the project to get more farmers on board and training them to use GPS and carry out internal inspections. I oversee monitoring and evaluation for the project and hope to create accurate maps of the farms and the planted trees.”

Ibrahim Manji,
Surveyor and Cartographer SAT, Tanzania

FINANCIAL STATEMENT BALANCE SHEET IN EURO*

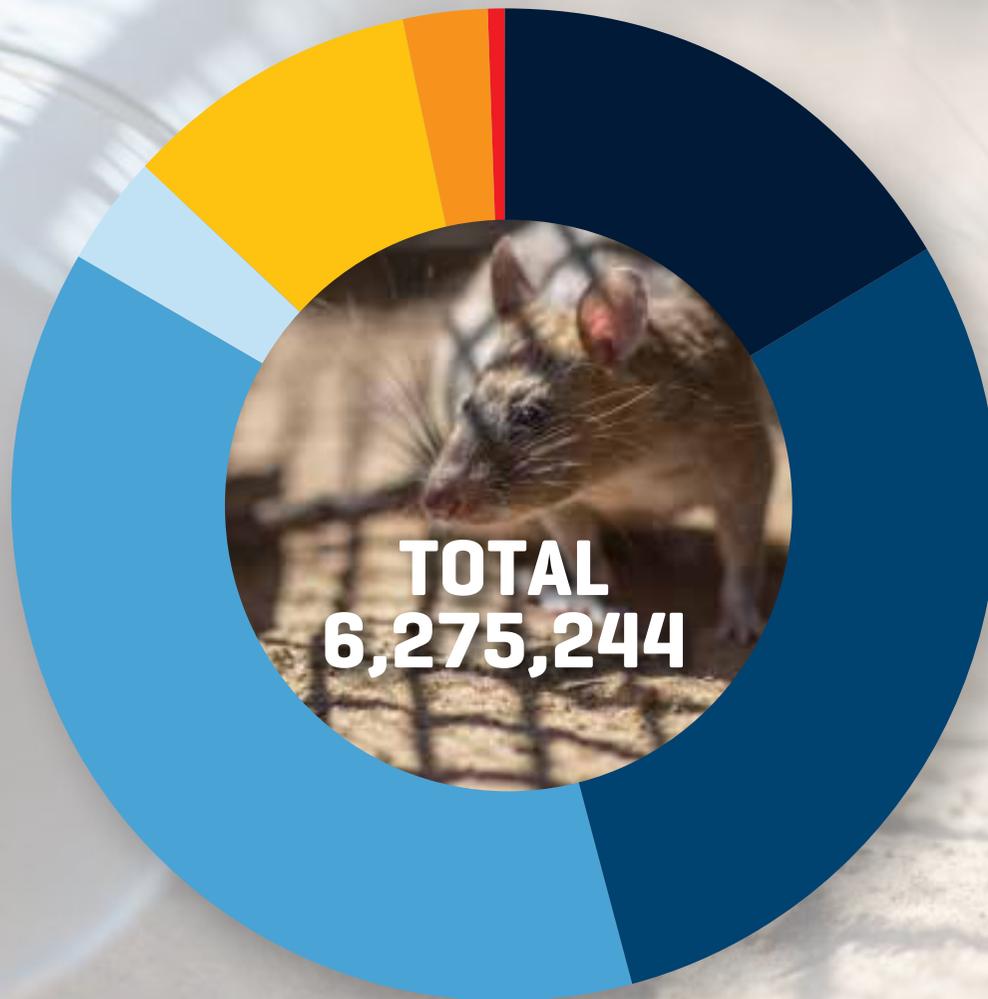
ASSETS	2021	2020
Current assets	2,634,646	2,979,563
Current receivables	513,020	376,310
Other assets	172,929	85,446
Cash and equivalents	1,948,697	2,517,808
TOTAL ASSETS	2,634,646	2,979,563
Liabilities		
Net capital	1,305,827	1,137,319
Funds of the organization	328,046	328,046
Retained Earnings	977,781	809,273
Long term liabilities	1,298,413	1,572,684
Deferred Income (Grants)	998,498	1,572,684
Loan	299,915	-
Current liabilities	30,405	269,560
Current payables	30,405	269,560
TOTAL LIABILITIES	2,634,646	2,979,563

PROFIT&LOSS STATEMENT (EURO)

	2021	2020
Total Income	6,275,244	4,541,251
Total Operational Expenses	2,612,856	2,153,977
Total Personnel Expenses	3,487,661	2,210,129
Depreciation	12,207	12,207
Operating Result	162,521	164,938
Financial Result	-12,863	-36,719
Extraordinary Result	-	-
Net Income	149,658	128,219

* Annual accounts audited by BDO

DONATIONS & SUBSIDIES 2021

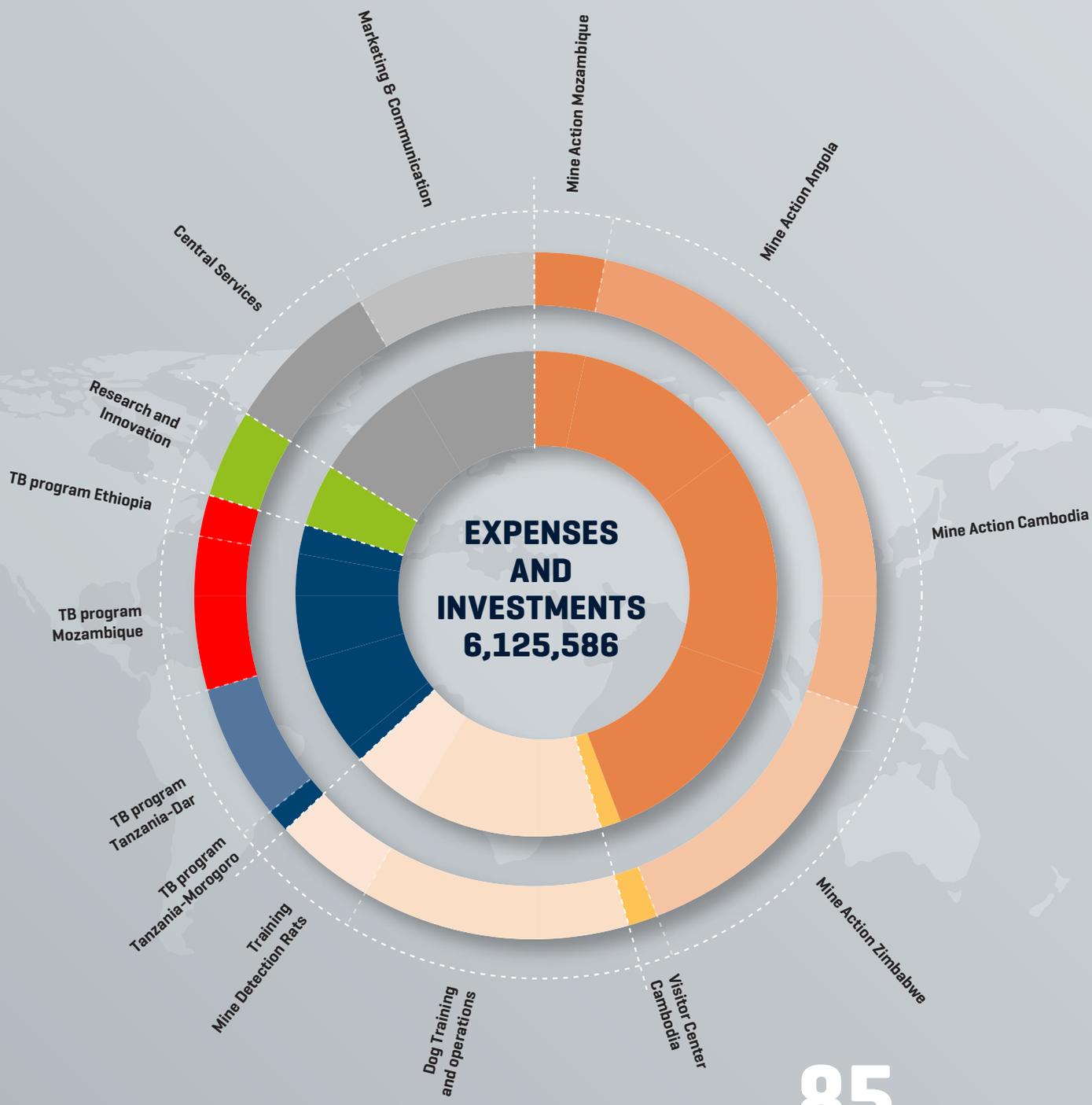


IN EURO

● Public fundraising	1,044,321
● Government grants	1,839,168
● Foundation grants	2,354,709
● International institution grants	218,891
● Earned income	610,546
● Research grants	183,649
● Miscellaneous operating income	23,960

Accountability and efficiency are important to us and for every €1 you donate, 92c goes directly to supporting our work on the ground. Only 8c contributes to fundraising costs, meaning that your support really impacts the communities that we serve.

EXPENSES AND INVESTMENTS 2021 PER ACTIVITY IN EURO



Mine Action Mozambique.....	213,019
Mine Action Angola	707,898
Mine Action Cambodia.....	941,048
Mine Action Zimbabwe	858,065
Visitor Center Cambodia	84,712
Dog training and operations	769,200
Training Mine Detection Rats	288,612
TB program Tanzania-Morogoro	84,120
TB program Tanzania-Dar	387,926
TB program Mozambique	432,876
TB program Ethiopia	125,762
Research and Innovation	247,729
Central services.....	466,923
Marketing and Communication.....	517,696
Total	6,125,586



A MESSAGE FROM THE CEO

Growing towards a better world

Christophe Cox, CEO

2021 was a very positive and invigorating year for APOPO. Already the organization has grown and expanded its activities by about 40% compared to the previous 5-year period 2016 - 2020. But growth is only meaningful and desirable if it contributes to a better world for the vulnerable communities we serve while safeguarding our planet.

After years of investment and perseverance, APOPO's Mine Action Program in Zimbabwe, which protects the local communities and wildlife of Gonarezhou National Park, is removing thousands of landmines. APOPO's Technical Survey Dogs were validated with the publication of a detailed study by the Geneva International Centre for Humanitarian Demining (GICHD) and are currently making a big impact by speeding up the demining process in five countries. APOPO's operational approach in Cambodia, combining rats and dogs with state-of-the-art technologies, has seen the highest effectiveness APOPO has been able to demonstrate. Not only will this provide considerable cost savings it will further reduce tragic accidents, as we strive to get people back on safe ground as quickly as possible.

We were delighted that the public showed increased support for our tuberculosis (TB) programs. Perhaps the world's most pressing global health issue,

the COVID-19 pandemic, played a role in raising awareness for this similar infectious disease. Our trained TB-detection rats continue to help diagnose vulnerable populations that otherwise would be left behind and remain untreated.

APOPO's Innovation team is progressing rapidly to develop new applications for our Super Sniffers, supporting APOPO's ambition to protect people and the planet by fighting disaster, pollution and the decline of biodiversity.

I am proud of our vibrant and committed global APOPO team and can't thank them enough for all the hard work they put in. In addition, my heartfelt thanks goes out to all our donors and partners on whom we rely for support and collaboration, and to all the good people who go the extra mile for our common cause, sharing our dream of building a better future for all.



People's Postcode Lottery is our largest recurring core funder. Since 2014, players have raised £5,169,421 in unrestricted funds for APOPO directly enabling the extensive, life-saving impact we are able to achieve.

TRUSTED PARTNER



Belgium
partner in development

APOPO went through the rigorous process of formal accreditation by the Belgian government for **official Belgian NGO** status. APOPO was thrilled to pass various criteria and underwent an organizational audit of our management capacities.

ERNST & YOUNG

This audit was conducted in the first quarter of 2021 by **Ernst & Young (EY)** and took into account the complexity of the organization, determined by the turnover, geographical and thematic spread, diversity of partners and donors and staff.

PROUD

APOPO is humbled and proud to be accepted in 2021 as an **official partner of the Directorate-general for Development Cooperation and Humanitarian Aid (DGD)** who are committed to supporting APOPO for the next 5 years.

A HUGE MILESTONE

This is a huge milestone for APOPO and an endorsement of the quality of the organization which will encourage stakeholders to choose APOPO as a trusted partner.

APOPO VZW

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SUPPORT OUR WORK

HeroRAT Adoption Program

From 9€ per month 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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