MACACA NIGRA PROJECT

ANNUAL REPORT 2020

TANGKOKO NATURE RESERVE

UNIVERSITÄT LEIPZIG

UNIVERSITY OF PORTSMOUTH

CONTENTS

Sulawesi bear cuscus in Tankoko Nature Reserve

DEAR FRIENDS AND SUPPORTERS

What an incredibly tough year for all of us! The pandemic of the SARS-CoV-2 virus, causing the disease Covid-19, started late 2019 and beginning 2020 has expended like wildfires in all regions of the world.

As a field research, conservation, education project in Indonesia, a very impacted country with little perspectives of rapid efficient vaccine deployment, we faced incredibly difficult decisions. Do we close the field site and send people home to focus on their family and health? But them, what will happen to the macaques and the forest if leave them completely unguarded? Do we maintain some activities but cancel others? Will the monkeys be at risk of the virus and the disease? Research showed that yes, monkeys can catch the virus and become sick. Many primate species, from great apes to lemurs, express the same – or very similar – binding receptors for the virus spike protein than humans, essential for the cells to recognize the virus, making them all highly susceptible to get infected. This advocates strongly for limiting exposure of non-human primates to human primates. The primatology and conservation communities have argued for closing field sites, both to tourism and research, and cancelling field work for the sake of all primates, humans and non-humans alike (e.g. Reid 2020; Gillespie & Leendertz 2020). Guidelines that were observed before like the International Union for Conservation of Nature's best-practice guidelines for health monitoring and disease control in great ape populations, became more stringent, more thorough, more impactful.

"MANY PRIMATES SPECIES, FROM GREAT APES TO LEMURS, EXPRESS THE SAME - OR VERY SIMILAR - BINDING RECEPTORS FOR THE VIRUS SPIKE PROTEINE AS HUMANS, ESSENTIAL FOR THE CELLS TO RECOGNIZE THE VIRUS, MAKING THEM ALL HIGHLY SUSCEPTIBLE TO GET INFECTED"

This all makes sense. We nevertheless decided to keep the station running and, with all precautions taken for everybody, to allow field work to continue. Our decision was based on weighing up the likelihood of spreading the disease and the risk of poaching and other illegal activities in the forest once we would have left. We considered several things: first, we cancelled all new international and domestic trips and visits. Second, we put in place a very stringent hygene protocol, including wearing mask at all times, keeping at least 1m physical distance with each other when at the station, washing hands very often, disinfecting material and equipment after use, limiting travels between the station and villages/cities around, taking a shower and changing clothes when away in village/city for shopping for instance and coming back at the station, having a separate set of clothes for the forest and for going to the village for local assistants, isolating or quarantining + testing after travel, etc, in addition to what was in place before: to keep several meters distance with the observed/studied animals, no peeing/defecating/spitting in the environment, sneezing/coughing/sniffing only in the elbow/sleeve, etc. Third, the Tangkoko Reserve like all other reserves, parks, and

recreational areas was closed from April to August, effectively reducing the circulation of humans both local, national, or international. The authorities allowed only locally-based people already present or working inside the reserve to enter or stay in the reserve and for very specific reasons, such as conservation work. To our knowledge, although the reserve was re-opened to tourism later in the year, no international tourist has been visiting since March as in many countries, international travel has not yet resumed and locally, travel restrictions are still in place as well. Fourth, local people found themselves suddenly without activities and income. They thus relied a bit more than usual on cultivating their gardens and foraging in the forest to provide themselves and their families with food and material for their house or their boat (the main activity of the nearby village is fishing). This increased encounters and conflicts with wildlife including the monkeys. Monkeys raid crops, rummage into kitchen and may cause - if not very significant at least very upsetting – damages to gardens and houses. This irritated people more than before the pandemic as people are psychologically and physically exhausted and fed up with the global situation.

All things considered, the facts that the monkeys are close to extinction but still hunted for food, even in Tangkoko, that people have more time and more needs to go to the forest for resources, that people are also in need of support, and that we deployed a very stringent protocol, convinced us that we should keep some activities at the station. Our local teams are very engaged and involved in pursuing research, conservation, and education activities in schools and with the general public, mostly online or in smaller groups where the situation allows it and we, in our respective countries, are very committed to supporting them!


An adult male crested macaque in Tangkoko Nature Reserve

HIGHLIGHTS

We are very grateful for the extraordinary support we received from the **Leakey Foundation** Primate Research Fund for the last 2 years and it has literally saved the project from bankruptcy and closure. Now that it arrives at its end, we are still not financially secure on the long-term, but we are in a stronger position.

A big thank also to the **Association for the Study of Animal Behaviour** (ASAB) through a Public Engagement Grant, our education initiative Tangkoko Conservation Education was able to run its first Science Camp, a week of immersive research and conservation activities at the MNP field station in Tangkoko.

STAFF CORNER

Our dear field manager, **Dwi Yandhi Febryianti**, left MNP to return to her family in East Java. We are sad to see her leave and are so grateful for her dedication to the project during all the years she worked for MNP. We wish her all the best! She is replaced by MNP alumni, **Rismayanti**, newly minted MSc student from IPB University. Congratulations on your degree and welcome back to the project Risma!

Dwi Yandhi Febryianti


Rismayanti

RESEARCH CONDUCTED

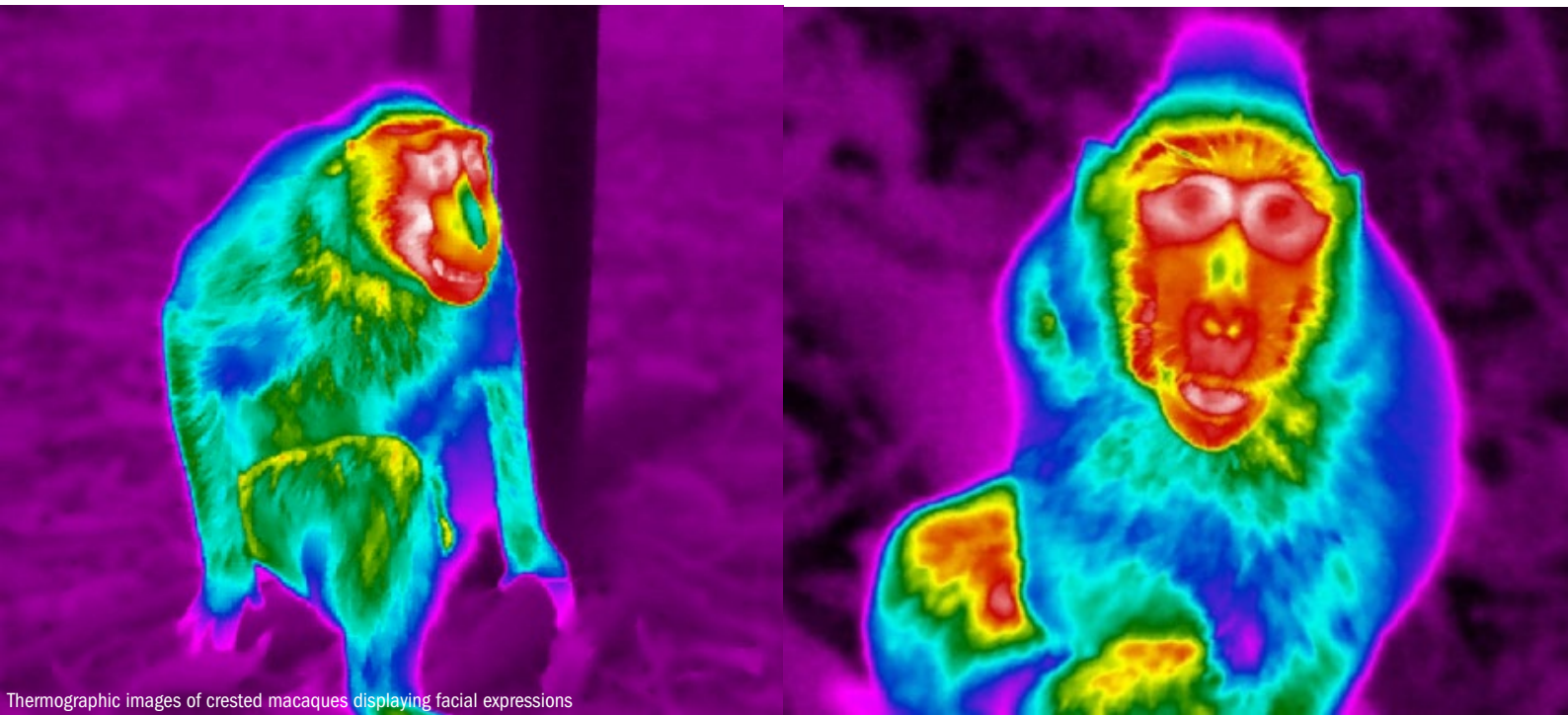
Aside from the continuous collection of macaque demography, reproduction, forest phenology, and climate data for the project on a daily basis, the following specific projects have been being carried out in 2020 or are ongoing. Other projects had to be cancelled.

Inter-group competition for sleeping sites and their function in home-range defense, Rismayanti

Rismayanti, our new field manager, successfully graduated from her Master's in Science degree in Animal Bioscience at IPB University. Her MSc thesis focused on inter-group competition for sleeping sites and their function in home range defence. She carried out field work in Tangkoko as the counterpart of Laura Martínez-Íñigo, PhD student at University of Lincoln, UK, in her PhD project on "Intergroup interactions in crested macaques (Macaca nigra): factors affecting intergroup encounter outcome and intensity".

The role of emotions in the communication system of wild crested macaques, Juliette Berthier

Juliette Berthier, PhD student from the University of Kent, England, started a project on "The role of emotions in the communication system of wild crested macaques (Macaca nigra) - A new approach using infrared thermography". She plans to address the question of whether the production of, and response to signals, by crested macaques is closely tied to context-specific emotional states. Juliette uses infrared thermography (IRT), recently validated for use in wild primates, to quantify the monkeys' emotional responses to a variety of stimuli. Juliette also uses playbacks and field experiments, mainly stimuli presentation, to determine the role of emotion in communication in different contexts (predation, social support during aggressive interactions, affiliative interactions). She was seconded by field assistant Casa Kanaug during the first 6 months of 2020, then by MSc student Indira Nurul Qomariah from IPB. Indira also carried out her own MSc research on characteristics and uses of sleeping trees by crested macaques. Field work was planned from December 2019 to December 2020 but was extended by another 6 months at least due to the pandemic and equipment issues.



Thermographic images of crested macaques displaying facial expressions

Genetic diversity of crested macaques' populations, Eleonora Neugebauer

Eleonora Neugebauer, PhD student from the University of Leipzig, Germany, started a project about genetic diversity of crested macaques' populations. Sagita Dini Lestari, from IPB, was her counterpart until July 2020. The overall aim of their project is to assess the genetic structure of the different crested macaque populations throughout their entire native range in North Sulawesi as well as in Bacan, where they were introduced more than 150 years ago. By noninvasively collecting fecal samples of crested macaques both in Sulawesi and Bacan, the genetic variability of the different populations can be assessed. This will be crucial to find out more about 1) the remaining population sizes of crested macaques, 2) anthropogenic or environmental barriers which affect population connectivity and 3) the risk of inbreeding depression. Furthermore, a potential differentiation of the Bacan population due to the spatial and temporal separation will be investigated to see if they would be suitable for a genetic rescue. Initially, field work was planned for about a year but was also extended indefinitely due to the pandemic.

NetFACS, using network science to examine facial expressions, Jérôme Micheletta

Co-director Jérôme Micheletta and colleagues are carrying out a project called NetFACS, which aims at combining the Facial Action Coding System (an anatomically-based system designed to break-down facial expressions into their most basic observable units, the contraction of individual facial muscles) with Social Network Analysis (a method to measure relationships between units in a system) to develop a novel framework to study communication via the face. Ultimately, this project will provide a tool to quantify the complexity of facial expressions and invigorate a new way of thinking about communication complexity across species. They have developed a first version of the NetFACS package and published it as a freely accessible pre-print on PsyArXiv (Mielke et al. 2020, see full reference below). Unfortunately, data collection on crested macaques, which was planned in Tangkoko, has been cancelled due to unplanned changes in personnel and the Covid pandemic. Existing data collected by University of Portsmouth PhD candidate Peter Clark in 2019 will be used instead.

Male crested macaque yawning

Mating behaviour, parasite infections and hormones in Sulawesi crested macaques, Angela Achorn

Angela Achorn, Fulbright fellow and PhD candidate at Texas A&M University under the advisement of Dr. Sharon Gursky., had planned to come and do field work in Tangkoko in March 2020 for her PhD study on coloration, mating behaviours, parasite infections, and hormones in Sulawesi crested macaques, but unfortunately had to cancel due to the coronavirus pandemic.

A group of crested macaque travelling on a beach in Tangkoko Nature Reserve

PUBLICATIONS

Scientific peer-reviewed articles

Clark, P.R., Waller, B.M., Burrows, A.M., Julle-Danière, E., Agil, M., Engelhardt, A., Micheletta, J. 2020 Morphological variants of silent bared-teeth displays have different social interaction outcomes in crested macaques (Macaca nigra). American Journal of Physical Anthropology, 173(3), 411-422, https://doi.org/10.1002/ajpa.24129

Mielke, A., Waller, B., Perez, C. J., Duboscq, J., & Micheletta, J. (2020, November 13). NetFACS: Using network science to understand facial communication systems. PsyArXiv. https://doi.org/10.31234/osf.io/4vghk

Pasetha A., Danish .LM., Perwitasari-Farajallah D., Agil M., Engelhardt A. 2020. Identification of follower status based on male proximity score in crested macaque (2020). HAYATI Journal of Biosciences, 27:241-246. https://doi.org/10.4308/hjb.27.3.241

Rebout, N., De Marco, A., Lone, J.-C., Sanna, A., Cozzolino, R., Micheletta, J., Sterck, E. H. M. , Langermans, J. A. M, Lemasson, A., Thierry, B. (2020). Tolerant and intolerant macaques show different levels of structural complexity in their vocal communication. Proceedings of the Royal Society, B. 28720200439. https://doi.org/10.1098/rspb.2020.0439

Tyrrell M., Berman C. M., Duboscq J., Agil M., Sutrisno T., Engelhardt A. (2020): Avoidant social style among wild crested macaque males (Macaca nigra) in Tangkoko Nature Reserve, Sulawesi, Indonesia, Behaviour 157: 451-246. https://doi.org/10.1163/1568539X-bja10009

Waller, B. M., Julle-Daniere, E., & Micheletta, J. (2020). Measuring the evolution of facial 'expression' using multi-species FACS. Neuroscience & Biobehavioral Reviews, 113:1-11. https://doi.org/10.1016/j.neubiorev.2020.02.031

CONSERVATION

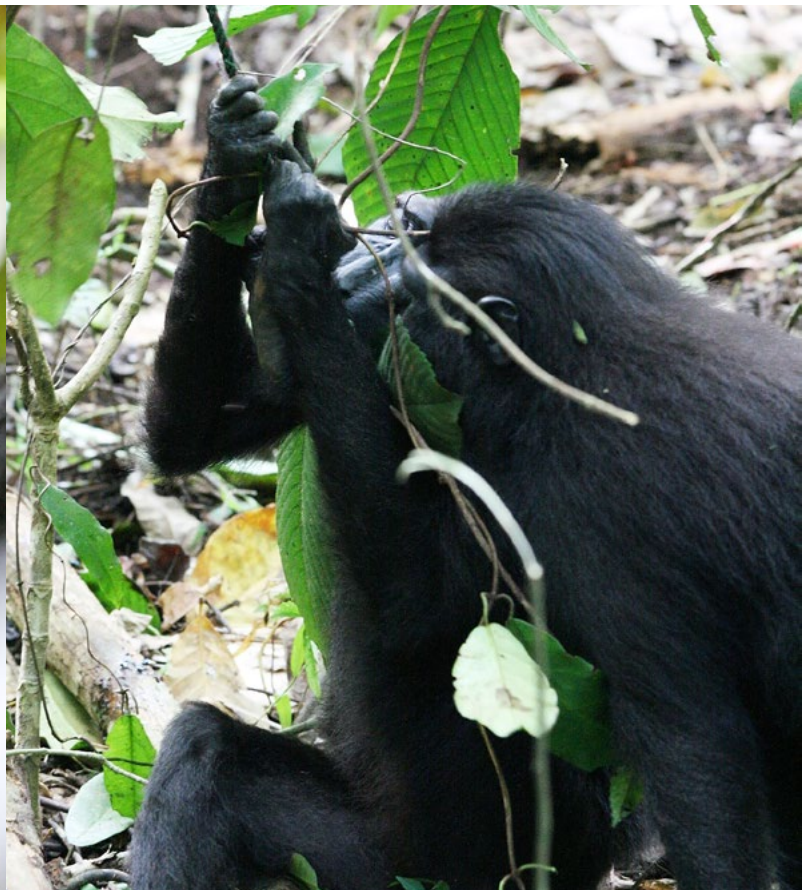
Human-wildlife interactions

At the end of 2020, we received a grant from Asian Species Action Partnership – Rapid Action Fund initiative, aiming at "Strengthening mitigation measures to protect the Sulawesi Crested Black Macaque in a time of crisis". This was to increase our conservation actions, for example by hiring rangers for a full year for patrolling within the Tangkoko Reserve to protect monkeys, and further supporting the Nature Conservation Agency in North Sulawesi (BKSDA). One important part was to keep the monkeys out of nearby villages and gardens and to discuss adequate self-sustainable solutions with villagers. Indeed, this year again, 83 problematic human-wildlife encounters per month occurred (total 2098 for 3 groups) at the border between the reserve and the village.

"83 PROBLEMATIC HUMAN-WILDLIFE ENCOUNTERS PER MONTHS OCCURRED (TOTAL 2098 FOR 3 GROUPS)"

Together with BKSDA, we already trained 60 people (villagers, volunteers from local NGOs, ect) in patrolling skills (data collection and environmental survey technics). We took the opportunity to increase our collaboration efforts with other local NGOs to enhance the conservation skills of our staff. For instance, the director of the Tasikoki Wildlife Rescue Centre came to the field station to give a one-day workshop on how to rescue monkeys from traps in the forest. Our liaison officer and our two field managers participated in several meetings about organising more and better patrols in the area. They were also involved in a reintroduction project led by BKSDA in the region: Two social groups of crested macaques from the Tasikoki Wildlife Rescue Centre were rehabilitated and reintroduced in Gunung Ambang and our staff spent 2 weeks training the people responsible for following the macaques in the forest after the release on behavioural and ecological data collection. Hopefully, we will be able to carry out

Bea, a female crested macaque caught in a snare trap.
She was later rescued by MNP researchers and recovered well



our main activities in 2021 despite the difficulties linked to the pandemic.

Direct protection

In addition to following the macaques every day, our conservation officer, field assistants and managers found and destroyed 261 traps and rescued 4 monkeys from traps (296 traps and 3 rescues in 2019).

A sample of the numerous snare traps removed from the forest by MNP field assistants and researchers

EDUCATION

Due to the COVID-19 pandemic, we had to amend our operations by replacing most direct school interventions with online activities focussing on live streams and interviews.

January-March 2020

In January and February onwards, we offered one-off interventions to schools participating in our programme, bringing together the content of all our environmental lessons in one intervention. The local TCE team (Nona Diko, Eunike Parera and Liska Kuas) was able to deliver assessment questionnaires to eight schools and high schools in the Bitung region, and interventions to five schools, for a total of 150 students. Unfortunately, schools were closed in March 2020 following the development of the pandemic. Thus, we were not able to complete this programme of interventions and to deliver post-interventions questionnaires for all schools.

April - August 2020 (alternative activities due to the pandemic)

From April onwards, we increased our online activities, as we were unable to carry out our environmental lessons in class. For this, the TCE team offered material to pupils at home via video-conferencing. From June 2020 onwards, each TCE member delivered a lesson with Power Point support, completed by quizzes and interactive games. Viewers were also asked questions online. We carried out 4 lessons (introduction to the environment, biodiversity and ecosystems, wildlife of Indonesia and Sulawesi, primates and crested macaques). Our lessons can be viewed on our Indonesian Facebook page Pendidikan Konservasi Tangkoko: https://www.facebook.com/pendidikan.tangkoko. We reached 700 viewers with this programme.

In April 2020, we offered conservation sessions on Facebook called "Bacarita Plank" ("Stories of Education, Nature and Conservation") composed of live interviews between Aryati Rahman (TCE, specifically hired for these activities) and local conservation actors, such as the managers of the Macaca Nigra Project, the head of the Tasikoki Wildlife Rescue Center, the Deputy Mayor of Bitung and the Indonesian director of the Climate Reality Project organisation. These sessions are very popular as they are also an opportunity for spectators to ask questions live to those invited. Fourteen sessions (watched by 4,500 people) have been carried out since April 2020 and the programme is still running on our Indonesian Facebook page Pendidikan Konservasi Tangkoko: https://www.facebook.com/pendidikan.tangkoko.

We have also enhanced our online presence as part of two events. For Earth Day (22nd April 2020), TCE has organised a photo competition for local young people (high school students), who have won prizes for their best wildlife pictures. We have promoted and exposed their pictures on social media and will present their pictures in future TCE exhibitions. For International Macaque week (May 2020), we shared pictures and stories about our conservation and education work. We created a video in English including MNP and TCE staff: https://www.facebook.com/tangkoko-conservationeducation/videos/451929755639181/.

Since September 2020

Schools in North Sulawesi have re-opened in September. The TCE team started to deliver the lessons for primary and secondary schools either for small groups of students in schools (respecting the health protocols in place), or online. This will continue until the end of the school year, in May 2021, for a total of 390 pupils.

The participants of the first Science camp

For the very first time, we organised a Science Camp: we welcomed 10 students from the 11th Grade of SMK 4 Negeri Senior high school in Batu Putih (village next to the Tangkoko Reserve) for a week of training at the MNP research station. The students learnt different field and scientific methods and research tools, observed the macaques in the forest, followed our environmental lessons, and met several local conservation partners. On the 24th November, an online Symposium has gathered all participants sharing their knowledge about biology, ecology and macaque behaviour. This can be watched online on our Youtube Channel: https://www.youtube.com/watch?v=jTMK1kuGS-0. So far, we reached 520 views of this event and hope that this will inspire these young people to pursue their studies or a professional path in conservation. We now aim to run the Science Camp every year.


Students participating in the Science Camp observing the macaques in the forest

MNP FINANCIAL STATEMENT

Revenues come from three principal sources. Individual researchers and students pay a fee to stay at the station and use the facilities. It is currently of 500€ per person per month. For the Indonesian staff and students, the fees are paid either by MNP directly or by their international counterparts. The second source comes from grants obtained by the head and co-heads of the project and by the Universities or international partners. The third source comes from donations from individuals or organisations.

Items	**Description**	**Cost in 2020 (€)**
7 to 9 employees	research organization, data collection and analysis, reports, outreach, conservation education liaison with villagers and authorities, staff management, health insurance	18,987
Camp maintenance + food	repairs, food, gasoline generator, communication, etc.	6,260
Transportation	car rental, gasoline motorbike bus etc.	643
Research	consumables, technique, cooperations	852
Administration	permits, post box, Covid-19 related, fees	1,717
TOTAL		**28,459**

The project permanently employs between 7 and 9 people: a research manager organising research, a liaison manager responsible for liaising with different authorities, linking research, outreach, education and conservation, as well as managing human resources issues (salaries, health insurance, permits). We are also very proud that our research assistants not only collect biological and behavioural data on the 5 groups of monkeys that are habituated for research, but are also heavily involved in outreach, education, conservation, and eco-tourism. One of them is specifically dedicated to patrolling the forest, linking with the rangers and mitigating issues between people living around the nature reserve and the monkeys. They make the very essential link to the local community. In addition, a cook and a janitor take care of the camp daily maintenance. They are also members of nearby villages and keep the team together through god food and good moods.

Health and risk insurance is required by Indonesian laws for all people working in Indonesia. We provide it to our employees as an essential benefit for a rural community.

Permits are required for carrying out research and any professional activities (to the national government) as well as for accessing the nature reserve (to the national and local government).

TCE FINANCIAL STATEMENT

Items	Description	Cost in 2020 (€)
Coordinators' salaries and insurance	Local coordinators' and assistants salaries and casual staff (school activities, Science Camp); Coordinators' insurance and medicine fees	6,487
Transportation	Car rental, motorbike rental and gasoline for general coordinators' and volunteers' transportation (meetings, education interventions in schools, events and trainings); Service and maintenance (for the project's motorbikes); Bus rental for pupils' transportation to Tangkoko reserve	1,369
Food	Food for the local coordinators (when outside the headquarters)	1,399
Pedagogical material	Stationeries: books, games, pens, paper, notebooks, ink, photocopies, etc; Creation, edition and printing of our environmental lessons (7 lessons)	2,352
Equipment	Electronic (phone, laptop, printer, speakers, tripod, etc); Personal protection material (masks, sanitizing gel, face shields)	1,004
Communication	Post, Internet and phone expenses	226
Office	Office rental, electricity, furniture and small equipment	111
Awareness campaigns	Earth Day, 10 year PKT, World Cleanup Day promotion: Material (banners, posters, T-shirts), Prizes, Hall booking, tree planting equipment and food/transport of participants.	77
Science Camp	Food, transport, equipment, material	2,129
Administration	Foundation fees and other administrative expenses (land etc)	723
Other	"Solidarity" expenses (wedding, funerals, etc)	365
TOTAL		**16,242**

ACKNOWLEDGEMENTS

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