



# Technology without borders

Annual report 2021

Technik ohne Grenzen



## **Impressum**

### **Technik ohne Grenzen e.V.**

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## **Preface**

In 2021, the Corona pandemic still had the world firmly in its grip. Nevertheless, we were able to carry out our activities at least partially as planned and implement some projects, which we are very proud of!

One highlight in times of the pandemic was certainly our project to supply Indian hospitals in rural areas with oxygen concentrators. The project leaders Franziska Weißörtel and Monja Müller-Spiekenheuer organised a total of 117 concentrators and other medical equipment and sent them to Bangalore in India. In this way, we were able to make an important contribution to the way out of the pandemic, independently of other projects.

This year, we also continued to expand our focus on agroforestry. In addition to the projects in India and Brazil, targeted projects in Africa are now being launched and supported by the main association. These projects not only contribute to an improved nutrition and economic situation, but are also actions for climate protection. In this context, our TeoG reforestation campaign in Schwarzenborn in autumn deserves special mention. Despite COVID, we were able to plant trees with about 50 participants. With the help of the Federal Forestry Office Schwarzenborn, a total of 5505 trees were planted, which were partly financed through our internal association CO2 account. We would like to take this opportunity to thank the project leaders Franziska Enzmann and Cora Kroner for organising the event.

We also welcome two new regional groups to our ranks: The regional group Weiden in the Upper Palatinate and the regional group Bayangam in Western Cameroon. Welcome, we are looking forward to your projects!

Last but not least, we welcome Markus Reinhard as the new second chairperson on the board and thank Franz Regler who held this post for the last ten years.

All in all, we can look back on a very successful year and would like to say thank you to all donors, supporters, project partners and, of course, to all our members who do excellent work in our projects all over the world!

**Frank Neumann, Markus Reinhard und Robert Schullan**

On behalf of all board members



## Organization

Technik ohne Grenzen e.V. (Technology without Borders, Germany) has one goal: improving living conditions in developing countries to offer people a life-worthy future in their home country. This goal is pursued principally through the following three areas of activity:

1. Coordinating on-site, tailored cooperative development work that makes the most effective use of the available resources.
2. Delivering education and training that empower local people effect change themselves.
3. Stimulating sustainable development, for example through microbusiness initiatives.

Through these activities, we aim to put our technical expertise to meaningful use in the service of others. This is the guiding principle behind the foundation of our organisation, our motto being “as sophisticated as necessary, as simple as possible“. In the organisation's name, the term “technology“ represents an invitation for all technical enthusiasts, as well as tradespeople, technicians, artisans and engineers, to participate in our work. Our organisation also places great importance on offering students the opportunity to make a difference through the application of technical and engineering skills to a variety of challenges in different locations and cultures.

Technik ohne Grenzen e.V. was founded in 2010 and is a decentralized operating organization. All members are working on a voluntary base to avoid administrative costs – all donations and funding flow into our projects to 100 %. Projects may be carried out on behalf of the board or any regional group of TeoG. The structure includes also administrative and topic related working groups for coordinated activities.



## Board

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<b>1. Chairman</b>	Dr. Frank Neumann	Since: 2010 Profession: Mechanical Engineering
<b>2. Chairman</b>	Markus Reinhard	Since: 2021 Profession: Electronics
<b>3. Chairman</b>	Robert Schullan	Since: 2017 Profession: Mechanical Engineering
<b>Secretary</b>	Lara Hachmann	Funktion seit: 2020 Profession: Mechanical Engineering
<b>Treasurer</b>	Michael Graf	Since: 2019 Profession: Finance
	Christian Zeidler	Since 2021 Profession: Process Technology
<b>Project Board</b>	Annika Fenn	Since: 2019 Profession: Electronics
	Andreas Vierling	Since: 2020 Profession: Medical technologies
	Jonas Schlund	Since: 2019 Profession: Energy
<b>Regional Organization</b>	Daniel Schaffert	Since: 2014 Profession: Energy
	Arne Bruns	Since: 2020 Profession: Engineering
<b>Public Relations</b>	Franziska Enzmann	Since 2021 Profession: Process Engineering

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## Facts and figures

### Members

Technik ohne Grenzen e.V. currently has 585 members in Germany, with 50 new members joining in 2021. In addition, the regional groups in Ghana, Brazil, Uganda and Cameroon have further members, but these are largely not registered as official members of TeoG Germany. The development of membership in recent years is shown in Figure 1. In the course of the change in membership administration, a number of members who could no longer be reached were removed from the statistics this year; they appear in the figure below as "members exited".

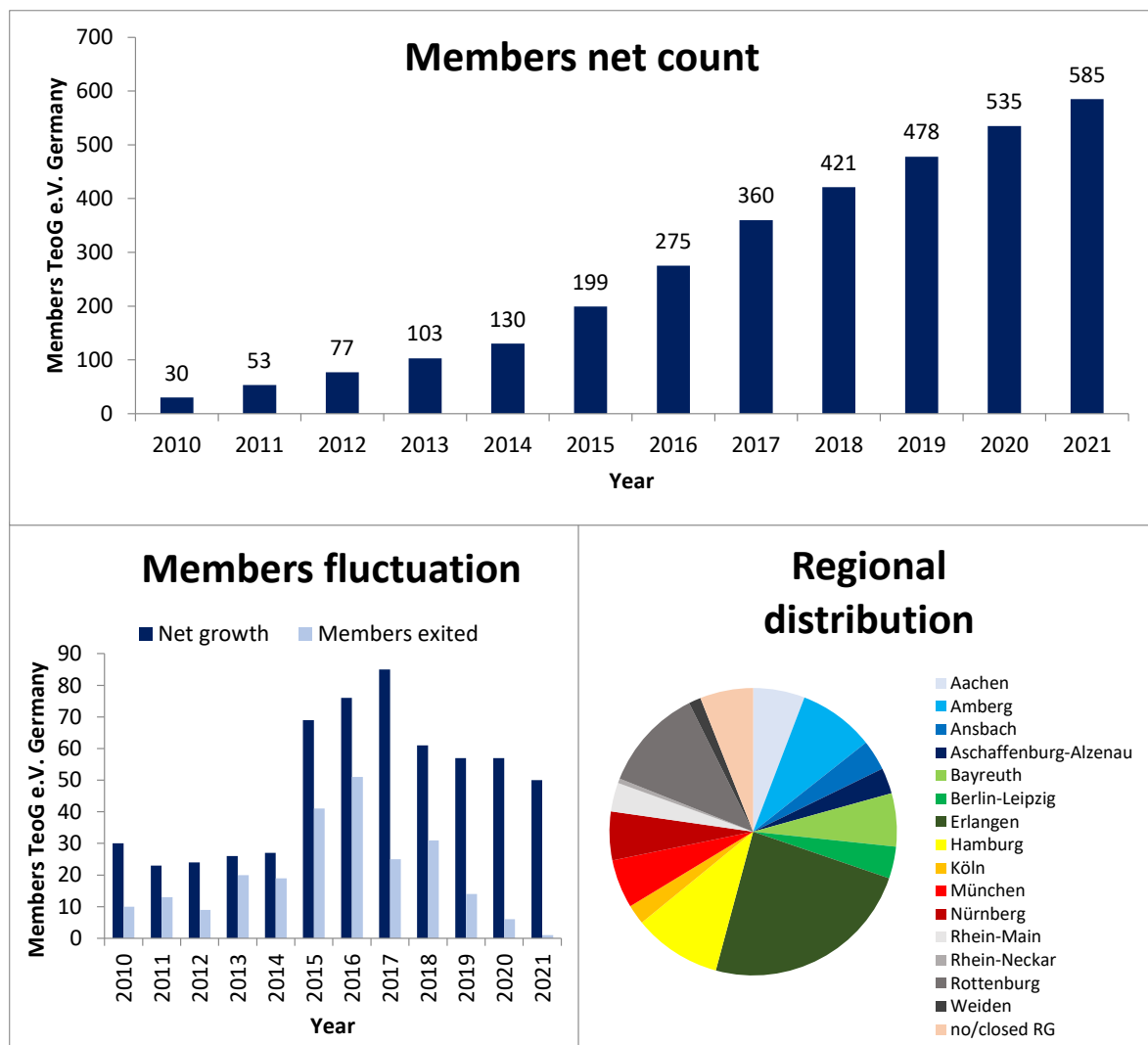


Figure 1: Members development at Technik ohne Grenzen e.V.



## Projects

In 2021, 13 new projects were registered and 12 projects were completed. The number of registered and completed projects as well as their distribution in terms of project topics and project countries over the last few years are shown in Figure 2.

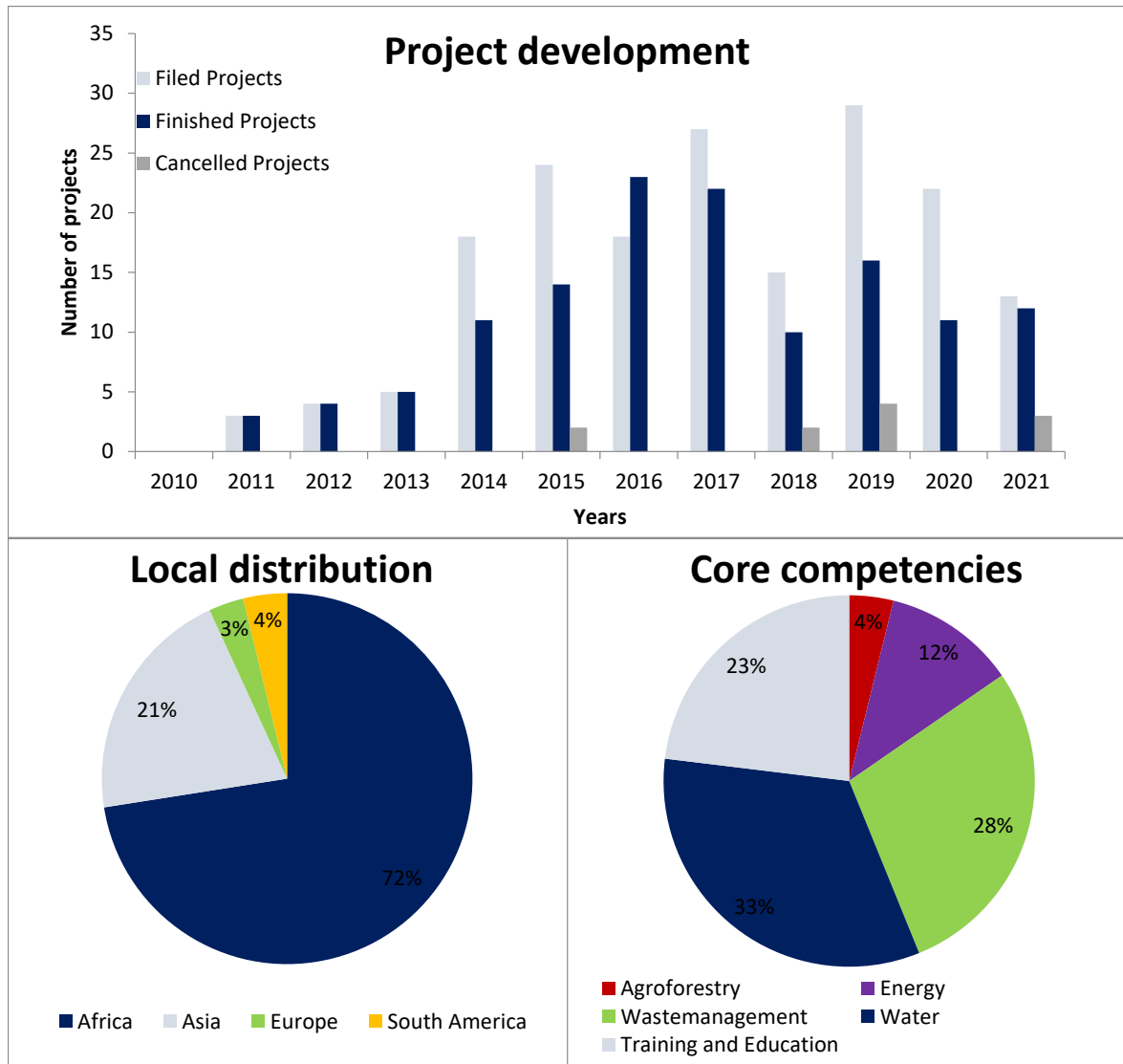


Figure 2: Project development

In total, Technik ohne Grenzen e.V. has completed 131 projects in 26 countries by the end of 2021. 37 projects are currently in the planning or implementation phase. The number of ongoing projects is thus roughly at the previous year's level (40 active projects). The ongoing COVID-19 pandemic continues to cause delays in project implementation. Most projects have been implemented so far in Ghana (43), followed by Nepal (12) and Tanzania (12). A more detailed view can be seen in Figure 3. The main focus of our work

with 43 completed projects is in the water/sanitation sector, followed by waste management and recycling with 37 completed projects.

Although the majority of projects took place in Ghana, a move towards other project locations is observed. In 2021, no new project was registered in Ghana, but 3 each in Tanzania and Kenya.

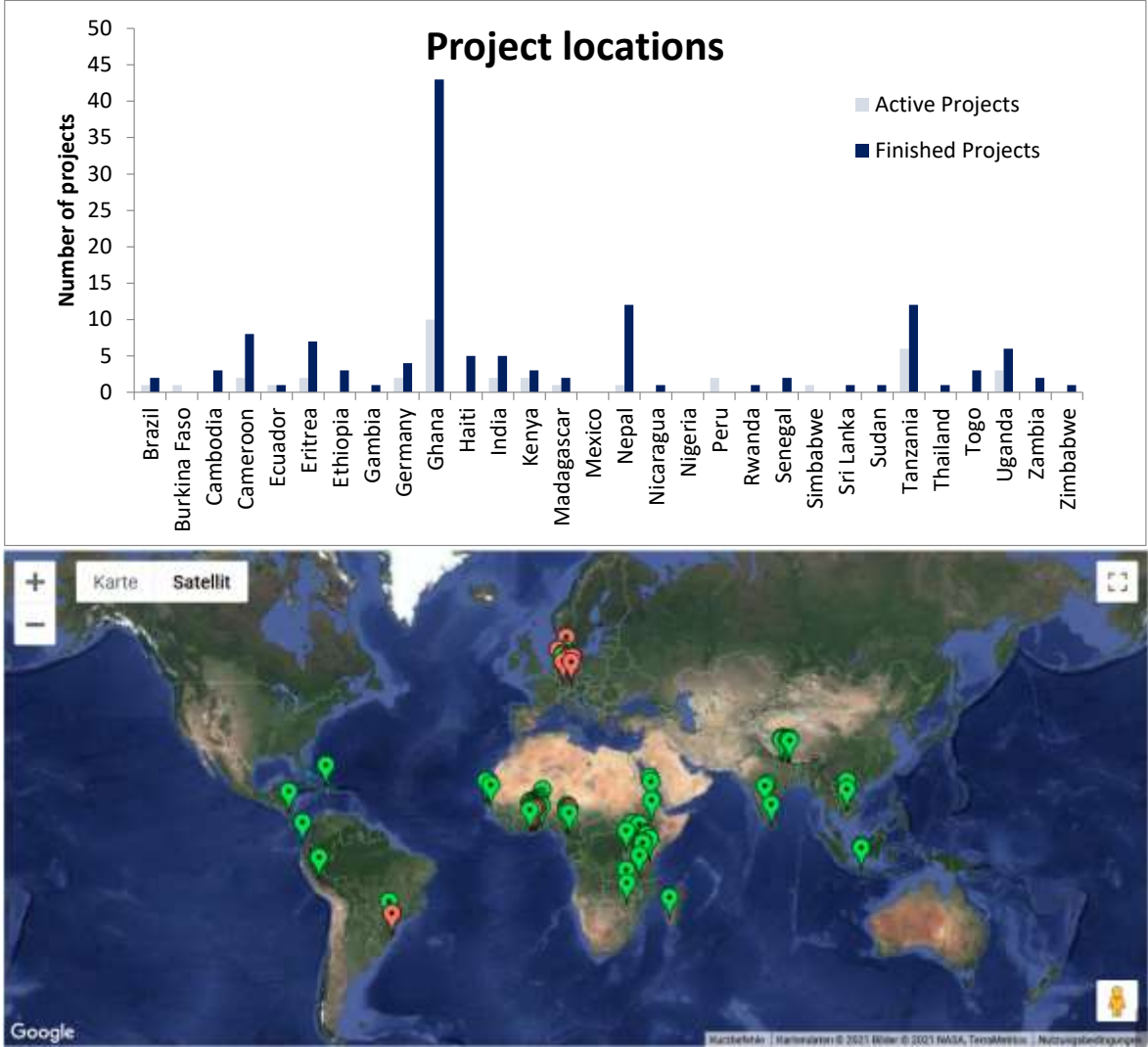


Figure 3: Project distribution worldwide, regional groups in red

## Finance

In 2021, income exceeded expenditure by about 21%, as some projects could not be implemented due to the COVID-19 pandemic, as in the previous year. could not be carried out, even though donations were received. As in previous years, the main part of the expenditure consisted of project costs, which were partly borne by the regional groups and partly directly by the main association. A detailed breakdown of income and expenditure can be found in Figure 4.

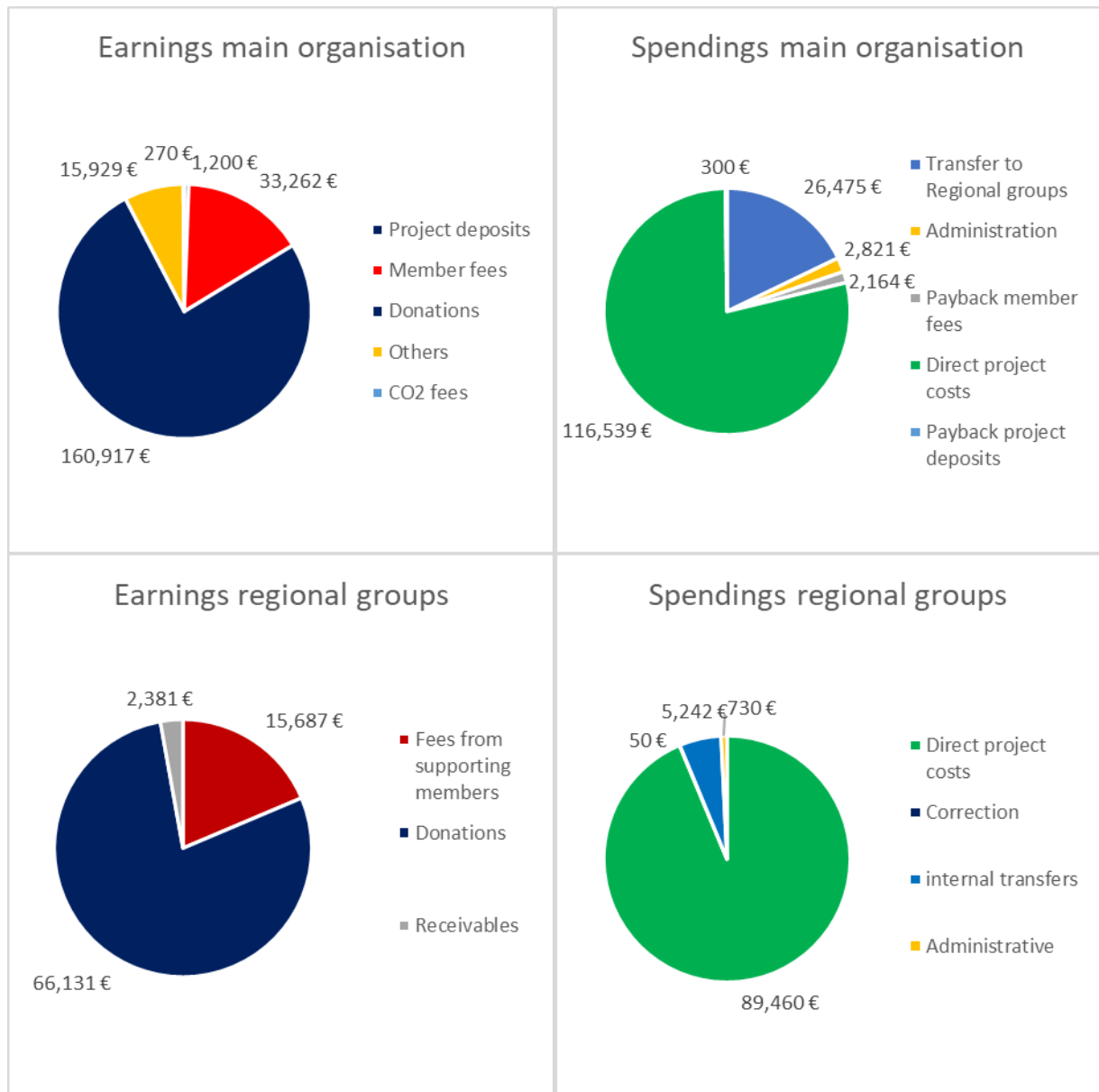


Figure 4: Earnings and spendings of main organisation and regional groups

The project costs consisted mainly of material costs (40 %) and costs for local companies in the country of operation (40 %).

## Members education

In 2021, a virtual project leader workshop was held in June by Franziska Enzmann and Julia Schupp. A total of 11 new project leaders were thus trained and can now lead projects on behalf of Technik ohne Grenzen e.V..

## Support of academic education

### Projects at universities

2016 - Measures against Soil Erosion in Begu Valley, Eritrea (Project work by Ezgi Arat), **RWTH Aachen**

2018 - Technology without Borders: Study and implementation of a sustainable container at UFSC – Mato Alto/Araranguá, **Federal University of Santa Catarina**

2017-2019 - Technology without Borders: study and implementation of a low-cost biodigester on a small rural property in the municipality of Araranguá, **Federal University of Santa Catarina**

2020 – Study related to the supply of the Ruanda Mission hospital with solar power. **Technische Hochschule Aschaffenburg**

### Bachelor thesis

**2014 – Bettina Hofmann.** Communication for a nonprofit organization. (Graduation in Media production and Media technology) - **Ostbayerische technische Hochschule Amberg-Weiden. Advisor: Michael Thiermeyer**

**2018 - Nathália Ledra Turnes.** Project Management Applied to a Container Building: Case Study at the Technical Association Without Borders Headquarters. (Graduation in Energy Engineering) - **Federal University of Santa Catarina. Advisor: Kátia Cilene Rodrigues Madruga.**

**2018 - Gustavo da Silveira Pereira.** Implantation of a low cost biodigester in a property with dairy cattle raising. (Graduation in Energy Engineering) - **Federal University of Santa Catarina. Advisor: Elaine Virmond.**

**2019 - Pascal Lefarth.** Möglichkeiten der Vermeidung von Plastikabfällen zur Verringerung globaler Umweltschäden am Fallbeispiel der Trinkwasserverpackungen in Ghana. (Graduation in Business Engineering) – **Ostfalia Hochschule für angewandte Wissenschaften. Advisor: Carmen Genning.**

**2020 – Josef Werth.** Machbarkeitsstudie der Wasserversorgung von Krankenhäusern in Entwicklungsländern am Beispiel des Ruanda Mission Hospital (Tansania) – **Technische Hochschule Aschaffenburg. Advisor: Kilian Hartmann.**

**2021 – Leticia Araujo Silagi.** Planung und Auslegung einer Regenwassernutzung für ein Studentenwohnheim in Tansania. (Graduation in Civil Engineering) – **Frankfurt University of Applied Sciences. Advisor: Kurt Kliesch.**

### Internships

2019: Scientific internship on the construction of well for the drinking water supply of a hospital; Project TZA\_11-1. **Technische Hochschule Aschaffenburg.**



## Scientific publications

**TURNES, N. L.; CONSTANT, F.; MARCAL, H.; BONADEU, F.; MADRUGA, K.; PFITSCHER, L. SUSTAINABILITY STRATEGIES APPLIED TO CONTAINERS: EXAMPLE OF THE HEADQUARTERS OF TECHNOLOGY WITHOUT BORDERS BRAZIL.** In: 7th Symposium on Scientific and Technological Integration of Southern Santa Catarina - SICT-Sul, 2018, Araranguá. Proceedings of the 7th Symposium on Scientific and Technological Integration of Southern Santa Catarina - SICT-Sul, 2018. v. 1. p. 356-362.

**MICHAELIS, L.; PEAR, G. S.; MADRUGA, K.C.R.. TECHNOLOGY WITHOUT BORDERS - LOW COST TECHNOLOGIES FOR DEVELOPING REGIONS.** In: 7th Symposium on Scientific and Technological Integration of Southern Santa Catarina - SICT-Sul, 2018, Araranguá. Proceedings of the 7th Symposium on Scientific and Technological Integration of Southern Santa Catarina - SICT-Sul, 2018. v. 1.





## Core competencies

### Water and waste water

Drinking water supply is still one of the central problems in developing countries. This is why Technik ohne Grenzen e.V. is becoming increasingly involved in this area. A total of 43 projects in the area of water/wastewater have already been completed, 5 of which in 2021. These are not only about the provision and treatment of water, but also about methods of saving water, for example through the use of dry toilets. Other goals in our projects are well construction, well regeneration, rainwater harvesting and wastewater treatment.

#### Working group water

Since	2010
Head	Thomas Witt



#### Activities 2021

Developing and implementing water-related projects, supporting project teams, building knowledge on water, answering technical questions.

One focus of the water working group is the collection of knowledge on the relevant topics. This knowledge is stored in a structured way and made available to the project teams. For this purpose, we use an internal knowledge management system that includes content on groundwater, sand storage dams, well drilling, water analysis, dry toilets and water extraction from air. In this way, our projects can be planned faster and better, project knowledge is not lost and we can contribute to improving the water situation in developing countries.



## Waste and recycling

Waste is an ever-growing problem worldwide and especially in developing countries. Therefore, TeoG has activities in three different categories, firstly the recycling of plastics, secondly the recycling of e-waste and thirdly the disposal of infectious waste. The construction of appropriate incinerators is one of the longest success stories of the association. Plastic waste entering ecosystems leads to environmental contamination and microplastics in oceans, fish and ultimately food, the effect on human health is still not fully understood. In addition to plastic waste, there is now a flood of electronic waste in developing countries, which poses a high health risk, especially for children who are looking for recyclable parts.

### Working group waste

Since	2010
Head	Henning Risse



#### Activities 2021

Continuous improvement of the MARK 9 incinerator, support of all projects in the field of waste, maintenance of knowledge management, response to enquiries regarding waste and recycling.

Through the cooperation with the German Rotarian Doctors (GRVD), we have focused on the incineration of infectious waste since our beginnings. The first project involved the construction of two De Montfort Mark 9s in Techiman, Ghana in 2012. After understanding the system better and better, we have since been able to further develop the incinerator, true to our motto "As technical as necessary, as simple as possible".

In addition to a second wall around the main combustion chamber and improvements in the metal construction, we have now also introduced adaptations to facilitate operation and maintenance. The training concept is also being constantly developed. Thanks to the support of many partners in Germany and the countries of operation, we have now been able to build incinerators in 27 locations on 3 continents. We are proud to enable environmentally sound and safe disposal of infectious waste in this way.



## Training and Education

In developing countries, low education and training is a major challenge, especially in rural areas. This is why TeoG is active in this field. The association and its members, especially the Hospital Support and TCB working groups, develop concepts for sustainable maintenance of technical facilities, training in the IT sector, implementation of recycling projects and much more. Two core topics are the Teaching Computer Basics (TCB) initiative, which aims to enable computer lessons in schools, and Hospital Support, which sets up maintenance plans for hospital equipment.


Working group	Hospital Support
Since	2013
Head	Katharina Mai



**Activities 2021**

Programming of a maintenance app for hospitals, support of all projects in the area of hospital support

Working group	TCB
Since	2015
Head	Ina Reichmann



**Activities 2021**

Collection of used laptops, support for all TCB projects with software problems and "knowledge boxes", contact with implemented projects for aftercare

## Energy

A reliable energy supply is still not a matter of course in developing countries. The working group on energy mainly deals with the energy supply in hospitals and other public buildings, such as schools. Projects in this area deal, for example, with the planning and installation of photovoltaic systems, whereby the sustainable use of the system and the training of users form an important part of the projects.

### Working group Energy

Since	2010
Head	Nicht besetzt



#### Activities 2021

non

## Agroforestry

Agroforestry is a form of land use in which perennial woody plants such as trees or shrubs are planted on land that is also used to grow agricultural crops and/or keep animals. These elements can be combined either in spatial arrangement or in temporal sequence.

Agroforestry systems are actually nothing new, as they have been managed for centuries. A classic example in Europe is orchard meadows. But in many places, monocultures and industrial agriculture have displaced agroforestry systems, even though they offer many advantages, especially for small farmers.

In any agroforestry system, there are several interactions, both ecological and economic, between the different components. In general, agroforestry systems are multifunctional systems and can provide a wide range of economic, socio-cultural and environmental benefits.



These benefits included, for example, an increase in biodiversity on agricultural land and a closed nutrient cycle, but also economic advantages such as independence from

monopolists (seeds, fertilisers, pesticides) and market prices for a given product. This point in particular is a very essential aspect for small farmers in developing countries, since, as in our projects, the seeds are home-grown and neither fertiliser nor pesticides are needed.

Agroforestry systems are also very interesting with regard to climate change, because on the one hand they contribute to the sequestration of CO<sub>2</sub>, e.g. by planting trees and improving soil quality, but they are also more resistant to climatic changes and extreme weather events.

Our goal in TeoG projects is primarily to support local partners in setting up agroforestry demonstration farms and information sessions on agroforestry for smallholder farmers. In 2016, Franziska Weissörtel from RG Munich started the project of an agroforestry demonstration farm in India. We are currently transferring the findings to a demonstration farm in Brazil through our RG Araranguá. First conceptual approaches already exist to also establish agroforestry demonstration farms in Africa. Two of our members in Ghana have already started with their first conceptual ideas.

## Working group Agroforestry

Since	2020
Head	Franziska Weißörtel



### Activities 2021

Knowledge enhancement in the field of agroforestry, support for agroforestry and reforestation projects



## Further working groups

### Working group PR

<b>Since</b>	2013
<b>Head</b>	Laura Gutwill
<b>Activities 2021</b>	Newsletter, Facebook Account



### Working group IT

<b>Since</b>	2010
<b>Head</b>	Julian Deyerler
<b>Activities 2021</b>	Homepage, Office 365



## Regional groups

TeoG currently has 13 active regional groups in Germany. Erlangen is the RG with the most members and the largest number of completed projects, however, as in the previous year, the RG Rhein-Main has registered the most new projects, as can be seen in Figure 4. In 2021, a new regional group was founded in Germany in Weiden in der Oberpfalz. Most RGs held mainly virtual meetings, as in the previous year. In addition to the groups in Germany, groups are currently active in Ghana, Uganda, Rwanda and Brazil; in 2021, a new group was also founded in Bayangam, Cameroon.

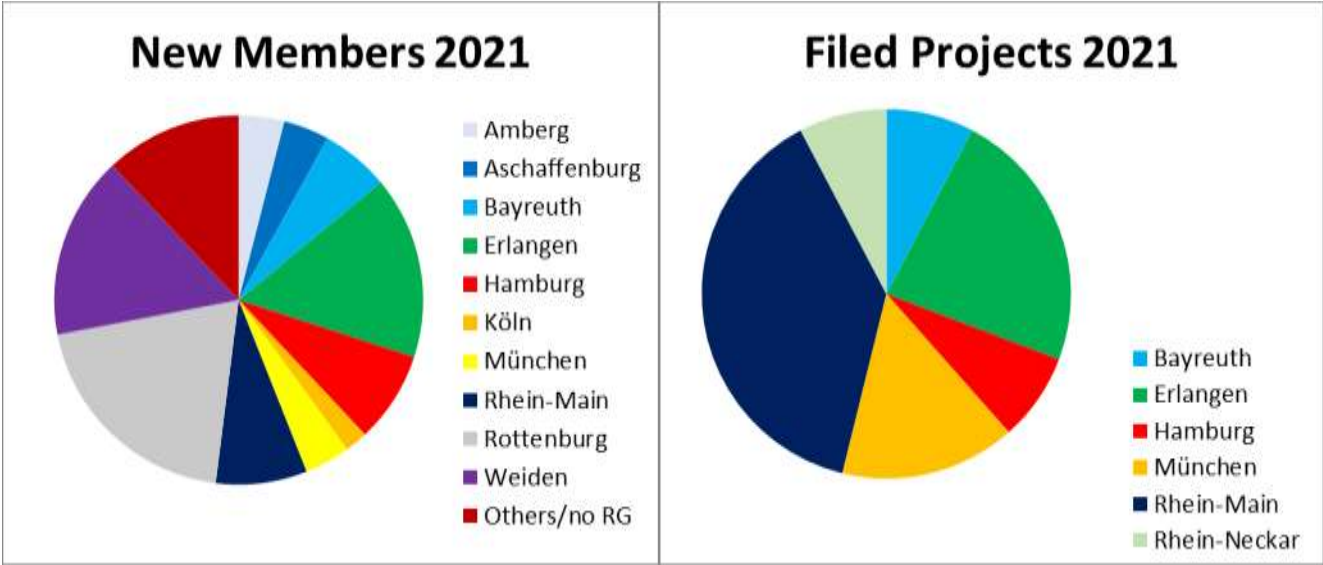


Figure 5: New members and projects in RGs

## RG Aachen

Since	2017
Head	Sophie Kraudszun
Deputy	NN
Cashier	Paul Grünefeld
Members (+ in 2021)	34 (+0)
New projects 2021	0
Finished projects 2021	0



Topics



Ongoing project in Ecuador

## RG Amberg

Since	2011
Head	Magnus Dunskus
Deputy	Adrian Danner
Cashier	Hannah Eichler
Members (+ in 2021)	50 (+ 2)
New projects 2021	0
Finished projects 2021	0



Topics



2 ongoing projects in Nepal and Tanzania

## RG Ansbach

Since	2015
Head	Eva Maria Wolz
Deputy	Franziska Hartmann
Cashier	Julian Britz
Members (+ in 2021)	20 (+0)
New projects 2021	0
Finished projects 2021	0



Topics



Ongoing project in Ghana

## RG Aschaffenburg Alzenau

Since	2017
Head	Johanna Schulte
Deputy	Kilian Hartmann
Cashier	Michael Mannt
Members (+ in 2021)	17 (+2)
New projects 2021	0
Finished projects 2021	0



Topics



No ongoing projects

## RG Bayreuth

Since	2010
Head	Johannes Häring
Deputy	Timon Günther
Cashier	Kira Schlesier
Members (+ in 2021)	35 (+3)
New projects 2021	1
Finished projects 2021	0



Topics



3 ongoing projects Ghana and Germany

## RG Erlangen

Since	2010
Head	Julian Bauer, Oscar Strobl
Deputy	Julian Deyerler
Cashier	Felix Schofer, Ricarda Brodwolf
Members (+ in 2021)	140 (+8)
New projects 2021	3
Finished projects 2021	2, 1 cancelled



Topics



2 ongoing projects in Ghana and Tanzania



## RG Hamburg

Since	2013
Head	Laura Schneider
Deputy	Dominik Heinrich
Cashier	Berno Hellauer
Members (+ in 2021)	58 (+4)
New projects 2021	1
Finished projects 2021	2



Topics



4 ongoing projects in Eritrea and Peru

## RG Köln

Since	2016
Head	Wolfgang Nentwig
Deputy	Roland Schneider
Cashier	Nils Roßbach
Members (+ in 2021)	13 (+1)
New projects 2021	0
Finished projects 2021	0



Topics



No ongoing projects

## RG München

Since	2014
Head	NN
Deputy	NN
Cashier	NN
Members (+ in 2021)	32 (+2)
New projects 2021	2
Finished projects 2021	1



Topics



5 ongoing projects in Cameroon, India, Simbabwe and Tanzania

## RG Rhein-Main

Since	2017
Head	Dr. Franziska Enzmann
Deputy	Cora Kroner
Cashier	Peter Scheunert
Members (+ in 2021)	19 (+ 4)
New projects 2021	5
Finished projects 2021	6, 2 cancelled



Topics



8 ongoing projects in Cameroon, Tanzania, Germany, Ghana, Kenya and Burkina Faso

## RG Rhein-Neckar

Since	2019
Head	Heiko Blumenschein
Deputy	Dr. Markus Reinhardt
Cashier	Melanie Reinhardt
Members (+ in 2021)	3 (+ 0)
New projects 2021	1
Finished projects 2021	1 cancelled



Topics

No ongoing projects

## RG Rottenburg

Since	2015
Head	Julia Güntherodt
Deputy	Nicht besetzt
Cashier	Annalena Grober
Members (+ in 2021)	68 (+ 10)
New projects 2021	0
Finished projects 2021	1



Topics



No ongoing projects

## RG Weiden

<b>Since</b>	2021
<b>Head</b>	Elisabeth Eikemeier
<b>Deputy</b>	Nico Spörl
<b>Cashier</b>	Alexander Gürtler
<b>Members (+ in 2021)</b>	8 (+ 8)
<b>New projects 2021</b>	0
<b>Finished projects 2021</b>	0



**Topics**

**No ongoing projects**

Regional group	Since	Members 2021	Finished projects (total)	Ongoing projects
Aachen	2017	34	1	1
Amberg	2011	50	12	2
Ansbach	2015	20	0	1
Aschaffenburg	2017	18	3	0
Bamberg	2014	5	2	3
Bayreuth	2010	35	8	3
Erlangen	2010	140	48	2
Hamburg	2013	58	11	4
Köln	2016	13	2	0
Konstanz	2015	4	0	0
Leipzig/Berlin	2015	21	3	1
München	2014	32	9	5
Nürnberg	2010	32	7	0
Rhein-Main	2017	19	7	8
Rhein-Neckar	2019	3	0	0
Rottenburg	2015	68	11	1
Ulm	2016	3	0	1
Weide	2021	8	0	0



## TwB international

Currently, other Technique without Borders groups are active internationally, in Ghana, in Uganda, in Brazil and since 2021 also in Cameroon.

TwB Ghana was mainly active in the field of agroforestry in 2021, and an agroforestry demonstration farm is being planned together with German partner RGs. The project is supported and accompanied by the Board of TeoG Germany. The regional group in Uganda is carrying out projects in cooperation with the RG Rottenburg, and there are ongoing projects in the field of waste management and water filtration. The group in Brazil continued its activities in the field of agroforestry in 2021, with particular emphasis on the workshops for smallholders in the Ararangua region. In Bayangam, Cameroon, a regional group was founded in November 2021; the members are students of the University of Bayangam and pupils of the technical high school. The group has already carried out a waste management project at the technical high school and realised projects in Bayangam together with the RG Rhine-Main. The cooperation with the international RGs is to be intensified in the coming year.



Foundation regional group in Bayangam

# Projects

In 2021, 13 new projects were started and, despite COVID-19, 12 projects were also terminated. Most of the new as well as terminated projects are in the water/wastewater sector, the exact distribution can be seen in Figure 5.

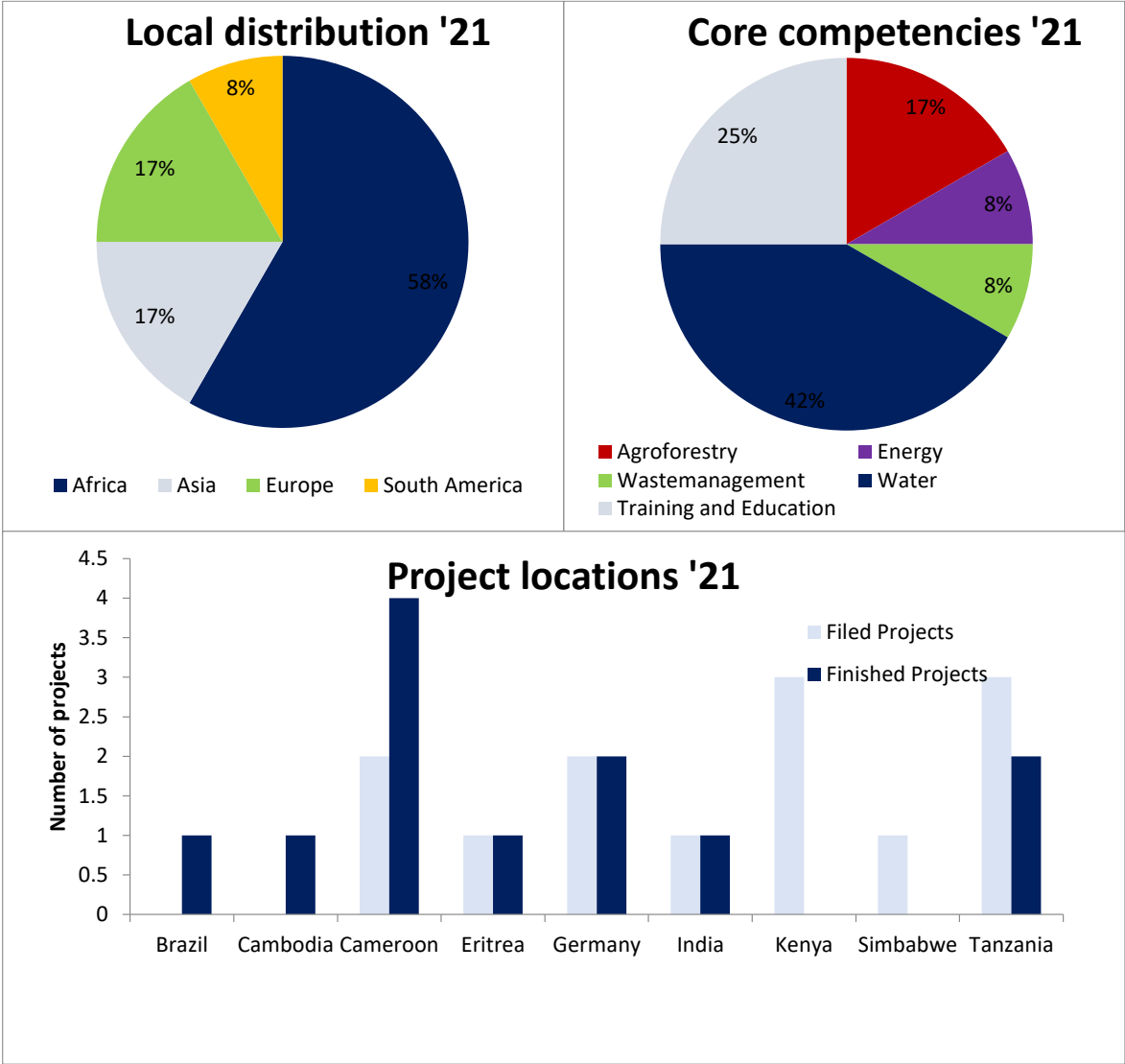


Figure 6: Projects filed and finished in 2021 and regional distribution

## New projects in 2021

### Hospital waste incineration in Cameroon

<b>Project number</b>	CMR_09
<b>Project leader</b>	Daniela Wegner
<b>RG</b>	Erlangen
<b>Location</b>	Mbouo
<b>Country</b>	Cameroon
<b>Topic</b>	Müll



**Goal**



Incinerator for hospital in Mbouo

### Plastic-Recycling – Ecoboats with Madiba&Nature

<b>Project number</b>	CMR_10
<b>Project leader</b>	Andre Eichmann
<b>RG</b>	Rhein-Main
<b>Location</b>	Douala
<b>Country</b>	Kamerun
<b>Topic</b>	Waste



**Goal**



Support local NGO Madiba & Nature upcycling plastic wastes

## Teaching Computer Basics

<b>Project number</b>	DEU_05
<b>Project leader</b>	Annika Schmuker
<b>RG</b>	Erlangen
<b>Location</b>	Erlangen
<b>Country</b>	Germany
<b>Topic</b>	Training



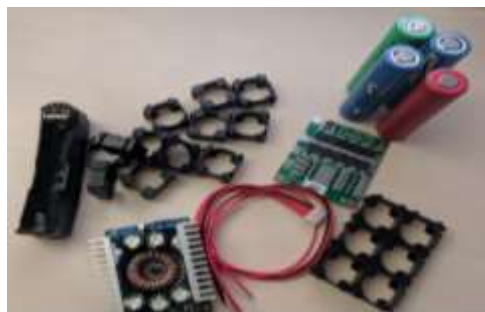
**Goal**



IT Infrastructur Support for integration trainings

## Upcycling E-Wastes: Power Walls

<b>Project number</b>	DEU_06
<b>Project leader</b>	Kira Schlesier
<b>RG</b>	Bayreuth
<b>Location</b>	Bayreuth
<b>Country</b>	Germany
<b>Topic</b>	Waste



**Goal**



Research on use of old batteries for power walls

## Water for Eritrea

<b>Project number</b>	ERI_09
<b>Project leader</b>	Jan Marc Schwidtal
<b>RG</b>	Hamburg
<b>Location</b>	Begu Valley
<b>Country</b>	Eritrea
<b>Topic</b>	Water



**Goal**



Continue sand storage for water in Begu valley

## COVID-19: Oxygen Concentrators for India

<b>Project number</b>	IND_04
<b>Project leader</b>	Franziska Weißörtel
<b>RG</b>	München
<b>Location</b>	Bangalore
<b>Country</b>	India
<b>Topic</b>	Hospital Support



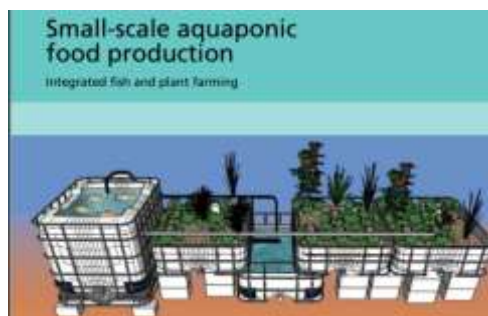
**Goal**



Support hospitals with oxygen concentrators to fight COVID

## Aquaponic

<b>Project number</b>	KEN_04
<b>Project leader</b>	Jonas Waldhäusl
<b>RG</b>	Erlangen
<b>Location</b>	Mtpawa
<b>Country</b>	Kenya
<b>Topic</b>	Agroforestry



**Goal**



Aquaponic Systems in Kenya

## Agroforestry and school gardens in Ngiya

<b>Project number</b>	KEN_05
<b>Project leader</b>	Franziska Enzmann
<b>RG</b>	Rhein-Main
<b>Location</b>	Ngiya
<b>Country</b>	Kenya
<b>Topic</b>	Agroforestry



**Goal**



School gardens to supply kids with healthy meals



## Childrens books for Kenya

<b>Project number</b>	KEN_06
<b>Project leader</b>	Franziska Enzmann
<b>RG</b>	Rhein-Main
<b>Location</b>	Nguya
<b>Country</b>	Kenya
<b>Topic</b>	Education



**Goal**



Increase literacy by providing books for kids

## Watering school gardens in Moshi

<b>Project number</b>	TZA_15
<b>Project leader</b>	Christine Dillmann
<b>RG</b>	Rhein-Main
<b>Location</b>	Moshi
<b>Country</b>	Tanzania
<b>Topic</b>	Agroforestry



**Goal**



Irrigation system for school garden at primary school

## Water supply in Mkindi

<b>Project number</b>	TZA_16
<b>Project leader</b>	Heiko Blumenschein
<b>RG</b>	Rhein-Neckar
<b>Location</b>	Mkindi
<b>Country</b>	Tanzania
<b>Topic</b>	Water



**Goal**



Water supply for village in  
Massai region

## Trees for primary schools in Tanzania

<b>Project number</b>	TZA_17
<b>Project leader</b>	Christine Dillmann
<b>RG</b>	Rhein-Main
<b>Location</b>	Hai District
<b>Country</b>	Tanzania
<b>Topic</b>	Agroforestry



**Goal**



Trees to protect climate and  
supply fruits to kids

## Hospital waste incineration

<b>Project number</b>	ZWE_02
<b>Project leader</b>	Valentin Grabmaier
<b>RG</b>	München
<b>Location</b>	Charandura
<b>Country</b>	Simbabwe
<b>Topic</b>	Waste



**Goal**



Construction of waste incinerator

## Cancelled projects in 2021

- TZA\_15 (Irrigation of a school garden in Moshi, Tanzania, RG Rhein-Main, project leader Christine Dillmann): Reason: Handover of the project to the Better Future Foundation.
- TZA\_16 (Water supply, Tanzania, RG Rhein-Neckar, project management Heiko Blumenschein); Reason: No need for the project, as several wells are available.
- KEN\_04 (Aquaponic, Kenya, RG Erlangen, project management Jonas Waldhäusl); reason: technical feasibility doubted

## Finished projects in 2021

### Agroforestry for small farms in Brazil

<b>Project number</b>	BRA_04
<b>Project leader</b>	Lutz Michaelis
<b>RG</b>	Rottenburg/Brazil
<b>Location</b>	Araranguá
<b>Country</b>	Brazil
<b>Topic</b>	Agroforestry



#### Goal



Demonstration farm with agroforestry systems

The demonstration farm in Brazil was successfully commissioned and the first harvest was harvested. In order to open up diversified income opportunities as well as educational opportunities for regional smallholders, an existing barn was also converted into a multi-purpose shed that will include a seed bank and a tree nursery, as well as providing space for events and presentations.



After nine months, this last work package of our project was also fulfilled: A public workshop for smallholders and interested parties in the new multipurpose building on the grounds of the organic farm Sítio Orgânico Serra e Mar in the Brazilian state of Santa Catarina. The audience consisted of small farmers, young agronomy and forestry students, families selling organic products

and others interested in organic farming. Many interesting presentations gave the visitors an understanding of agroforestry, permaculture, environmental education and marketing for organic products.

## Water supply for Nzindong

<b>Project number</b>	CMR_06
<b>Project leader</b>	Stefan Hartleif
<b>RG</b>	Rhein-Main
<b>Location</b>	Nzindong
<b>Country</b>	Cameroon
<b>Topic</b>	Water



### Goal



Well drilling and solar driven pump to supply water to school, church and hospital

In Nzindong, a mountain village in the west of Cameroon, a well with a depth of over 70 m was drilled in cooperation with a local entrepreneur. In cooperation with the Cameroonian engineer Hervé Ngawa, a solar system was set up for an electric pump. The villagers in Nzindong also dug trenches for the water pipes at the end of the rainy season. A new public washing place was built at the hospital and the existing washing place was repaired.

Together with the local mason, we built a watertight casing around the well bore and then installed the electric pump and the control system for the pump. A 3000 l tank was cleaned, disinfected and then placed at the highest point of the village. The pump is now automatically controlled by the filling level in the tank and is additionally protected by a dry-running sensor in



the well. We laid a total of 1.3 km of pipe to transport the water from the well to the tank and from there to distribute it via the natural gradient to the primary school, hospital, church, rectory and the two public washing places. The residents of Nzindong can now fetch clean mineral water from eight taps. Water analyses have shown that the water is safe to consume. During the last days of our stay, the people in Nzindong have already accepted the water very well.



## Water supply for technical highschool Bayangam

<b>Project number</b>	CMR_07
<b>Project leader</b>	Edgar Tagheu
<b>RG</b>	Rhein-Main
<b>Location</b>	Bayangam
<b>Country</b>	Cameroon
<b>Topic</b>	Water



### Goal



Regeneration and optimization of school well, foundation RG Cameroon



At the technical high school in Bayangam, a 20 m deep well with an electric pump was regenerated with Wessoclean. This loosened deposits in the well's filter pipe. A water analysis was then carried out with a test kit, which showed that the water does not contain any alarming amounts of heavy metals or alkali metals.

In addition to regenerating the well, the pipe to the tank was renewed, the tank was flushed out and the existing well house was cleaned and renovated. A new water point was also built, providing two taps for the children.

As the electricity grid in Bayangam is unstable, a small solar system was installed to power the electric pump during power outages. The solar system was installed in collaboration with a local contractor who has also assisted with another TeoG project in the region. Mains electricity continues to be used, but in case of outages, water can now still be pumped for the students.

In addition to the actual project work, a TeoG regional group of students, teachers, local university staff and other interested parties has been formed at Bayangam Technical High School. Bienvenue, Bayangam! We look forward to a good cooperation in Cameroon!

## Teaching Computer Basics Bayangam

<b>Project number</b>	CMR_08
<b>Project leader</b>	Tilman Beck
<b>RG</b>	Rhein-Main
<b>Location</b>	Bayangam
<b>Country</b>	Cameroon
<b>Topic</b>	Training



### Goal



Computer class equipped with laptops, training for teachers and students

After months of planning and fundraising in Germany, the TCB project in Cameroon was implemented in November 2021 at the Technical High School of Bayangam (LTB = Lycée Technique de Bayangam). The laptops are used at the school in the form of a mobile computer lab. We started the workshops with two classes that had different IT experiences. The first two days we got started easily with the use of different office programmes.



In the following days we continued the workshop with a focus on special software for electrical engineering purposes. The last and most complex programme introduced to the students was KiCAD. KiCAD is a free software for the automation of electronic design. It facilitates the design and simulation of electronic hardware. Together with the students, we worked through

each step of the design of an LED timer.

Although the workshop imparted a lot of information in a short time, all the students participated in all the lessons and were highly focused throughout the programme. LT Bayangam received 18 laptops, USB mice, power strips, a projector and a visualiser from TeoG. The project team also commissioned the construction of a metal cabinet to keep the hardware safe.

## Hospital waste incineration

<b>Project number</b>	CMR_09
<b>Project leader</b>	Daniela Wegner
<b>RG</b>	Erlangen
<b>Location</b>	Mbouo
<b>Country</b>	Cameroon
<b>Topic</b>	Waste



### Goal



Construction of incinerator for infectious hospital waste

The "Hôpital Protestant de Mbouo" with 200 beds is located in Cameroon's western region (Ouest). Until now, the hospital had collected all the waste in a hole and openly burned it at certain intervals. The temperatures generated are not sufficient to completely sterilise the waste. Furthermore, the strong smoke development is a considerable health hazard for residents, staff and patients. This situation will be changed by the project.

The technology chosen is the DeMontfort Mark 9a incinerator with a throughput of up to 50 kg of waste per hour. The advantage of the furnace is that it reaches sufficiently high temperatures (at least 800 °C) to completely sterilise the waste. When operated properly, flue gas emissions can also be kept very low due to the second combustion chamber of the oven. The project was fully financed by Klinikpartnerschaften e.V..



In addition to the actual oven, the construction also included a foundation, waste chambers and a roof. Already during the construction phase, the hospital's previous waste separation system was evaluated, waste signs were attached to new waste bins and the entire hospital staff was instructed in the necessary waste separation. After the construction of the stove was completed, the first burns with the stove were scheduled. Five prospective furnace operators were instructed in detail in the steps of the incineration process.

## TwB planting event

<b>Project number</b>	DEU_03
<b>Project leader</b>	Franziska Enzmann
<b>RG</b>	Rhein-Main
<b>Location</b>	Schwarzenborn
<b>Country</b>	Germany
<b>Topic</b>	Agroforestry



### Goal



Planting trees for climate protection

On Saturday, 9 October 2021, our TeoG planting campaign took place in Schwarzenborn. With 51 planting enthusiasts, we went into the planting circles in bright sunshine and took to the spade. Five different tree species were planted, including three deciduous species and two coniferous species, in order to create a climate-adapted mixed forest. TeoG was actively supported by the Federal Forestry Enterprise in Schwarzenborn and the Board of Trustees for Forest Work and Technology. The trees were not only planted, but also provided with individual protection to minimise game damage.



The planting campaign was not only a measure to compensate for the CO<sub>2</sub> emissions caused by our flights and to make the forest more future-proof, but also a perfect opportunity to meet again for a joint event after almost two years of the Corona pandemic. We had set ourselves the target of 5505 trees. We didn't manage to plant all of them, but it was a successful campaign for climate protection in any case. The remaining trees were planted by professionals from the Schwarzenborn forestry company.

The campaign ended with a cosy barbecue evening, where the regional groups could network better and promote cooperation.

## Teaching Computer Basics

<b>Project number</b>	DEU_05
<b>Project leader</b>	Annika Schmuker
<b>RG</b>	Erlangen
<b>Location</b>	Erlangen
<b>Country</b>	Germany
<b>Topic</b>	Training



### Goal



IT Infrastruktur Support for integration trainings

The Erlangen municipality runs integration courses online (4 months duration), with some participants taking home the municipality's laptops for the duration of the course. The participants often have little IT knowledge. Not all courses can be run due to lack of hardware.

Amil Sharifov (Refugee and Migration Project Coordinator of the Erlangen Municipality) has lobbied for TCB. The city administration still has a remaining stock of 6 laptops. Amil Sharifov asked the TCB working group to support the operation of the 6 laptops in the context of integration classes.

In exchange with Amil Sharifov, we developed a preliminary project structure to support the city of Erlangen. TCB has a supporting role. The project partner remains responsible for the organisation and implementation of the integration classes. The 6 laptops were equipped with appropriate software and now enable the participants to take part in the integration classes online.



## Water for Eritrea

<b>Project number</b>	ERI_08
<b>Project leader</b>	Jan Marc Schwidtal
<b>RG</b>	Hamburg
<b>Location</b>	Begu Valley
<b>Country</b>	Eritrea
<b>Topic</b>	Water



### Goal



Sand storage for water supply



This project is about the construction of a sand storage dam to supply water to the Begu Valley. Construction began at the beginning of 2017, and since then the dam construction has progressed in stages with each rainfall event. The completion of the eighth sub-project was delayed recently; this project involved the middle section of the dam. In this case, it was

mainly the pandemic that slowed us down. The innovative construction method ensures maximum efficiency and longevity of the reservoir. Now the construction phase could be completed in 2021, and a follow-up project for further construction is already in the works. At the same time, the dam is already functional and provides an increasingly valuable contribution to the population's water supply.

This project was made possible by co-financing from the BMZ. The last construction phase will hopefully be completed soon.





## COVID-19: Oxygen concentrators for India

<b>Project number</b>	IND_04
<b>Project leader</b>	Franziska Weißörtel
<b>RG</b>	München
<b>Location</b>	Bangalore
<b>Country</b>	India
<b>Topic</b>	Hospital Support



### Goal



Supply hospitals in India with oxygen concentrators to fight COVID

Earlier this year, India was hit by a catastrophic wave of covid cases and deaths. Unfortunately, there were not nearly enough medicines, respirators and oxygen available to help the sick.

Vinay Kumar, the contact person in India, and many friends and acquaintances from India therefore turned to TeoG with the request to find oxygen concentrators and send them from Germany to India. There should be 100 of them.

Thanks to great support from the TeoG board, we were able to start the project within one day and put an appeal for donations on betterplace.org. At the same time, we started looking for the equipment we needed. After a lot of negative feedback from manufacturers with delivery times of three to four months, we actually found a company that did everything in its power to help us find the oxygen concentrators we needed. We would like to take this opportunity to thank GPG - Gasepartner and Marvin Zierau. Through the



incredible cooperation of donors and everyone involved, we actually managed to raise over 100,000 euros from 500 donors in just two weeks, organise the transport, which was donated by DHL Express, and distribute the oxygen concentrators and other medical equipment (O2 masks, pulse oximeters, etc.) in India.

## Water supply for Chiro

<b>Project number</b>	KHM_03
<b>Project leader</b>	Bruna Ribeiro Alves
<b>RG</b>	Hamburg
<b>Location</b>	Chiro
<b>Country</b>	Cambodia
<b>Topic</b>	Water



### Goal



Pipelines to complete water project in Chiro

Before our intervention, the water supply was ensured via a well-based water system. The problems here were the strongly increasing demand and the constantly sinking groundwater level, which led to regular system failures, especially in the dry season. Especially in the critical and hot months of the dry season, this posed great challenges for the inhabitants of Chiro. The unforeseen climate fluctuations of recent years had further complicated the situation. Despite the proximity to the Mekong River, the stabilisation of the water supply had not been successful until then due to a lack of financial resources and technical know-how.

We took up this initial situation and created a water system that integrates the existing infrastructure and provides a secure source of water all year round. This goal was achieved by relieving the wells through the additional use of the nearby Mekong River. For this purpose, a pipeline was laid and an additional storage tank was installed from locally available and cost-effective resources. In the storage tank, the water from the Mekong and the wells is mixed and sedimented. During the construction and commissioning of the plant, the villagers were involved from the very beginning in order to be able to carry out the maintenance and servicing of the plant.

## Ressource efficient students home

<b>Project number</b>	TZA_10-1
<b>Project leader</b>	Christine Dillmann
<b>RG</b>	Rhein-Main
<b>Location</b>	Hombolo
<b>Country</b>	Tanzania
<b>Topic</b>	Water



### Goal



Well for drinking water supply

In Hombolo, our partner is building a student dormitory, which we are designing to be water and energy self-sufficient. Our first project in this overall project was the construction of a well.

This well not only supplies water to this and the surrounding student dormitories, but can also be used by the villagers. For a small fee of 100 Tanzanian shillings (approx. 4ct) per 10 litres of water, anyone can draw water. The money can be used for maintenance work and thus contributes to making the project sustainable.

The well in Hombolo was drilled to a depth of 150 m following the recommendation of a hydrogeo-logical report. An electric pump delivers the water to a 5000-litre tank. This has two outlet taps so that two water canisters can be filled at once.

According to an initial analysis, the water quality is very good, so that the water no longer needs to be boiled before use. In addition, the salt content is lower than in the other well in Hombolo. This means that students and villagers in Hombolo now have access to healthy water.



## Support kids with albinism

<b>Project number</b>	TZA_14
<b>Project leader</b>	Christine Dillmann
<b>RG</b>	Rhein-Main
<b>Location</b>	Moshi
<b>Country</b>	Tanzania
<b>Topic</b>	Training



### Goal



Getting reading aids and sun protection to kids with albinism

In Tanzania, there are many people with albinism. This not only leads to skin problems, but is also accompanied by impaired vision. This is especially fatal for children, as they are unable to read educational materials at school. Together with the Albino Care Programme of the KCMK Hospital, we wanted to support children with albinism in Tanzania in particular.



We collected more than 80 pairs of sunglasses (used and new) in Germany and brought them to Tanzania. The doctors of the Albino Care Project examined the glasses and handed them out to the affected children. Especially people with albinism need to have their eyes protected from UV radiation. In addition, we were able to purchase 300 sun hats from a company in Tanzania, some

of which have already been distributed to the children, and the doctors are handing out more hats. The hats are well received because they are of high quality and also a real eye-catcher with our TeoG logo!

With magnifying glasses and magnifying films, we can make it easier for children who have reduced vision due to albinism to attend school. We were able to bring different models to Tanzania, which are further tested by the children. In addition, we brought more than 4000 tubes of sunscreen to protect the children's skin from UV radiation.



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