Technology without Borders

Annual report 2023

Impressum

Technik ohne Grenzen e.V.

1. Chairman Robert Schullan

Richard-Strauß-Str. 38
91315 Höchstadt
Tel: +49 9193 – 4288
Fax: +49 9193 – 4284
E-Mail: info@teog.de

Web: www.teog.ngo

Registered in Fürth: VR 200486

TwB Bank account:
Technik ohne Grenzen e.V.
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Content

Preface

We can look back on a successful project year 2023. We are particularly pleased that the number of our project completions has now returned to the level we had before the pandemic - that means 17 project completions that we can look back on with pride. As in 2022, we travelled to a total of seven different countries.

Our new Executive Board team has familiarised itself well this year. In addition to numerous online meetings, the direction of the association was confirmed at a two-day strategy meeting and new paths and measures were decided on to strengthen the regional groups and cooperation in Germany in the future. One major problem that we want to work on was identified: after a long period with few face-to-face meetings, some regional groups have lost many members. In the long term, this trend should be reversed.

In the course of this, the founding of an online RG was decided and implemented, in which those TeoG members who are no longer assigned to an existing regional group will find a home. We are looking forward to trying out this new format and are excited about your projects!

Finally, as always, we would like to thank all our donors, supporters, project partners and, of course, all our members who do outstanding work in our projects all over the world!

Robert Schullan and Markus Reinhard

On behalf of the entire board

Organisation

Technology without Borders has set itself the goal of **improving living conditions**, especially in developing countries. This is essentially achieved with the following three fields of action:

1. to carry out practical development cooperation adapted to the situation in order to achieve as much as possible with given means.
2. helping those affected to help themselves through education and training.
3. generate sustainability - e.g. through microbusiness approaches.

In doing so, we want to use our technical knowledge sensibly to help other people. This was the overriding idea behind the founding of this association. In the title of the association Technik ohne Grenzen e.V. (Technology without Borders), the term "technology" stands for the possibility that all people who are enthusiastic about technology as well as skilled workers, technicians, master craftsmen and engineers can contribute. In doing so, we follow the motto: "As technical as necessary, as simple as possible." The association is also intended to open up the possibility for students in particular to help interculturally in this world in a variety of ways through the use of technical and engineering know-how.

Technology without Borders was founded in 2010 and is a decentralised organisation. All members work on a voluntary basis to avoid administrative costs, so donations go 100% to our projects. Projects can be carried out by the board or by the various TwB regional groups. The structure of the association also includes administrative and technical working groups for coordinated cooperation.

Board

1. **Chairman**	Robert Schullan	Since: 2022 Expertise: Mechanical Engineering
2. Chairman	Markus Reinhard	Since: 2021 Expertise: Electrical Engineering
Secretary	Lara Hachmann	Since: 2020 Expertise: Mechanical Engineering
Treasurer	Felix Schofer	Since: 2022 Expertise: Mechanical Engineering
	Christian Zeidler	Since: 2021 Expertise: Process Technology
Project Board	Annika Weiß	Since: 2019 Expertise: Electrical Engineering
	Andreas Vierling	Since: 2020 Expertise: Medical Engineering
	Heiko Blumenschein	Since: 2022 Expertise: Electrotechnology
Regional Organization	Daniel Schaffert	Since: 2014 Expertise: Energy Technologies
	Arne Bruns	Since: 2020 Expertise: Medical Engineering
	Jannik Mechau	Since: 2022 Expertise: Chemistry
Public Relations	Franziska Enzmann	Since: 2021 Expertise: Bioprocess Technology

The Organisation in Numbers

Members

Technology without Borders had 562 members in Germany as at 31 December 2023, with 39 new members joining in 2023. This was offset by 38 resignations, meaning that the total number of members in Germany remained almost constant. In addition, the regional groups in Ghana, Brazil, Uganda and Cameroon have further members who are not registered as official members of TeoG Germany. The development of membership in recent years is shown in Figure 1.

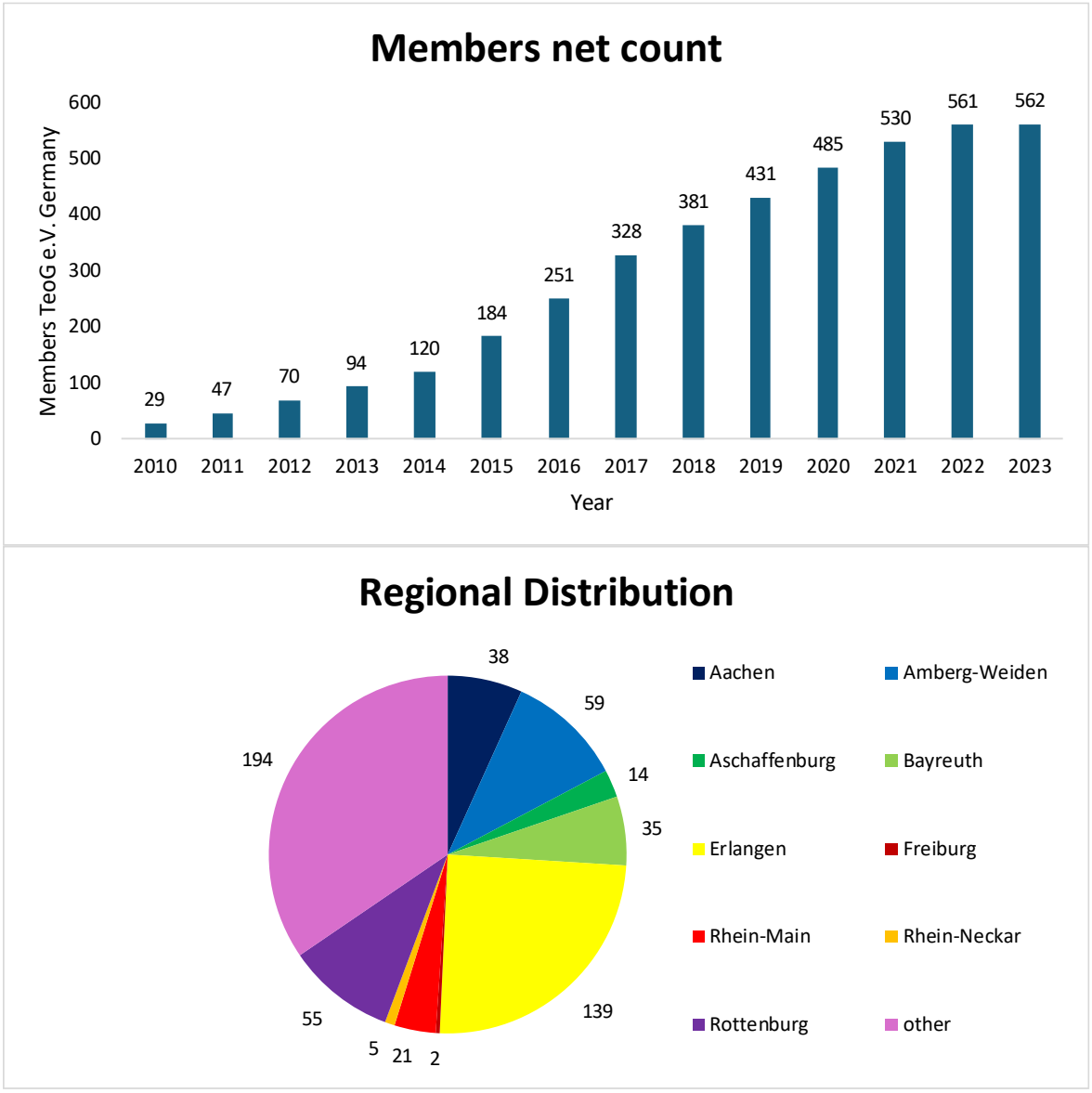


Figure 1: Members development at Technology without Borders

Projects

In 2023, 24 new projects were registered and 17 projects were completed; one major existing project was divided into four sub-projects, i.e. formally cancelled and replaced by a further four new registrations. The number of registered and completed projects and their distribution in terms of project topics and project countries over the last few years are shown in Figure 2.

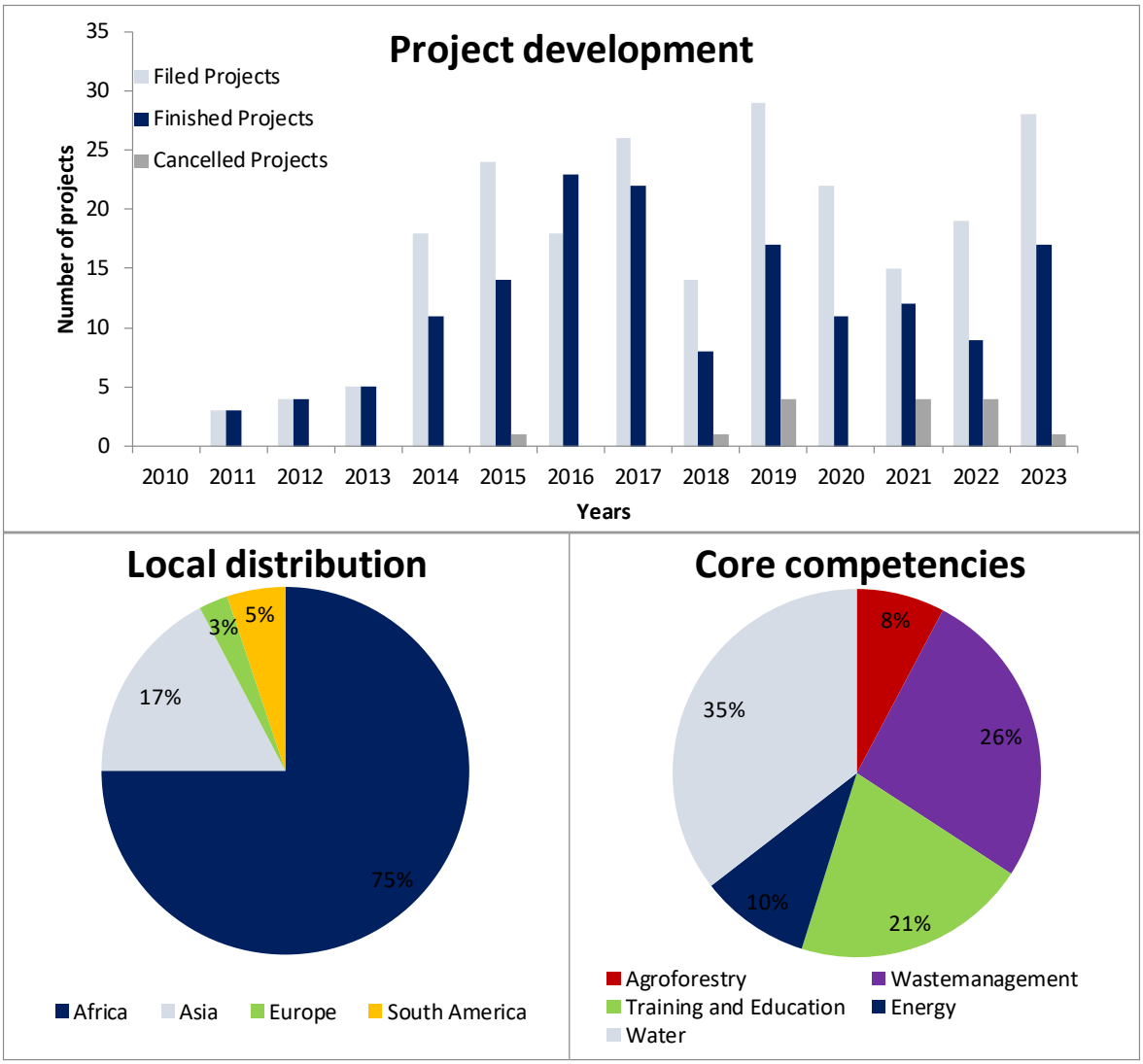


Figure 2: Project development and distribution of recent finished projects

In total, Technology without Borders has completed 156 projects in 27 countries by the end of 2023. 52 projects are currently in the planning or implementation phase. The number of ongoing projects is therefore slightly higher than in the previous year (44 active projects), as more new projects were submitted again after the pandemic-related break. The implementation of projects has increased again after many travel restrictions were lifted and has almost doubled compared to the previous year (9). Most projects have so far been implemented in Ghana (48), followed by Tanzania (18) and Nepal (13). A more detailed

view can be seen in Figure 3. The focus of our work, with 55 completed projects, is in the area of water/wastewater, followed by waste management and recycling with 41 completed projects.

In 2023, eight new projects were registered in Ghana and Tanzania and five in Kenya.

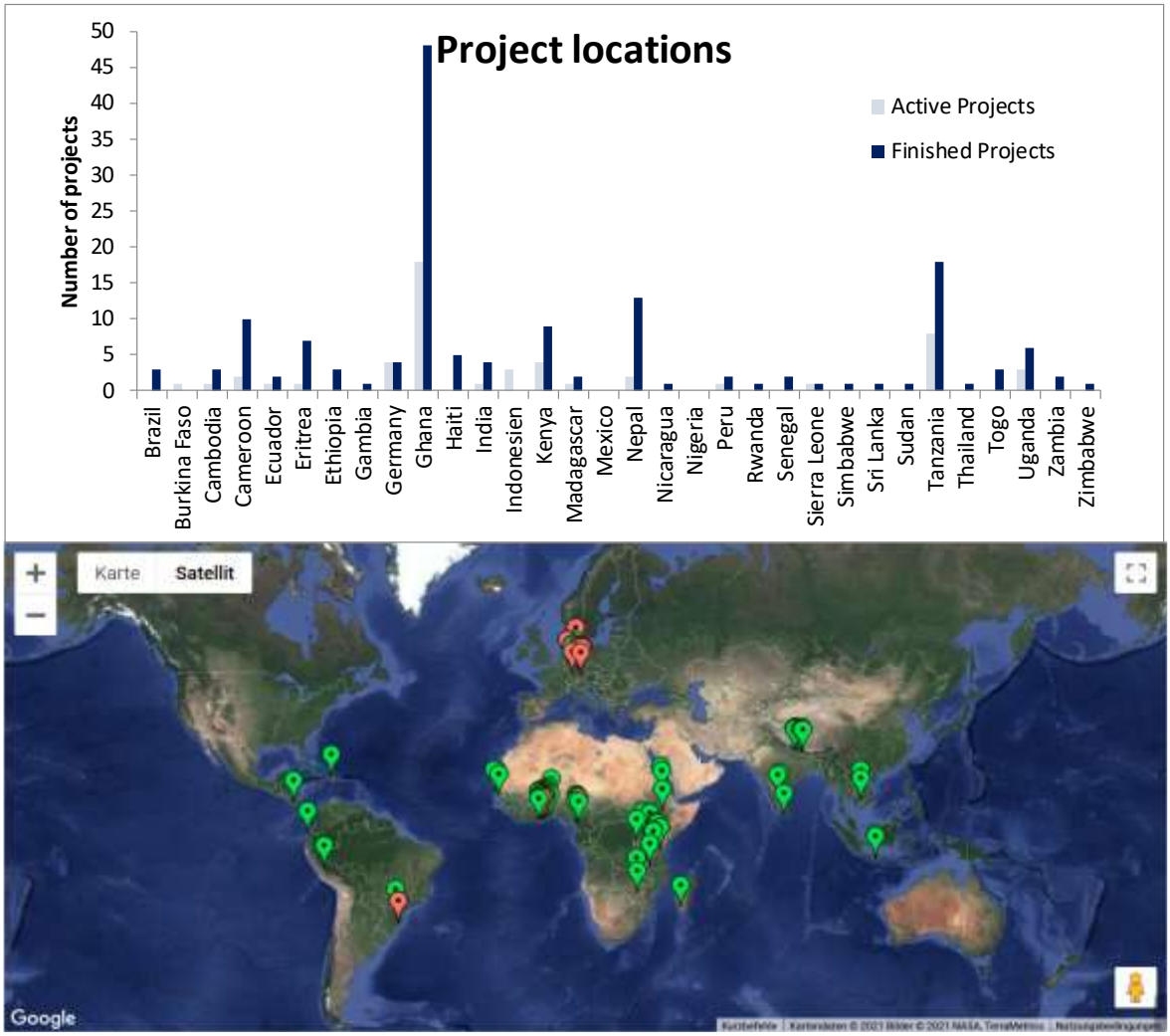
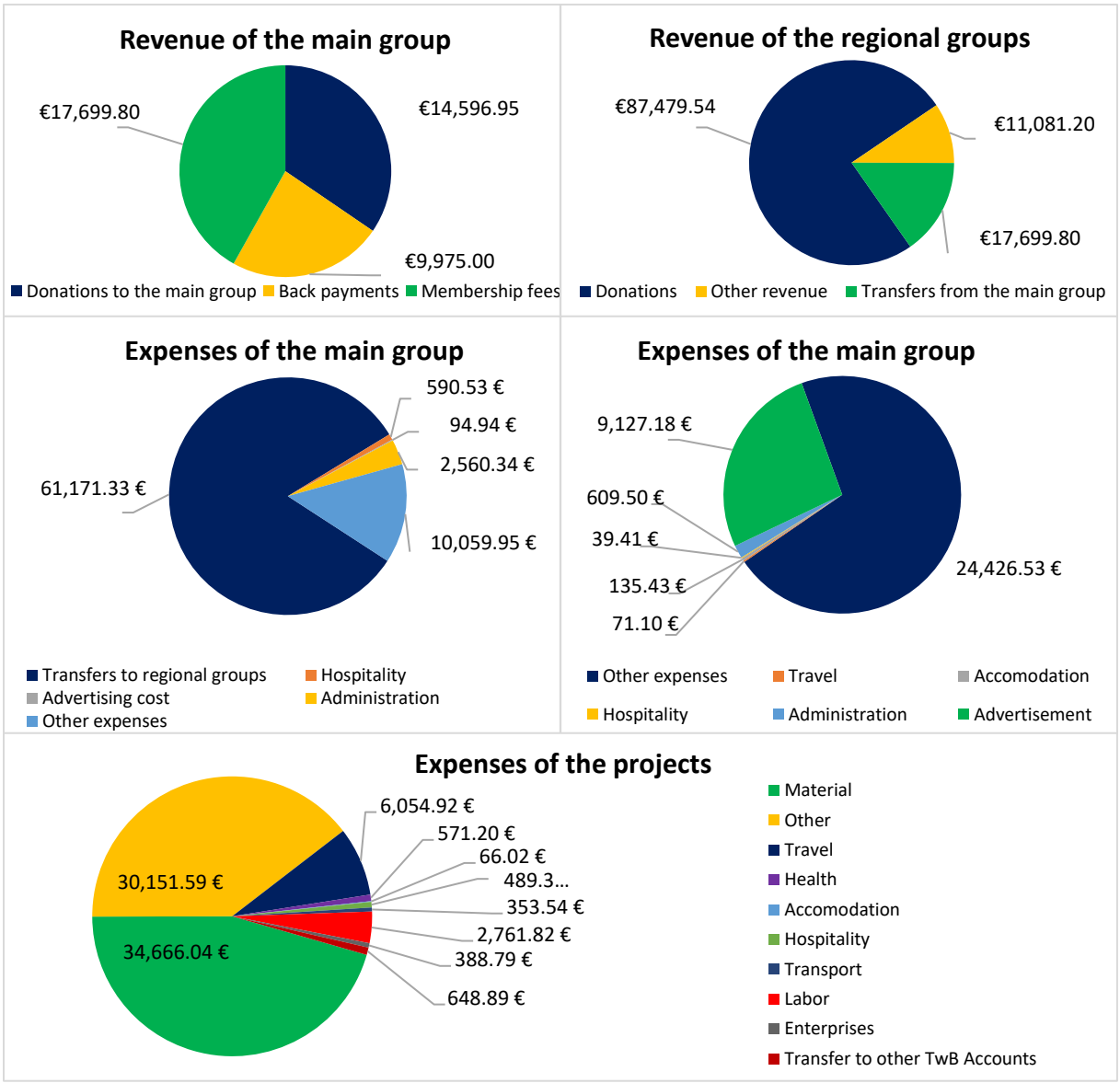


Figure 3: Worldwide distribution of project locations (green) and regional groups (red).

Finances

Due to the higher number of projects in 2023 and the increased support of projects by the main group, the expenses of the main group exceeded the earnings significantly. However, since these expenses are mostly used for our projects, this is not an issue. A total of 110 000 € were spent on projects in 2023, which is an increase of 20 000 € over the last year. The main group supported projects with 61 000 €, increased from 31 000 € last year. In the projects, the largest part of expenses was for material. Since this means that the largest part of our expenditures stays in the project countries, this is a positive development for us. The details on the finances of TwB can be found in Figure 4.



cFigure 4: Earning and spending of main association, regional groups and projects.

Core Competencies

Water and Waste Waster

Drinking water supply is still one of the key problems in developing countries. This is why Technology without Borders is increasingly involved in this area. A total of 55 projects in the area of water/wastewater have already been completed, 7 of which in 2023. These are not only concerned with the provision and treatment of water, but also with methods for saving water, for example through the use of dry toilets. Other objectives in our projects include well construction, well regeneration, rainwater utilisation and wastewater treatment.

Working Group Water

Foundation	2010
Head	Thomas Witt

Activities 2023

Developing and implementing water-related projects, supporting project teams, building knowledge on the topic of 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 manner and made available to the project teams. We use an internal knowledge management system for this purpose, which includes content on groundwater, sand storage dams, well drilling, water analyses, dry toilets and water extraction from air. This means that our projects can be planned faster and better, project knowledge is not lost and we can make an overall contribution to improving the water situation in developing countries.

Waste and Recycling

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

Working Group Waste

Foundation	2010
Head	Henning Risse

Activities 2023

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 our cooperation with the German Rotary Volunteer Doctors (GRVD), we have focussed on the incineration of infectious waste since our beginnings. The first project in 2012 involved the construction of two De Montfort Mark 9 incinerators in Techiman, Ghana. 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 to the metal construction, we have now also introduced modifications to make operation and maintenance easier. The training concept is also being continuously developed. Thanks to the support of many partners in Germany and the countries of operation, we have now been able to build incinerators in 10 countries and on 3 continents. We are proud to be able to provide environmentally friendly and safe disposal of infectious waste in this way.

Education and Training

In developing countries, the lack of education and training is a major challenge, especially in rural areas. TeoG is therefore involved in this area. The association and its members, in particular the Hospital Support and TCB working groups, develop concepts for the sustainable maintenance of technical facilities, training in the IT sector, the 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 draws up maintenance plans for hospital equipment.

Working Group Hospital Support

Foundation	2013
Head	Katharina Mai, Lena Augustin

Activities 2023

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

Working Group TCB

Foundation	2015
Head	Ina Reichmann

Activities 2023

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

Energy

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

Working Group Energy

Foundation	2010
Head	NN

Activities 2023

Currently no activities

Agroforestry

Agroforestry is a form of land use in which perennial woody plants such as trees or shrubs are planted on land on which agricultural crops are also grown and/or animals are kept. Agroforestry systems are actually nothing new, as they have been cultivated for centuries. Orchard meadows are a classic example in Europe. However, in many places monocultures and industrial agriculture have replaced agroforestry systems, even though they offer many advantages, especially for small farmers. Our aim in TeoG projects is primarily to support local partners in setting up agroforestry demonstration farms and organising information events on agroforestry for smallholders.

Working Group Agroforestry

Foundation	2020
Head	Monica Conchiero

Activities 2023

Expanding knowledge in the field of agroforestry, supporting agroforestry and reforestation projects.

Other active Working Groups

Working Group PR

Foundation	2013
Head	Laura Gutwill
Activities 2023	Newsletter, Social networks

Working Group IT

Foundation	2010
Head	Julian Deyerler
Activities 2023	Homepage, Office 365

Regional Groups

TeoG currently has 9 active regional groups in Germany and an online regional group since 2023. Erlangen is the regional group with the most members (139) and the largest number of completed projects (51), although the Rhine-Main regional group has registered the most new projects (9), as can be seen in Figure 5. In addition to the groups in Germany, regional groups are currently active in Ghana, Uganda, Cameroon and Brazil.

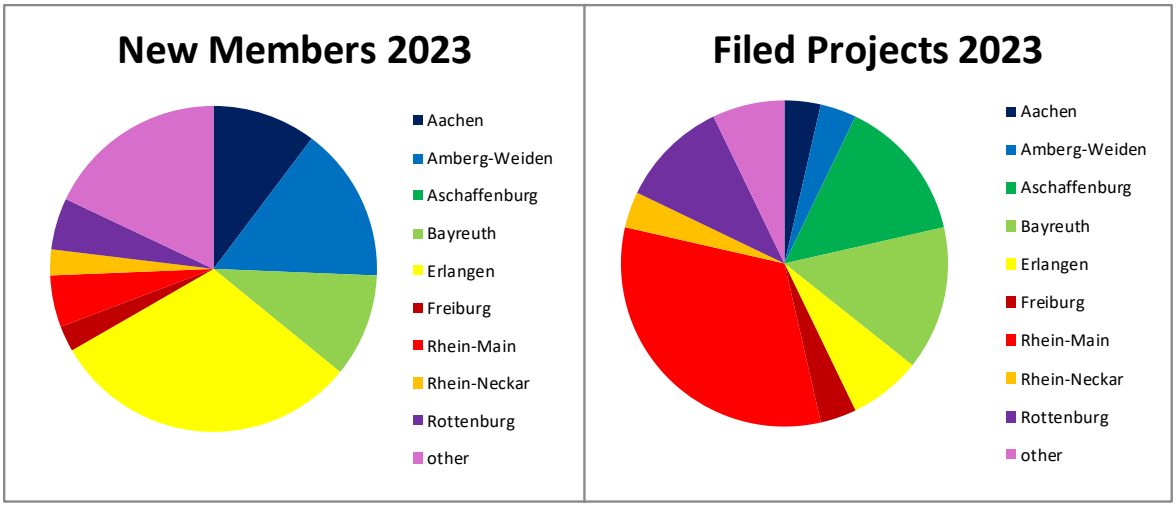


Figure 5: RG distribution of new members and new projects in 2023

RG Aachen

Foundation	2017
Head	Jan Erazo
Deputy	Luis Cisnero
Treasurer	Paul Grünefeld
Members (+ in 2023)	38 (+0)
New projects 2023	1
Finished projects 2023	0
Topics	

3 ongoing projects in Tanzania, Ecuador and Sierra Leone

RG Amberg-Weiden

Foundation	2011
Head	Leah Ebert
Deputy	Adrian Danner
Treasurer	Sabrina Schweiger
Members (+ in 2023)	59 (+6)
New projects 2023	1
Finished projects 2023	0

Topics

3 ongoing projects in Germany, Nepal and Tanzania

RG Aschaffenburg Alzenau

Foundation	2017
Head	Johanna Schulte
Deputy	Kilian Hartmann
Treasurer	Jan Ackermann
Members (+ in 2023)	14 (+0)
New projects 2023	4
Finished projects 2023	1

Topics

5 ongoing projects in Indonesia and Tanzania

RG Bayreuth

Foundation	2010
Head	Johannes Häring
Deputy	Timon Günther
Treasurer	Jonas Groß
Members (+ in 2023)	33 (+1)
New projects 2023	4
Finished projects 2023	4

Topics

5 ongoing projects in Ghana

RG Erlangen

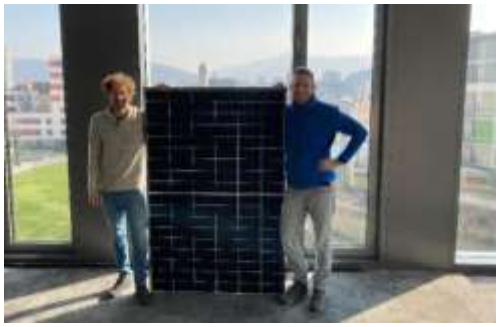
Foundation	2010
Head	Rebekka Haslinger, Anna Schnehle
Deputy	Julian Deyerler
Treasurer	Ricarda Brodwolf
Members (+ in 2023)	139 (+4)
New projects 2023	2
Finished projects 2023	2

Topics

4 ongoing projects in Ghana and Nepal

RG Freiburg

Foundation	2023
Head	Philippe Ruß
Deputy	Johannes Dörflingerl
Treasurer	N.A.
Members (+ in 2023)	2 (+ 1)
New projects 2023	1
Finished projects 2023	0



Topics

Ongoing project in Kenya

RG Rhein-Main

Foundation	2017
Head	Franziska Enzmann
Deputy	Peter Scheunert
Treasurer	Alaa Raja
Members (+ in 2023)	21 (+ 1)
New projects 2023	9
Finished projects 2023	4, 1 cancelled

Topics

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

RG Rhein-Neckar

Foundation	2019
Head	Heiko Blumenschein
Deputy	Markus Reinhard
Treasurer	Melanie Reinhard
Members (+ in 2023)	5 (+ 1)
New projects 2023	1
Finished projects 2023	0
Topics	

2 ongoing projects in Germany

RG Rottenburg

Foundation	2015
Head	Merle Grüter
Deputy	Matthias Friedle
Treasurer	Nelia Wolf
Members (+ in 2023)	55 (- 3)
New projects 2023	3
Finished projects 2023	1
Topics	 

2 ongoing projects in Ghana and Tanzania

Regional Group	Foundation	Members 2023	Total Finished Projects	Ongoing Projects
Aachen	2017	38	2	3
Amberg-Weiden	2011	59	12	3
Aschaffenburg	2017	14	4	4
Bayreuth	2010	35	12	5
Erlangen	2010	139	51	4
Freiburg	2022	2	0	1
Rhein-Main	2017	21	17	8
Rhein-Neckar	2019	5	0	2
Rottenburg	2015	55	12	2

Resting Regional Groups

- Ansbach
- Bamberg
- Berlin
- Hamburg
- Köln
- Konstanz
- Leipzig
- München
- Nürnberg
- Ulm

TwB international

Other Technology without Borders (TwB) groups are currently active internationally in Ghana, Uganda, Brazil and Cameroon.

TwB Ghana carried out several projects in 2023. A board trip was also organised and three new regional groups were founded.

In the area of water supply, a project to implement water meters in the village of Asesewa was completed by our local member Joseph Maudjorm. Several neighbourhoods in Asesewa were connected to the water supply network by extending water pipes. Together with Joseph, an expert in the field of water, we have also initiated an initial micro-business in the area of well drilling and well regeneration and supported the procurement of drilling equipment, including a compressor, with start-up funding, some of which will flow back into TeoG projects in Ghana in the coming years.

The Sunyani regional group repaired or regenerated a total of 6 wells in 5 villages and organised workshops for the communities to repair defective wells. In addition, the TwB container at the University of Energy and Natural Resources (UENR) was further expanded. Among other things, the interior and exterior walls were painted.

The ‘Recycle Up! Water Sachets’ project implemented in Ghana since 2012 has again achieved great success. The first schools in the Eastern Region were able to generate initial income from the collected drinking water bags and use them to repair a well and buy exercise books, for example. In 2023, the project was expanded to 10 schools in the city of Koforidua with a total of almost 20,000 pupils. In addition, a new regional group has been founded in Koforidua, which will focus on the topic of recycling and has already organised a waste collection campaign in Koforidua.

In the field of agroforestry, it was decided to set up the first demonstration farm in the Northern Region rather than in the Bono Region due to the better starting conditions. The project is scheduled to start in 2024.

In October 2023, the Executive Board (Country Coordinator and Honorary Executive Board) and two members of the Ndejje regional group (Uganda) travelled to Ghana. The trip focussed on several days of water training and a project manager workshop in the presence of 14 Ghanaian and two Ugandan members from various regional groups. This enabled us to intensify the dialogue between our English-speaking national groups in Ghana and Uganda. Other points of the Board trip included visits to the universities of Somanya, Koforidua and Sunyani and the implementation of the ‘Lean Hospital’ project at Holy Family

Hospital Techiman, which aimed to improve hospital processes. New regional groups were founded in Somanya and Accra. In addition, the initiation of three further regional groups was started in Tamale, Kumasi and Ho, which are planned to be founded in 2024.

In Uganda, the Ndejje regional group organised a WASH workshop in a school. The pupils were informed about critical issues relating to clean water, sanitary facilities and appropriate hygiene practices.

The Bayangam regional group in Cameroon renovated the kindergarten in Bayangam. The walls were painted, the tables and benches replaced and the toilets renovated. The first phase of the well drilling project at the preschool in Bayangam has been completed. The borehole is 100 metres deep. The second phase, consisting of making the connections, extending the water pipes, building standpipes and constructing a water storage tank with a capacity of 5000 litres, is being planned. The Bayangam regional group took part in the open day at Bayangam Technical High School and continues to supervise the ‘Teaching Computer Basics’ project and the regenerated and automated well.

Projects

In 2023, 28 new projects were started and, after two years with few project completions, 17 projects were completed. Most of the new and completed projects are in the water/wastewater sector; the exact distribution can be seen in Figure 6.

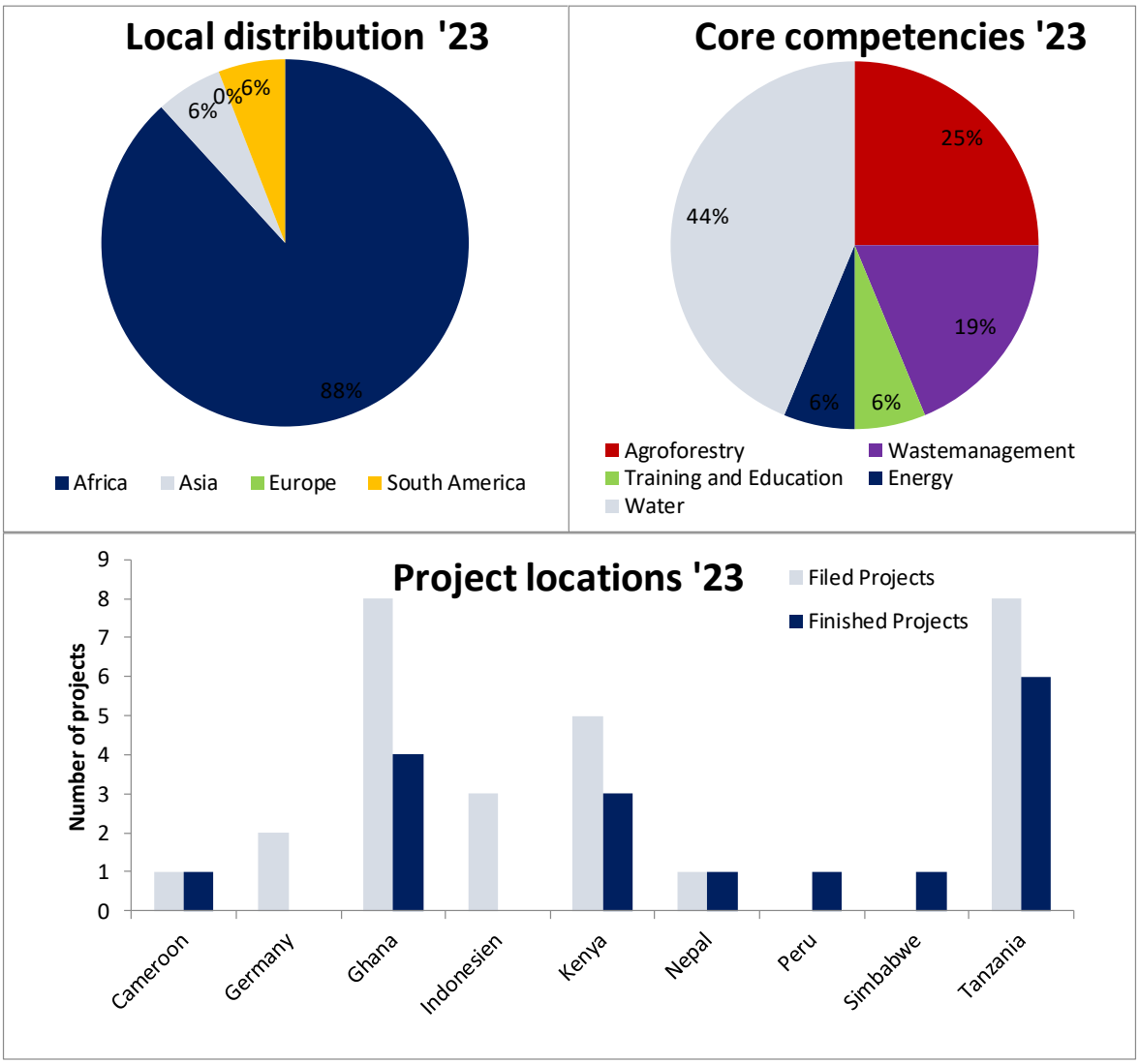


Figure 6: Finished projects in 2023, global distribution and topic wise distribution; global distribution of projects started in 2023.

New projects filed in 2023

Pre-exploration for Water Projects in Western Cameroon

Project number	CMR_11_WT
Project manager	Edgar Tagheu
RG	Rhein-Main
Location	Bayangam
Country	Cameroon
Topic	Water
Target	Hydrogeological examinations on various locations in preparation of well drilling projects.

Maintenance of Generators

Project number	DEU_08_EN
Project manager	Heiko Blumenschein
RG	Rhein-Neckar
Location	Ludwigshafen
Country	Germany
Topic	Energy
Target	Maintenance of non-functional generators, which can later be used e.g. in Ukraine.

Construction Guide and Manuals for MARK8a

Project number	DEU_09_WM
Project manager	Leah Ebert
RG	Amberg
Location	Amberg
Country	Germany
Topic	Wastemanagement
Target	

Conception of new manuals and instructions for MARK8a incinerators for infectious hospital waste.

Further Work on TWB Water Analysis-Container

Project number	GHA_56-2
Project manager	Dominik Lang
RG	Bayreuth
Location	Sunyani
Country	Ghana
Topic	Water
Target	

Further work on the already existing container that serves as a water analysis lab.

Support for Nursery School in Drobo

Project number	GHA_56-3
Project manager	Luisa Spremberg
RG	Bayreuth
Location	Drobo
Country	Ghana
Topic	Agroforestry
Target	Pre-exploration for Agroforestry Demonstration Farm on nursery school area.

Well Regeneration and Maintenance in Sunyani

Project number	GHA_60_WT
Project manager	Johannes Häring
RG	Bayreuth
Location	Sunyani
Country	Ghana
Topic	Water
Target	Well regeneration with Wessoclean and development of maintenance plans for wells.

Examination of Heavy Metal Concentrations in Cocoa

Project number	GHA_61_AF
Project manager	Julia Güntherodt
RG	Rottenburg
Location	Osino
Country	Ghana
Topic	Agroforestry
Target	Examination of the effect of high heavy metal concentrations in cocoa and concepts for optimisation.

Board Trip to Ghana

Project number	GHA_62_WT
Project manager	Jannik Mechau
RG	Board
Location	Several
Country	Ghana
Topic	Diverse
Target	Control of finished projects, visit of regional groups in Ghana and of partnering organisations, pre-explorations for new projects, project leader workshops.

Furniture for Class Rooms in Agona Abodom

Project number	GHA_63_ED
Project manager	Jan Amtmann
RG	Erlangen
Location	Agona Abodom
Country	Ghana
Topic	Education
Target	

Furniture for two classrooms to allow computer classes.

Well Regneration and Support of Local Micro-Business

Project number	GHA_64_WT
Project manager	Jannik Mechau
RG	Bayreuth
Location	Several
Country	Ghana
Topic	Water
Target	

Set up improved infrastructure for well regeneration together with local Micro-Business.

Water Supply in Rural Areas

Project number	GHA_65_WT
Project manager	Jannik Mechau
RG	Vorstand
Location	Verschiedene
Country	Ghana
Topic	Water
Target	

Well drilling in rural areas of Ghana to allow access to clean water.

Waste Management in Indonesia

Project number	IND_02_WM
Project manager	Florianus Josopandojo
RG	Aschaffenburg
Location	Padangbai
Country	Indonesia
Topic	Wastemanagement
Target	

Recycling of plastic waste and introduction of waste separation – pre-exploration.

Wastemanagement in Indonesia – Onshore Plastic Recycling

Project number	IND_03_WM
Project manager	Florianus Josopandojo
RG	Aschaffenburg
Location	Padangbai
Country	Indonesia
Topic	Wastemanagement

Target

Recycling of plastic, waste separation and improvement of waste incineration.

Wastemanagement in Indonesia – Offshore Korallenriffe

Project number	IND_03-2
Project manager	Claudia Koch
RG	Aschaffenburg
Location	Padangbai
Country	Indonesia
Topic	Wastemanagement

Target

Support Livingseas in regeneration of coral reefs and cleaning of reef.

Tree Planting Action in Kenya

Project number	KEN_10_AF
Project manager	Franziska Enzmann
RG	Rhein-Main
Location	Ngiya
Country	Kenya
Topic	Agroforestry
Target	

Tree planting at schools and sustainability workshops for kids.

Highly Efficient Ovens for Schools in Kenya

Project number	KEN_11_WM
Project manager	Johannes Dörflinger
RG	Freiburg
Location	Tamugh
Country	Kenya
Topic	Energy
Target	

Construction of highly efficient ovens for cooking at schools and boarding schools in Kenya

Use of Sewage Water as Fertilizer

Project number	KEN_11_WT
Project manager	Julia Güntherodt
RG	Rottenburg
Location	Watamu
Country	Kenya
Topic	Water
Target	

Construction of Ecosan toilets at a school and use of excrements for fertilizing soils.

Improved Garden Irrigation in Ngiya

Project number	KEN_12_WT
Project manager	Franziska Enzmann
RG	Rhein-Main
Location	Ngiya
Country	Kenya
Topic	Water
Target	

Automized drip irrigation for school garden in Kenya.

Water Supply for Dispensary

Project number	KEN_13_WT
Project manager	Franziska Enzmann
RG	Rhein-Main
Location	Ngiya
Country	Kenya
Topic	Water
Target	

Repairing an existing water supply at dispensary in Kenya.

Radiation Therapy in Nepal

Project number	NPL_16_HS
Project manager	Daniel Sakarli
RG	Erlangen
Location	Bharatpur
Country	Nepal
Topic	Hospital Support
Target	

Introduction of radiation therapy for tumour treatment in Nepal.

Sustainable Nursery School – House Construction

Project number	TZA_20-1
Project manager	Franziska Enzmann
RG	Rhein-Main
Location	Hai District
Country	Tanzania
Topic	Education
Target	

Construction of a sustainable nursery school together with Trinity Academy.

Sustainable Nursery School – Rain Water Use

Project number	TZA_20-2
Project manager	Franziska Enzmann
RG	Rhein-Main
Location	Hai District
Country	Tanzania
Topic	Water
Target	

Sustainable water concept for nursery school in Tanzania.

Sustainable Nursery School – Solar Power

Project number	TZA_20-3
Project manager	Franziska Enzmann
RG	Rhein-Main
Location	Hai District
Country	Tanzania
Topic	Energy
Target	

Supply of solar energy for nursery school.

Sustainable Nursery School – Interieur and Playground

Project number	TZA_20-4
Project manager	Franziska Enzmann
RG	Rhein-Main
Location	Hai District
Country	Tanzania
Topic	Education
Target	

Final works on sustainable nursery school, including playground and interieur.

Water Capture and Vegetable Garden

Project number	TZA_21_WT
Project manager	Merle Grüter
RG	Rottenburg
Location	Luduga
Country	Tanzania
Topic	Water
Target	Pre-exploration for construction of water reservoir and irrigation of school garden.

Agroforestry Demonstration Farm

Project number	TZA_22_AF
Project manager	Christine Dillmann
RG	Rhein-Main
Location	Hai District
Country	Tanzania
Topic	Agroforestry
Target	Set up Agroforestry Demonstration Farm for food supply for school.

Solar Power for Ruanda Mission Hospital

Project number	TZA_23_EN
Project manager	Wolfgang Zifl
RG	Aschaffenburg
Location	Ruanda
Country	Tanzania
Topic	Energy

Target

Solar power for gap-free enery supply of hospital.

Water Filtration for School in Hai District

Project number	TZA_24_WT
Project manager	Erik Muschnik
RG	Aachen
Location	Boma N'gombe
Country	Tanzania
Topic	Water

Target

Filtration and desalination of well water.

Cancelled Projects in 2023

TZA_20, Construction of a sustainable kindergarten: This project was cancelled as such and divided into project sections 1-4 (see projects started) in order to be able to complete the individual sections more quickly.

Finished Projects in 2023

Pre-exploration for Water Projects in Western Cameroon

Project number	CMR_11_WT
Project manager	Edgar Tagheu
RG	Rhein-Main
Location	Bayangam
Country	Cameroon
Topic	Water
Target	Hydrogeological examinations on various locations in preparation of well drilling projects.

The aim of the project was to carry out hydrogeological investigations in western Cameroon in order to find optimal areas for drilling. The surveys were carried out by a Cameroonian company. The surveys were carried out or updated in Bangang, Bangangté and Bayangam.

The main component of the project was a new water survey for Bangang, which is located in the Western Region of Cameroon. The survey was carried out by a local company at the Bangang Technical College. The site was chosen based on findings from previous projects CMR_06 and CMR_07 when the school was visited and water was found to be a major problem. The result of the investigation was a detailed report on the geology and climate of the site and a cost estimate for drilling the well. It was also considered whether a well could be drilled in the centre of the village, but it was agreed that the need at the school was greater.

A hydrogeological survey had already been carried out for Bayangam during the CMR_07 project, which was revised as part of this project. The result of the investigation at that time was that a well depth of 50 metres was absolutely necessary for a constant water supply, while the existing well at the technical college is less than 20 metres deep.

Another survey was carried out in Bangangte, which was taken over by the local community, who are also prepared to finance the drilling of the well. RG Bayangam will help with this.

Project Support in Ghana

Project number	GHA_56
Project manager	Dominik Lang
RG	Bayreuth
Location	Several
Country	Ghana
Topic	Diverse
Target	Overall project support, e.g. regenerating wells, recycling, agroforestry.

As part of a 4-month project trip, various projects were supported in Ghana, including Recycle Up Water Sachets, the water analysis container, well regeneration in two villages and the establishment of regional groups in Ghana.

Further Work on TWB Water Analysis-Container

Project number	GHA_56-2
Project manager	Dominik Lang
RG	Bayreuth
Location	Sunyani
Country	Ghana
Topic	Water
Target	

Further work on the already existing container that serves as a water analysis lab.

In the past, it has become increasingly difficult for our members to use the laboratory at their university ('University of Energy and Natural Resources' - 'UENR' for short) to analyse water. For this reason, it was decided to transport a 40-foot freight container from Tarkwa to Sunyani to convert it into a water laboratory. Since then, the container has been located on the university campus of UENR, which kindly provided us with a free space.

The conversion of the container began in April 2022 as part of a project trip in collaboration between two members of RG Bayreuth and RG Sunyani. In addition to five windows and a new door, we also cut and built an additional second roof on the container to protect the container ceiling from direct sunlight and thus from heat. For the same reason, we attached plywood panels to the inside walls of the container after the electrical cabling for a future power supply via solar panels had been installed. Apart from the welding and electrical work, the conversion was carried out in-house in order to keep the costs as low as possible. In project section GHA_56-2, further work was carried out on the container so that a usable room has now been created.

Support for Nursery School in Drobo

Project number	GHA_56-3
Project manager	Luisa Spremberg
RG	Bayreuth
Location	Drobo
Country	Ghana
Topic	Agroforestry
Target	Pre-exploration for Agroforestry Demonstration Farm on nursery school area.

Our Board trip ended with a visit to the kindergarten in Drobo, which gave rise to new project ideas. The Drobo kindergarten was set up by the organisation ‘African Future Kids’, of which Stephen Takyi is a member. He is also a member of TeoG, which is why we are supporting the kindergarten. When we arrived, we were warmly welcomed by the children and school staff, who were beaming with joy. During our tour of the building, we were fascinated to see the commitment and enthusiasm with which both the kindergarten children and the pupils are taught by their teachers. As the building will not be connected to the electricity grid, one of the follow-up projects will focus on the kindergarten's energy supply. The Amberg regional group will drive the project forward. During the tour, we noticed that although the rubbish is collected in baskets, it is not properly disposed of or collected afterwards, so another project idea is a project on waste disposal and recycling. A visit to the kindergarten farm was also on the agenda, which could be a possible location for an agroforestry demonstration farm. However, as the farm is unfortunately not located directly next to the kindergarten, we decided to abandon this plan and look for a new location.

Recylce Up Water Sachets

Project number	GHA_58
Project manager	Jonas Groß
RG	Bayreuth
Location	Several
Country	Ghana
Topic	Wastemanagement

Target

Improving infrastructure for plastic recycling

This project involved the expansion of the Recycle Up! Water Sachets project in the Eastern Region, Ghana. The three-month project mainly took place in Koforidua, although visits to participating schools in Asesewa, Akateng and Accra were also part of the project. In Koforidua, 10 new schools with a total of 18,990 pupils were recruited for the project. The schools now have a total of 118 rubbish bins in which the frequently used Water Sachets can be disposed of. A new transport partner was found and a small contact list of people interested in recyclable plastic was compiled. Contact was also made with the local Rotary Club and the Recycle Up! Water Sachets workshop was held in front of the associated Rotaract club. In addition, a new regional group was founded in Koforidua. The members are teachers, bankers, students and radio hosts. The contacts were established through the project, as they are all interested in recycling and a clean Ghana. Now they are able to start their own projects and help their community. The first projects have already been planned. A memorandum of understanding with the University of Energy and Sustainable Development Somanya was also formulated and signed as part of the project. The foundation stone has now been laid for the establishment of a regional group in Somanya.

Agroforestry and School Gardens in Ngiya - 2

Project number	KEN_08_AF
Project manager	Franziska Enzmann
RG	Rhein-Main
Location	Ngiya
Country	Kenya
Topic	Agroforestry
Target	School gardens to provide healthy meals for children.

Thanks to a donation from REHAU Industries SE & Co. KG, we were able to realise our second agroforestry and school garden project in Ngi'ya, Kenya. Our partner organisation Stawisha Africa Initiative has created school gardens based on the agroforestry principle at a total of five schools, after work had already been carried out at ten other schools in a previous project in spring 2022. The pupils actively helped with this and also founded environmental clubs at the schools, which will look after the gardens in future. Gardens were created at the following schools Bar Kagwanda Primary School, Ng'iya Mixed Secondary School, Ulafu Primary School, Ulafu Secondary School, Nyasidhi Secondary School.

The agroforestry principle combines agricultural and forestry utilisation of an area.

In the school gardens, so-called ‘Islands of Abundance’ were created, in which vegetable plants and fruit trees complement each other in a circular pattern. The soil is first prepared so that trenches and hills alternate in concentric circles - varieties that require more water are planted in the trenches, while varieties that prefer dry conditions are planted on the hills. Various types of vegetables that are used in Kenyan cuisine have been planted. In the centre of the circle is a banana plant, and in the outermost circle mangoes, papayas and other fruit trees, which improve the water absorption capacity of the soil and also provide shade after a while. The fruit and vegetables are used in the school kitchens.

Tree Planting Action in Kenya

Project number	KEN_10_AF
Project manager	Franziska Enzmann
RG	Rhein-Main
Location	Ngiya
Country	Kenya
Topic	Agroforestry
Target	Tree planting at schools and sustainability workshops for kids.

This project covered several different topics. The first was a review of the agroforestry projects in Ngiya in 2022 (KEN_05_AF and KEN_08_AF), which were successfully implemented at three of 15 schools and in the tree nursery. This included a test for an automatic irrigation system at one of the schools. Secondly, a new workshop concept dealing with the SDGs was tested at three schools. Thirdly, trees were planted and the tree map app and Stockosorb were tested. In addition, a preliminary investigation was carried out for water projects in hospital wards, which led to new project proposals. Last but not least, ideas were collected on the use of plastic waste, which can be followed up by our partner Stawisha Africa. Overall, all aspects of the project were successful and the partnership with Stawisha was improved.

Tree planting and use of Stockosorb.

Use of Sewage Water as Fertilizer

Project number	KEN_11_WT
Project manager	Julia Güntherodt
RG	Rottenburg
Location	Watamu
Country	Kenya
Topic	Water
Target	

Construction of Ecosan toilets at a school and use of excrements for fertilizing soils.

As part of the KEN_WT_11 project, which was carried out in August 2023 in cooperation with the two NGOs ‘Char2Cool’ and ‘Bahari Hai’, toilets were renovated at Dongokundu Primary School in Watamu, Kenya, and an EcoSan toilet with a composting system was built.

The term EcoSan (derived from Ecological Sanitation) describes ecologically orientated recirculation systems for wastewater management and sanitation. These toilets are alternatives to conventional flush toilets and enable the complete or partial recycling of human excrement as fertiliser for agriculture. Local nutrient cycles can be closed by recovering and utilising the trace elements, nitrogen, phosphorus, potassium and organic components contained in the excrement. The use of organic fertilisers is becoming increasingly important in agriculture. The most commonly used EcoSan system is the urine separation toilet, which requires two chambers and collects liquid and solid faeces separately. This prevents the formation of odours. The solid components are composted in a composting plant over a comparatively long period of time, which ensures that dangerous germs and bacteria are safely killed and no longer pose a risk when used as fertiliser. A toilet of this type was built as part of this project. The construction was complemented by WASH workshops with the pupils and the renovation of the existing toilets.

Hospital Support in Nepal

Project number	NPL_15_HS
Project manager	Katharina May
RG	Erlangen
Location	Dhulikhel
Country	Nepal
Topic	Hospital Support
Target	Introduction of Swift App, Support of hospitals technician team.

The hospital support project went to Dhulikhel Hospital in October. The project team introduced the TeoG Swift app there and supported the maintenance department on site.

The Swift app is used by technicians to digitally inventory clinical equipment. They can also network with each other and share their knowledge to solve problems more quickly.

TeoG launched the first steps of the app in a pilot project back in 2018. The application is now fully developed and can also be fully utilised here. The entire appliance inventory was digitised during the three-week stay in Dhulikhel. This includes around 1600 devices at the main hospital site. During our project time, we also visited three outreach health centres: Dolakha Hospital, Kirnetar Hospital and Dumja Hospital. Here, too, all clinical devices were included in the database. Apart from the work there, the trip to the outreach clinics was also a great insight into rural areas of Nepal!

The medical staff were also familiarised with the application's reporting system to facilitate communication with the technicians. During our last week at Dhulikhel Hospital, we also had many important discussions with both the technicians and the hospital's Administrative Director. These mainly centred on the integration of maintenance into the hospital's processes, but also on the planning of new premises and other requirements. At the end of our stay in Dhulikhel, we met with our long-standing GRVD cooperation partners.

Water Supply in Satipo

Project number	PER_02_WT
Project manager	Nicolas Pezet
RG	Hamburg
Location	Sapito
Country	Peru
Topic	Water
Target	

Continuation of the water project in Sapito.

The Sondoveni Water Supply project was initiated with the main goal of establishing a reliable water supply system for the indigenous village of Alto Sondoveni in Peru. The main components of the water supply system include two water collection tanks, a pipeline and a cistern. The project was successfully carried out within a month by a dedicated team consisting of Nicolas Pezet, Chiara Onnasch and Lucas Puebla.

The following objectives were achieved:

1. Installation of a functioning water supply system.
2. Providing clean and accessible water to the villagers of Alto Sondoveni.
3. Improving the quality of life and health in the community.

The project faced several challenges, including logistical constraints and planning difficulties with the locals. Despite these obstacles, the team showed perseverance and adaptability, allowing the project to be completed.

Disposal of Hospital Waste

Project number	ZWE_02
Project manager	Valentin Grabmaier
RG	München
Location	Charandura
Country	Zimbabwe
Topic	Wastemanagement

Target

Construction of an incinerator for infectious waste at a hospital.

The aim of the project was to help St. Theresas Hospital in Chirumanzu, Zimbabwe, find a clean, safe and cost-effective solution for its waste disposal.

Dourich Construction Ltd. was the main contractor and built the incinerator in two phases. In the first phase, the foundation and roof were erected. In the second phase of construction, which includes the incinerator, the garbage yard and the fencing, a team from TwB was present. They provided guidance, knowledge and support during construction.

After the construction of the incinerator, TwB conducted training on the correct use of the incinerator. The staff of St. Theresa Hospital were educated and trained about the burn process, its necessity and its dangers. The fact that all employees, including the cleaning and maintenance staff, spoke and understood English at least passably was very helpful in all trainings. If necessary, a translation into Shona was provided by the hospital management to ensure that all important details were properly understood. During the first incineration training, it became clear how important it is that the waste is properly separated and dry in order to reach the right temperature, because the 800 °C required for the incineration of infectious waste has not been reached. Subsequently, final adjustments were made to the grate and chimney top, which significantly increased the airflow. As a result, and by using dry waste to light the fire, the temperatures reached were almost doubled to up to 950 °C.

Resource-efficient Student Residence

Project number	TZA_10-3
Project manager	Christine Dillmann
RG	Rhein-Main
Location	Hombolo
Country	Tanzania
Topic	Water

Target

Equipping a new student dormitory with rainwater harvesting.

The overall project for the construction of a resource-saving student dormitory in Tanzania was originally about making the water and energy supply of a new student dormitory in Hombolo in Tanzania self-sufficient and efficient. In the first phase of the project, the local architect's construction plans were already optimised, so that, for example, fewer cables were needed. In addition, a well was drilled, which supplies clean drinking water not only to the student dormitory, but also to the neighboring population for a small fee. In this new section, a rainwater cistern was built and gutters were installed on the roof of the building to ensure garden irrigation with the collected water as well as to have service water for the student dormitory.

The cistern was built of a waterproof concrete, a technique that has proven to be durable in the area. Other cisterns of this type were visited in advance by our project team. In addition to the better insulation of the water against heat, the UV resistance of the cistern is also higher than that of a plastic tank. Other possibilities, as well as an estimation of the size of the possible amount of water, were investigated in a bachelor thesis completed on the project in 2021. The construction was finally carried out by a local company. The slightly elevated cistern has a total capacity of 15,000 litres and was directly connected to the gutter. The water can be taken either manually via an outlet at the bottom of the cistern to irrigate the garden, but a pipe has also been laid into the building. The cistern has overflow protection. As part of the project, the platform of the drinking water tank from the first phase of the project was also replaced, as cracks had formed.

Trees for Primary Schools in Tanzania

Project number	TZA_17
Project manager	Christine Dillmann
RG	Rhein-Main
Location	Hai District
Country	Tanzania
Topic	Agroforestry
Target	Tree planting for environmental protection and to deliver fruits for school kids.

Together with the Jali Foundation – a Tanzanian NGO – we have enabled the planting of a total of 480 fruit and shade trees at four schools in the region around Boma Ng'ombe. Among them were orange, mango, avocado, papaya, jackfruit and tamarind trees. The students were actively involved in the planting process.

Under the guidance of a local tree expert, they planted the trees and learned about the importance of trees for the environment and the sustainable use of resources. Although the rainy season at the end of the year has once again almost failed, students and teachers have done their best and diligently watered and cared for the trees by hand. The students will soon be able to harvest fresh fruit themselves and plant vegetable fields in the shade of the trees. With such an agroforestry system, we want to protect the environment and improve the nutritional situation at the schools.

This project is part of a larger initiative to promote sustainable agriculture and environmental education in the region. Students learn how to care for the trees and how to harvest and process the fruit. They can use their knowledge to support their families at home. The planting of the trees is also intended to counteract soil erosion and the negative effects of climate change, as well as to improve air quality. This tree-planting project is an important step in promoting sustainable practices in Tanzania and shows how small initiatives can have a big impact. It is an example of the importance of environmental education and the need to actively involve young people in environmental protection measures in schools.

Hospital Waste Management in Liuli

Project number	TZA_18_WM
Project manager	Stefan Leimbach
RG	Erlangen
Location	Liuli
Country	Tanzania
Topic	Wastemanagement
Target	

Incinerator for disposal of infectious hospital waste.

In Tanzania, there has been a national guideline for the disposal of hospital waste since 2017. This offers assistance in the classification and separation of different types of waste, as well as their disposal methods. However, the implementation of these guidelines is difficult, especially for remote hospitals in small towns, such as St. Anne's Hospital in Liuli, due to a lack of funds. Therefore, the waste is not disposed of properly and a risk of infectious waste cannot be ruled out. In cooperation with our partner organization Friends of St. Anne's Hospital e.V., which supports the hospital in various areas, this problem is being tackled at St. Anne's Hospital.

The three main objectives of the project were the construction of an incinerator near the hospital, the training of "burners", and the training of hospital staff in waste separation and awareness. The kiln, as well as appropriate waste chambers for sorting and storing the waste at the kiln, stand on a cemented foundation with an appropriate height. This prevents flooding, damage and unusability of the stove during the rainy seasons. The incinerator has two chambers. In the first, the waste is incinerated, and in the second, the gases produced are post-combustion. This enables low-smoke combustion. In order to fire the stove to the required 900°C, a precise separation of the waste is required. Therefore, the hospital staff was trained to separate the infectious waste and non-infectious waste and to use the implemented waste separation system. In addition, hospital staff have been trained in the function, use and maintenance of the furnace so that its longevity is ensured by correct use and maintenance.

Electricity and Water Supply for Hospital

Project number	TZA_19_WT
Project manager	Johanna Schulte
RG	Aschaffenburg
Location	Rwanda
Country	Tanzania
Topic	Water
Target	

Pre-exploration: Electricty and water supply for Rwanda Mission Hospital.

The Rwanda Mission Hospital is a small bush hospital with two doctors and about 20 nurses and has 80 beds, which are often double-occupied. 500-600 treatments are carried out every month, several hundred children are born there every year, and several thousand children are treated there in their first years of life.

The water supply system installed in 2019 at the Rwanda Mission Hospital (RMH) is functioning and also supports the municipal water supply. However, the existing pipes, which are partially damaged and are also laid above ground in such an unfavourable way that there is an increased risk of accidents, should be replaced.

The power supply works less well. Since the public grid often fails, there is a generator, but it has to be started manually, so that there are also interruptions in the power supply in the operating room. This has already led to damage to the water pump, but it is to be feared that medical equipment will also be damaged over time. This is where a TeoG project for stabilization and automation could come in.

Sustainable Nursery School – House Construction

Project number	TZA_20-1
Project manager	Franziska Enzmann
RG	Rhein-Main
Location	Hai District
Country	Tanzania
Topic	Education
Target	

Construction of a sustainable nursery school together with Trinity Academy.

The planning for our Sustainable Kindergarten started back in 2022, together with our project partners from Trinity Academy, a primary school in Boma n'gombe in the Hai District in Tanzania. At that time, the kindergarten children were accommodated in two empty classrooms of the primary school, but on the one hand the conditions were not suitable for our youngest, on the other hand the rooms had to be cleared for the next year of primary school children. So the plan was to build a new building opposite the primary school that would meet the children's needs and could also be operated sustainably.

To this end, the shell was first completed in spring 2023. The construction plans were drawn up by local architects and adapted in collaboration with TeoG to later simplify the installation of water pipes and solar panels. The shell of the building was already in place in May, and in July the first kindergarten class was able to move in, admittedly with a bit of construction site charm.

Sustainable Nursery School – Rain Water Use

Project number	TZA_20-2
Project manager	Franziska Enzmann
RG	Rhein-Main
Location	Hai District
Country	Tanzania
Topic	Water
Target	

Sustainable water concept for nursery school in Tanzania.

In our second phase of the project, we took care of the water supply and sanitation. In order to be as sustainable as possible, rainwater is collected from the roof of the kindergarten and stored for the dry season. This water is used to irrigate the garden, clean it and wash its hands. A special feature is that the water is pumped from the large tank to a smaller, higher tank, which is directly connected to the house, so there is running water in the toilets. For us in Germany, this is a matter of course, but not an everyday occurrence in Tanzania. This is an important building block for an improved hygiene situation, because it means that the toilets can always be flushed immediately, which minimizes the proliferation of bacteria, and the children can wash their hands immediately. Apart from the rainwater, a drinking water tank has also been installed, which is connected to the local water network, so that the children always have drinkable water available.

Technology without Borders