



Newsletter No. 115
April 2022

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ABOUT CED

Christian Engineers in Development (CED) is a Christian professional consultancy service dedicated to development work with overseas communities, and through service, to witness to the Christian faith. Operations usually comprise a tri-partite arrangement between a developing country organisation, a funding agency and CED providing technical assistance. CED responds to requests for assistance, improved water supply being the most frequent request but by no means the only one. CED promotes self-help with the maximum use of local resources.

CED's services include site visits, feasibility studies, assistance with project proposals, design, contract documents, procurement, tender evaluation, project supervision, direct labour employment, on-the-job training of local staff, project monitoring and evaluation, assistance with fund-raising and the management of project funding.

CED's income comes primarily from grants for projects together with donations from churches, trusts, members and supporters, and membership subscriptions. Most of the expenditure goes to operations; management costs are kept as low as possible. CED is not a funding agency and therefore cannot directly fund major projects but it can, and often does, fund preliminary investigations for potential projects.

The Association is registered as a Company Limited by Guarantee (without shares) and being a non-profit organisation, it is registered as a charity. It is managed by an Executive Committee overseen by a Board of Trustees, all of whom give their services voluntarily. CED Members participate in the work of the Association either voluntarily or if they depend on earnings for their livelihood on negotiated payment for their services.

Membership of CED is open to any person who is professionally qualified, supports the Aims, accepts the Statement of Faith, supports the activities of CED in any way, or serves as an employee or volunteer, both in the UK and overseas. Becoming a Supporter of CED is open to any person or group that supports the Aims, and wishes to be kept informed of CED matters. Anyone wishing to become a Member or Supporter should contact the Secretary.

Newsletter

The Newsletter is published twice annually. We'd be delighted to provide additional copies for friends, colleagues, church book stands etc. Please contact ian@ced.org.uk and let us know how many you'd like. The newsletter can also be downloaded from the CED website.

The editor would be happy to receive contributions for the next Newsletter. Please send to toian@ced.org.uk

PrayerPoints

Copies of our monthly prayer bulletin are available by e-mail or post. Please request a copy by email to pray@ced.org.uk or by writing to the Secretary.

Privacy Statement

For administrative and mailing purposes we hold your name and contact details in our records. They will not be given to any other person or organisation. If you prefer not to receive publicity and information literature, then please inform the CED Secretary (admin@ced.org.uk).



**SHARING SKILLS
CHANGING LIVES**

From the Chair

Welcome! What has been happening since our last newsletter in November 2021? Here are some headlines:

Sierra Leone:

Feasibility-level work continues on the Manowa project, and by the time you read this James Fallah-Williams and Malcolm Anderson will probably be on site carrying out further investigative work and meeting the local community. In the mean time Alan Michell continues to work hard at fundraising for Manowa – in some ways the hardest part of the project!

DR Congo:

Jonathan Cox and Graham Miller have been working with Rob Wakeling to implement the refurbishment of a 5kW pico-hydro installation at Lwamba Hospital, and have reached the stage of testing the assembled equipment in the UK prior to shipping out to DRC for installation later in the year.

India:

Graham Miller and Steven Harris have prepared the documentation for the proposed borehole at Sathya Veda Seminary, Kerala, and we expect to be able to appoint a contractor for this work in the near future.

Uganda:

Nigel Heeler and Edwin Wasingya have almost finished the assembly and commissioning process for the new Clariwash water treatment filter and chlorine dosing for Kagando Hospital. At the same time, Jonathan Appleby, Paul Darrall and Jonathan Cox have been continuing their work to implement a refurbishment of a micro-hydro installation at Kuluva Hospital.

Tanzania:

Ian Rankin worked with Amani Schools in Musoma, Tanzania to organise another rainwater harvesting training course.



New Treasurer:

We are pleased to be able to announce that David Beak has agreed to become our next Treasurer. David is a Chartered Accountant with many years experience in business, and we are delighted that he has taken on the challenge. As part of a phased handover, Bill Harper will be stepping down at the AGM in June after 20 years, and we are immensely grateful for his work and his wise counsel over the years.

New NEDS:

Finally, we are pleased to announce that Richard Franceys and Colin Gibson have been co-opted onto the Board as Non-Executive Directors of CED, with the hope that the membership will be pleased to vote them both onto the Board at the forthcoming AGM on 25th June. Both Richard and Colin bring a wealth of experience to the Board, both from within and outwith CED, and we are grateful for their willingness to serve in this capacity.

Thought for the Day:

One of the foundational tenets of St. Benedict was “*pray and work*” (*ora et labora*). Both work and prayer are indispensable, and both produce change. Let us pray and work for God’s kingdom to come, here on earth, as it is in heaven.

Jonathan Appleby, Chair

Project Funding

We are enormously thankful for the sources of project funds that we have had access to during the 37 years of CED's existence. However, in recent years many of these sources - in particular, those able to award larger grants - have, for one reason or another, dried up. By leaving the EU we lost access to EU funding. Other grant givers, such as the Isle of Man International Development Department, have changed the focus of the projects that they wish to support. Many of you will know that in 2020 we were awarded a grant by UKAid Direct via the Small Charities Challenge Fund but in order to receive the funds we had to go through an arduous due diligence process. We hoped that in doing this and making the required changes to our charity, we would then be in a good position to apply for further grants from UKAid Direct in the future. However, with the Department for International Development now subsumed by the Foreign, Commonwealth and Development Office, the Small Charities Challenge Fund has been closed. Without other major funding sources becoming available, the size of projects that CED is able to carry out is much reduced.

Having said that, much benefit can be delivered via relatively small projects. In recent years we have been able to use the sizeable legacy left by William Beak to help fund several smaller projects. We expect to be able to continue doing this for another 3 years or so, but we really do need to work on finding new sources of funding during this time.

Here are a few thoughts on how we might do this.

Get your local church involved

Are you a member of an Anglican Church? If so, you are probably aware that most

dioceses in this country are linked to dioceses overseas. This means that if you are part of a diocese which supports, say, Uganda, your church may well feel more inclined to support CED project there.

Here are some of the dioceses which support areas where we are currently working:

- ◇ Bristol - Uganda
- ◇ Chichester - Sierra Leone.
- ◇ Gloucester - Western Tanganyika.
- ◇ Hereford - Tanga, Zanzibar, Dar es Salaam, Mount Kilimanjaro.
- ◇ Leicester - Mount Kilimanjaro (Tanzania).
- ◇ Saint Edmundsbury and Ipswich - Kagera (Tanzania)
- ◇ Winchester - Province of Uganda, Provinces of Rwanda, Burundi and Republic of Congo.
- ◇ Worcester - Morogoro (Tanzania).

You can find all the links at <https://www.churchofengland.org/resources/world-mission/diocesan-links>

If you live in one of these dioceses and feel able to promote a potential CED project, please get in touch. But you don't have to be an Anglican! Most churches and denominations have overseas links. Alan Michell has shared his passion for the projects in which he has been involved with his church, Crawley Baptist, and as a result, a group of people from the church are raising money for the Manowa Project in Sierra Leone. Any member can do this and, if you feel unable to do so yourself, we can find someone to come to speak to your church about CED.

Sponsor a Rainwater Tank

Many of you will be familiar with the work that Ian Rankin and others have been doing to train people to build rainwater harvesting tanks in Rwanda and Tanzania. However, although the tanks are relatively cheap, they are beyond the reach of many ordinary

people. But if you, or a group of which you are a member, were to sponsor a tank, it could make a huge difference to a family, as well as enabling someone who has been trained to put their skills to good use.

Leave a legacy

Have you considered leaving a legacy to CED? One advantage of giving to CED is that almost all donations go directly to supporting

projects as our overheads are so low. Please give this your prayerful consideration and get in touch if you have any questions.

Finally, if anyone reading this knows of alternative sources of funding of which you think we are unaware, or has other suggestions whereby we might gain funds, please let us know.

Barbara Brighthouse

Rainwater Harvesting Funding

Following from the article above, we'd like to explain our tank-building plans further.

CED has now managed 6 training courses for people to learn to make ferrocement "pumpkin" tanks. We are keen to see new-found skills being developed and are inviting supporters to donate further tanks. Recipients would be the poorest in their communities, unable to afford even a subsidised tank.

A 1,000 litre tank for smaller households costs £75. A further £30 is required for a basic gutter to collect the water, bringing the total to £105.

A 5,000 litre tank for bigger families costs £300. A further £90 pays for a good quality pvc gutter, bringing the total to £390.

A 10,000 litre tank for a church or school



Mercianna, a widow, with Thomas, the CCMP co-ordinator.

costs £480. The gutters add £90 to this cost, bringing the total to £570.

If you'd like to find out more about this programme, please email ian@ced.org.uk. Donations can be made via PayPal on the CED website or by making a transfer to the CED account. Please email our treasurer at treasurer@ced.org.uk for more details.

Ian Rankin

Virtual News: Cutting the Carbon

As CED considers ways of cutting our carbon footprint the mailing of the Newsletter came up for discussion. Not every copy of the NL is read; many members by now are accustomed to reading on phones and computers.

We have therefore decided to offer members and supporters the option to go paperless. You will shortly receive an email with an invitation to download the current newsletter and the option to be taken off the postal listing. Thereafter, each time a newsletter is published, you will receive a notification with a link to the download page. Back copies of the Newsletter are already available in the Members' Area of the website.

Ian Rankin

New Non-Executives

Two new Non-Executive Directors have recently joined the CED Board and bring with them an enormous amount of invaluable experience and wisdom. We are very grateful for their willingness to serve in this way.

But why did we approach them to be NEDs and what exactly is their role?

A Non-Executive Director is appointed to provide both challenge and support to those directors who are involved in the day-to-day running of the charity/company. (CED is both a company and a charity). They can provide an independent viewpoint and, looking from the outside in, can provide fresh insight. To do their job well, they need certain personal characteristics: confidence to voice their opinions, even when they may be a 'lone voice', the tact to deliver criticism in a way that it is likely to be accepted and wisdom which comes from experience. We believe our new NEDs are well-equipped for the task!

Here Richard Franceys, one of our new NEDs, introduces himself...

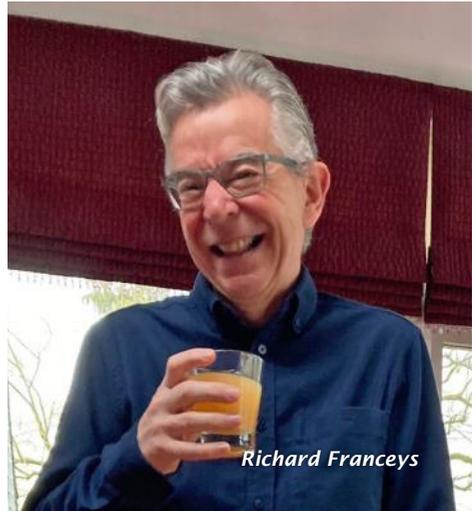
"Taking on-board my Civil Engineering final year tutor's advice: 'you have to get chartered first before you can become involved in development work' I did just that, then went to South Sudan with ACROSS/Tear Fund for five years (overlapping with Ian R towards the end of that time).

Joining the Water, Engineering and Development Centre at Loughborough University, I attempted to put into practice what I had learnt about capacity building for engineering development, that "enabling" is more effective than "doing" in development terms. I was pleased to attend the initial October 1984 'CED' meeting at the ICE but as CED grew it felt that my suggestions didn't quite mesh with the founders' approach and so I drifted away, finding many other aspects of

development to become involved with – including serving on the Editorial Committee of Tear Fund's excellent 'Footsteps' for many years. My initial focus on integrated rural development and WASH took a turn towards 'serving the urban poor' (equally important but also necessarily following development/academic funding streams) which necessitated a growing focus on institutional development of the engineering-oriented utilities which were usually failing to serve richer customers, let alone the poorest slum dwellers.

So investigating, and teaching around the world, issues such as utility commercialisation and change management, economic & financial analysis for tariff development, along with the 'fun' of the 'privatisation decade', all supported by customer involvement issues and economic regulation. Oh, and not to mention appropriate water and sanitation technologies/techniques for serving low-income urban settlements.

Having started at WEDC, we moved for five years to IHE, Delft, then finally to Cranfield University whilst also being a part-time 'Local Consumer Advocate/Regional Member' with the Consumer Council for Water. This experience (including arguing with the regulator about the critical 'cost of capital' through four price reviews) was incredibly



Richard Franceys

helpful in understanding something more of the challenges facing utility service providers in a high-income country with relatively high-income customers– which to my mind excuses many of the ‘failing’ low-income country service providers. It’s such a capital-intensive business – but how else to achieve scale and economies of scale whilst serving all urban consumers?

All of which ultimately became conversations, research and capacity-building in over 100 utilities in over 60 countries, recently with significant consultancy inputs with Lusaka Water and Sanitation Company, Guma Valley Water Company (Sierra Leone) and WATCO, Odisha. Then Covid came along and stopped my travelling, so it appears I have completed my post-Cranfield consultancy career, this with three home-office projects on variations of ‘Regulating for Citywide Inclusive Sanitation (CWIS)’ for WSUP, ESAWAS and IWA. Don’t hold your breath on the success of ‘regulating CWIS’ but it has become one of the latest fashions.

And so back to the question which started this mini-biography: ‘why did I agree to take on the role of NED?’ Ian R had kept me in touch with the ongoing work of CED over the years and last year he asked if I could assist. The time seemed right.”

Colin Gibson brings a civils slant to the Board...

“Having been born in India, and schooled there until I was nearly 15, I was attracted to development work as a career. Though I looked at agricultural engineering I chose civil engineering for my degree course, with the intention of being involved in irrigation in some way.

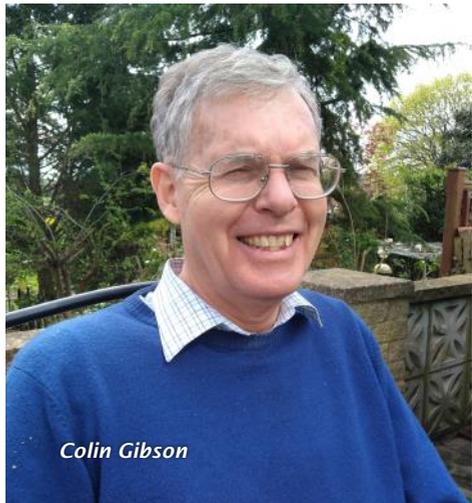
While at university I had one summer in Ghana helping build a rain water storage tank, and room above, in a remote village for a missionary. The following year I spent time on

a very different project in Pakistan. This was a multi-storey office building in Lahore, being built by a Christian owned and operated construction company (Zor Engineers Pvt Ltd).

After graduation, in spite of several interviews with companies working overseas, I joined a small structural consultancy in London. God had other plans it seems and as the company grew, I gained valuable experience, with increasing responsibilities, over a range of building types.

After becoming chartered as a civil and structural engineer, (and getting married!) I looked again for overseas opportunities and was invited to join the company in Pakistan (Zor Engineers) for whom I had worked as a student. So in 1993 I moved to Pakistan, with my wife and small son, where I served as Technical Manager with Zor, responsible mainly for design and consultancy work, but also overseeing construction work in the city where we lived (Karachi). Six years later in 1999, and now with two children at school age we moved back to England and I re-joined my previous employer.

Another fourteen or so years passed, undertaking a variety of challenging structural engineering. With leadership changes in Zor I was asked to return as Technical Director to Pakistan. My wife and I settled our children into universities and headed off to Karachi again in 2014. Though with a similar role, this



Colin Gibson

time I undertook much more travelling all over the country, but mainly to and from Lahore, for management, consultancy, and site inspections. Zor undertook design, consultancy, and construction for the Christian, NGO, and commercial sectors with schools, churches, residences, power stations, fuel filling stations, small hospitals, hostels, and offices etc. During this time, I served on (and still do) the Board of the YMCA Technical Institute, where I learnt about the challenges of bringing engineering education at diploma level.

I joined CED in about 2010 and was able to make a trip to Pakistan in 2012 to view a water related project in the Thar desert (underground cisterns, kitchen gardens, fodder trees, sand dam, storage pond and village function capacity building) - being managed by CED, together with a local NGO, and funded by the Scottish Government. This project overlapped with our moving to Pakistan so I was able to make several trips for the project until its completion in 2017.

In 2021, with funding from the UK government, a similar project (also in the Thar Desert) was undertaken – this time concentrating on water, sanitation and hygiene (WASH – but using the Community

Led Total Sanitation approach – CLTS). I was able to make one monitoring visit before moving back to England in April '21.

The vast majority of my professional career has been involved with building construction rather than water related engineering. So why would I agree to take on the role of Non-Executive Director with CED? !! Though I have had some experience of water related projects I am obviously not able to bring the technical skills that many others possess and offer to CED. I have lived and worked in a less developed country than the UK with a company that is seeking to be locally sustainable (not a foreign funded NGO) on a local salary, schooling, and housing basis. This has given me the unusual experience of bringing, but adapting, technical skills from the UK and using local resources and practice, while seeking to maintain integrity and a Christian witness in a commercially hostile environment. Time and project types will tell but I see my role as being able to support the work of CED by bringing, in effect, an 'end user' or 'end applicator' perspective."

Barbara Brighouse, Richard Franceys, Colin Gibson.

Restoring Pico-Hydro to Lwamba Hospital, DR Congo

CED has been in partnership with CAM International (<https://caminternational.uk/>) since early 2021. Jonathan Cox produced a comprehensive report in July 2021 on proposals for restoring and upgrading their pico-hydro electricity supply as well as advising them on the purchase of a solar vaccine fridge-freezer.

The project reached a critical stage on 21st March 2022 when the CED team met the

CAM International team in a church hall in Preston near the CAM International UK office. Jonathan Cox had to attend via Zoom because of a positive COVID test but Graham Miller and Rob Wakeling were there in person.

A series of deliveries of vital electrical equipment had been collected there and it was time for all the boxes to be unpacked so that the equipment could be thoroughly

checked before being repacked for shipment to DRC via Zambia. Important parts included new turbines supplied by PowerSpout in New Zealand.

Lwamba Hospital is situated about 600 km north of Lubumbashi in a very remote location which is only accessible by road during the short, relatively dry season in July/August. MAF used to fly to an air strip near there, but Lubumbashi airport charged them too much, so they had to stop. It is an insecure area where special insurance is required because of official advice against travel.

At least three CAM International staff who are now in the UK were based at Lwamba Hospital for a few years and they are providing essential local knowledge. They plan to travel back there to supervise the installation and commissioning of the restored scheme, but they are reluctant to start the long and expensive process of applying for DRC visas before the shipment of essential electrical equipment has at least reached northern Zambia. It could take many months to get that far!

There was a pico-hydro scheme installed in the early 1990s which was well maintained and worked well for nearly 30 years. After many years' service and wear it had reached the stage where a thorough restoration was needed. The powerhouse will be extended to allow two similar turbines to be installed in parallel.

One of the challenges in that part of DRC Congo is the very frequent lightning strikes, about 100 times more frequent than in the UK. CED consulted AN Wallis Lightning and Earthing specialists for advice on the earthing requirements. We had to estimate the conductivity of the lateritic earth between the powerhouse and the hospital guest house where the main control panels are to be located. A grid of earthing rods has been specified as well as surge protectors at many points around the mini-network.

Please pray for the safe and effective completion of this small but vital project. See <https://caminternational.uk/2021-lwamba-hospital-update/#> for an update on Lwamba Hospital. There is also an appeal for funds in the CED website under News.

The hospital is a training hospital with medical students and 37 staff. It has been instrumental in changing lives, treating over 7,000 patients in the last year. People come from up to 200 miles away to seek medical care. There are 67 beds over all the departments, including maternity and paediatrics. The hospital is expanding and new buildings are under construction.

There is not enough funding to include the vaccine fridge-freezer this year. Priority is being given to restoring the pico-hydro power supply and the new buildings.

Rob Wakeling



Rainwater Harvesting Training, Musoma

In February CED ran another successful training course, this time in Musoma. Amani School hosts 600 pupils over pre-primary, primary and secondary sections. The school's vision is to provide affordable education for the poor.

The course was organised by Leonard Safari, one of the Church Community Mobilization Partnership (CCMP) staff at Kagera Diocese who has since moved to Tarime. He requested two masons from Kagera to assist, both to demonstrate the technical aspects and also to sharpen their skills for building in Kagera.

Here is Leonard's report:

Rainwater harvesting technology contributes to the needs of families and institutions where water resources are limited. CED, in cooperation with CCMP and other partners, has been promoting wire reinforced cement and unreinforced tanks as a simple technology that can be adopted at village level. The tanks become more affordable when recipients gather local materials like sand, stones and water themselves.

I arrived in Musoma on Saturday 19TH February around 9:45 am and a Bajaji (3 wheeler taxi) sent by Pastor Samwel took me to the hotel. I asked the driver to take me to the place where I can buy plywood and timber for the template for the steelwork. He took me to the Small Industries Development Organisation (SIDO) area. I had the template made and an hour later was at the welding shop discussing the skeleton steel frames. In the afternoon I met Pastor Samwel and he

took me to buy the steel. We returned to the welding workshop with this and the work was soon underway.

On Monday morning Pastor Samwel picked us up and took us to Amani Schools and introduced us to the schools' staff. After selecting the positions for the tanks we had a short gathering for prayer and training with opening words from Pastor Samwel. I had opportunity to explain the content and purpose of the course. We then all went outside to start preparation of the bases for two tanks. During the preparation of the base for the small tank I was away seeing to the progress of the skeleton and when I returned found that the sizes were wrong. I called the trainees together with Pastor Samwel to see what we can do to make things better.

The other trainers, Bosco and Nelson, had failed to arrive for the start of the course on Monday as their bus broke down.

We selected a position beside the kitchen for the first tank. Monday was challenging but the team was well organized and despite it being the first time many of them had tackled masonry work they succeeded in laying the foundations for two tanks.

On Tuesday we held a seminar and showed a Sri Lankan video of the tanks being built, then Ian Rankin from CED, who had arrived the previous evening, introduced himself. Later we continued with the third tank base. We discussed how we might make the small tank less expensive and chose a plastic tap to be mounted on the wall rather than the longer pipework through the floor of the tank.

Wednesday started with a discussion seminar regarding sizing a rainwater harvesting system with the team making comments about their experience in Musoma.



Practical class

On Thursday we fixed the tank skeleton framework. The three female trainees worked very well in mixing cement and plastering the tanks.

On Friday we fixed some of the gutters and fixed the tap in the small tank. Ian left late morning.

On Sunday we joined Pastor Samwel at the church service then rested in the afternoon.

On Monday morning I taught the SODIS method of disinfecting water. After that the teams removed the skeleton formwork from the big tanks and started plastering the inside faces.

Tuesday's seminar covered repairs and maintenance of tanks and gutters. We finished the first of the 5000 litre tanks.

On Wednesday we discussed water and health issues then continued finishing the second tank, the gutters and tank covers.

Thursday was a day for reflection on the course. People were asked questions around tank construction and seminar content, then gave feedback. After lunch we held a graduation ceremony. Each trainer said a few words then a man and a woman from the trainees spoke on behalf of the trainee group. They said how happy they were to have the opportunity to be among the twelve people invited and thanked FORM and CED for facilitating the training. They were keen to know where their training might lead. I confirmed that we hope they will build tanks at their homes and find others who might want to purchase them. The school also plans

to build more tanks. The trainees were keen to be considered should opportunity for further training arise.

Finally Pastor Samwel said a word of prayer and made some remarks and then the certificates were distributed and we took some group photos.

Having noticed the eagerness of the trainees to learn and to build further tanks I wonder whether it might be possible to hold a further workshop that would include forming savings groups so that people might build tanks from their savings. This would both strengthen the Musoma team of trained artisans and also help spread the technology. The two best Musoma masons, Mussa Mangoya and Thomas Mashauri, would be able to train others with just a little more training themselves.

Conclusion:

Rainwater harvesting is a viable solution to water problems for many people, especially in rural areas. The idea works best when people form groups since peer learning is powerful. Again, I would like to thank God for being part of the Musoma training. Thanks to Ian and to my fellow trainers, Bosco Daudi and Nelson for their co-operation and to the trainees for their timely and tireless commitment to the course. Lastly, thanks to Pastor Samwel who was always on hand when we needed his support. God bless you all.

Leonard Safari.



Climate Change: Pakistan

Having looked at how climate change is affecting Tanzania and Sierra Leone, we now turn our attention to Pakistan. For the full report and references please see the Climate Risk Profile: Pakistan Fact Sheet, <https://www.climatelinks.org/resources/climate-risk-profile-pakistan>. Climatelinks contains all sorts of useful information for those who work at the intersection of climate change and international development

Barbara Brighthouse

Country Overview:

Pakistan, the sixth most populous country in the world, lies in a mostly arid and semi-arid geographic area prone to recurring large-scale floods, earthquakes, droughts and landslides. Despite recent economic growth, nearly 30% of Pakistan's 189 million people live below the poverty line and high rates of malnutrition and food insecurity persist. Climate change is expected to exacerbate these challenges.

Pakistan has distinct climate zones, with high altitude mountains in the north and west, arid deserts in the south, the hot and dry Indus River Valley in the centre and south, and a humid 990-km coastline. Most of the country receives very little rainfall (less than 200 mm/year on average nationally), with the majority occurring in the summer monsoon season.

Historical Climate:

Key climate change trends since 1960 include:

- 🌐 Average annual temperature increased 0.6°–1.0°C, with temperature increases higher in the north.
- 🌐 Maximum and minimum temperatures increased, resulting in shorter winters and longer summers.
- 🌐 Mean annual rainfall decreased 10–15%

in arid plains and the coastal belt but increased in the north due to increased winter precipitation.

- 🌐 Number of days considered “hot” increased by 20 and nights by 23.
- 🌐 Number of heavy rainfall events increased.
- 🌐 Snow cover decreased by about 10%.
- 🌐 Sea levels rose by 1.2 mm per year.

Future Climate

Projected changes include:

- 🌐 Increased temperatures of 1.4°–3.7°C by the 2060s and of 6.0°C by the 2090s, with projected increases higher during winter and in the north.
- 🌐 Uncertain mean annual precipitation changes, with projected monthly rainfall changes ranging from a decrease of 20% to an increase of 41% by the 2090s.
- 🌐 While large uncertainties remain, climate models point to increased rainfall from January–June and decreased from July–September. Decreased glacier volume and snow cover. Increased frequency and intensity of extreme climate events
- 🌐 Rise in sea levels 30–80cm by 2100.

Water Resources

The Indus River, Pakistan's primary freshwater source, receives 50–80% of its flows from snow and glacier melt. Increased temperatures are rapidly melting glaciers and reducing winter snowfall, which will increase stream flows and glacial lake outburst floods in the next few decades but will significantly reduce long-term water levels as glaciers disappear. Pakistan's per capita water availability, now about 1000 m³, is projected to decrease to 800 m³ by 2025, transitioning it from a water-stressed to a water-scarce

country. Water scarcity will reduce agricultural productivity, which utilizes 93% of the water supply – half of which is sourced from heavily exploited groundwater. Pakistan’s water insecurity is compounded by the country’s limited 30-day storage capacity and indecision over the Indus River headwaters in Kashmir.

WATER RESOURCES	
Stressors	Risks
Increased temperatures	Reduced water table and access to water supplies. Increased conflicts over limited water resources
Accelerated snow and glacier melt	Reduced storage capacity in reservoirs due to siltation.
Irregular monsoon rains	High stream flows and glacial outburst in the short term, leading to increased flooding, turbidity and sedimentation
Droughts	Decreased water supply and quality from higher pollutant concentrations and saline intrusion

Energy

Hydropower generates 31% of Pakistan’s energy supply, yet reduced water supplies from decreasing rainfall and increasing temperatures may undermine the goal to increase energy availability and eliminate the power supply-demand gap by 2025.

ENERGY	
Stressors	Risks
Increased temperatures	Increased demand for energy services, particularly cooling
Increased incidence of drought, flooding and more variable rainfall	Increased power outages and resultant economic losses Reduced hydropower production Limited prospects for hydropower development

Human Health

Climate change threatens to exacerbate Pakistan’s already low health indicators. The majority of the population lives along the flood-prone Indus River, and diarrheal disease from contaminated water is a leading cause of morbidity and mortality. Higher temperatures increase the risk of heatstroke. In 2015, an unprecedented heat wave with temperatures as high as 49°C killed more than 1,200 in Karachi. In 2010, unprecedented monsoon rainfall flooded 20% of the country, affecting 21 million people and triggering infectious disease outbreaks and diarrheal illness due to contaminated drinking water and unhygienic conditions in makeshift camps. The climate risks to food security, such as crop loss/failure, could also have implications for malnutrition, which is already severe in Pakistan – nearly half of all children are malnourished.

HUMAN HEALTH	
Stressors	Risks
Increased temperature	Increased heat-related mortality
Increased frequency and intensity of extreme weather events	Expansion of vector-borne diseases like malaria and dengue Increase in diarrheal disease outbreaks attributable to climate change
Sea level rise	Reduced access to health care systems, water and food supplies in extreme weather events Loss of life and livelihoods from flood and landslide disasters Population displacement in disaster risk areas

CED: The Climate Debate

On Thursday 17th March 2022 CED met on Zoom for a Tech Talk on CED and Climate Change. Although the attendance was small, we discussed the issues and responded to CED's Environment Policy that had been agreed by the Executive in November 2020.

Those who joined the discussion were generally in agreement that the steep rise in carbon emissions in the last 50 years is caused by human activities, mostly associated with burning fossil fuels. We wondered how representative we were as a group taken out of the membership of CED. Do some members think that human activities are not the main reason for global warming? Were any not present for that reason?

Part of my presentation focussed on the use of concrete, which is responsible for more than 4% of all global carbon emissions. On reflection, when considering CED's work, the focus on carbon was misplaced, as recent projects have been lighter on the use of concrete. With enough care in design and implementation all projects should be able to do more good than harm. The subject did provoke some interesting discussion on alternative building materials.

We discussed alternatives to cement which may become available in the future. GGBS and PFA are by-products of fossil-fuel power generation which can be mixed with cement to reduce the cement content. Other alternatives are being developed that will be carbon neutral based on clay and other natural materials.

In the presentation we posed the question of whether individual CED members should reduce their own carbon footprint as well as addressing the carbon footprint of the organisation. It became clear in the discussion that some members are willing or even keen to discuss this and these ideas could have been taken further.

We faced the dilemma that all our activities contribute to carbon emissions, and we could modify our behaviour and our projects, but we could not eliminate carbon emissions completely without stopping our important work. On the positive side, installing a water supply could have the effect of reducing carbon emissions in the long term by reducing or eliminating wood burning for boiling unsafe water.

We agreed to focus on reducing travel and using video conferencing as we are doing. We agreed to continue educating ourselves about the issues. We thought about whether we could calculate the carbon footprint of our organisation and then set a target for reducing it.

Before we could agree on a policy for individual responses to go alongside the organisational response, we would need to consult a larger number of CED members than those who attended this Tech Talk. Further responses from members, supporters and friends are always welcome. One of the best things we can do about climate change is to talk about it with our family, friends and colleagues. Below you can find a book by Louis Keal to help us do that with our own personal words and experience inserted.

The talk and the discussion are available to view on the CED website.

Rob Wakeling



References

Berners-Lee, Mike. *There is no Planet B, A Handbook for the make or break years.* (Cambridge University Press 2019) Everything from technology to thinking skills by the Professor at Lancaster University

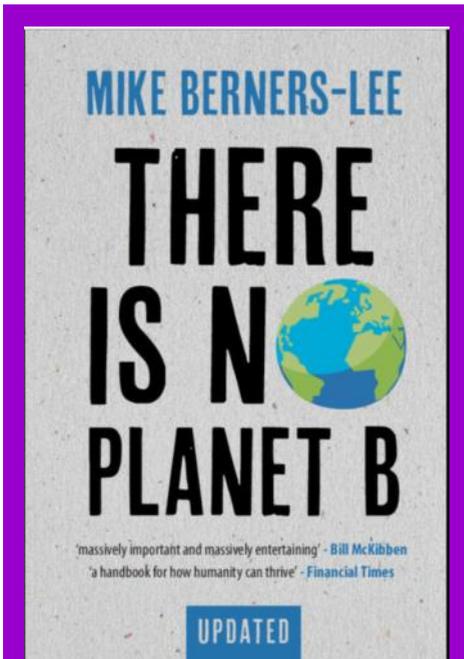
Valerio, Ruth. *Saying Yes to Life* (SPCK 2020) Tearfund Global Advocacy and Influencing Director The Archbishop of Canterbury's Lent Book 2020.

Christian Climate Action. *Time to Act* (SPCK 2020) Christians committed to direct action

Keal, Dr Louis. *A Gift for Conversation: Let's discuss Climate Change* (2021) published by the author.

<https://www.climatestewards.org/> website for calculating carbon footprints and taking action.

<https://www.climatelinks.org/> website from USAID with resources on climate change in many countries.



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Front cover: our Kagera partners sent tank builders to help an old, blind widow in the diocese.

This picture: RWH Training course at Musoma.