

SHARING SKILLS
CHANGING LIVES



Newsletter No. 119

April 2024

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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 of a tri-partite arrangement between a developing country organisation, a funding agency and CED providing technical assistance. CED responds to various requests for assistance. Improved water supply is the most frequent but by no means the only request. 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 would 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 would 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 ian@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

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From the Chair of the Exec.

Welcome to the Spring 2024 Newsletter. I hope you enjoy reading it! Many thanks to Ian Rankin and Dick Waller for their work in pulling this together.

Last Sunday in our church service we looked at Mark 8v34-38. It was the second Sunday in Lent, and those verses were part of the reading for the day. In the NIV that paragraph is subtitled "The way of the cross."

Landrover Defender owners often have a sticker in their rear window which says "One life. Live it." I think Jesus would say "Yes, live life to the full - but live it following me." That is so counter-cultural – even more so for us than for Jesus' first disciples. We live in a self-centred and self-obsessed generation, and yet Jesus makes it clear in Mark 8 that we have to give up our self-centredness, take up our cross and follow him.

In the final paragraph of his book *Mere Christianity*, CS Lewis says this:

"There must be a real giving up of the self. You must throw it away "blindly" so to speak. This principle runs through all life from top to bottom. Give up yourself and you will find your real self. Lose your life and you will save it. Submit to death, death of your ambitions and favourite wishes every day and the death of your body in the end; submit with every fibre of your being, and you will find eternal life. Keep back nothing. Nothing in you that has not died will ever be raised from the dead. Look for yourself, and you will find in the long run only hatred, loneliness, despair, rage, ruin and decay. But look for Christ and you will find Him, and with him everything else thrown in."



One life. Live it. Live it to the full – for Christ – and you will find life in all its fullness.

In his covenant prayer, which he offered every year at midnight on New Year's Eve, John Wesley prayed this:

"I am no longer my own but Thine, put me to what thou wilt, rank me with whom thou wilt, put me to doing, put me to suffering, let me be employed for thee or laid aside for thee, exalted for thee or brought low for thee; let me be full, let me be empty; let me have all things, let me have nothing; I freely and heartily yield all things to thy pleasure and disposal."

That is a good prayer to pray – but not an easy prayer to pray! (Methodists have an annual Covenant Service at which this prayer is prayed – a re-commitment to God.)

The season of Lent is a good time to ask yourself "How can I spend my life for Christ? What does that mean for me in my situation?" How do I spend my time? How do I spend my money? How do I use my skills and gifts? Lent is a good time to listen to God, and to be open to what and where he might be leading us. One life. Live it.

Jonathan Appleby

Tanzania, Proposed Restoration of Buhuri Dam

This project came about because Brenda Allan of Bromyard, Herefordshire knows my brother Hugh through the Diocese of Hereford. She went to Tanga, a port town on the Tanzanian coast, regularly for many years starting in 2001. There she has taught students about computers. The Bromyard-Buhuri Community Link was started through her local Anglican Church. Brenda wrote a book recently called "To Tanga with Love" and has brought the Buhuri dam to CED's attention.

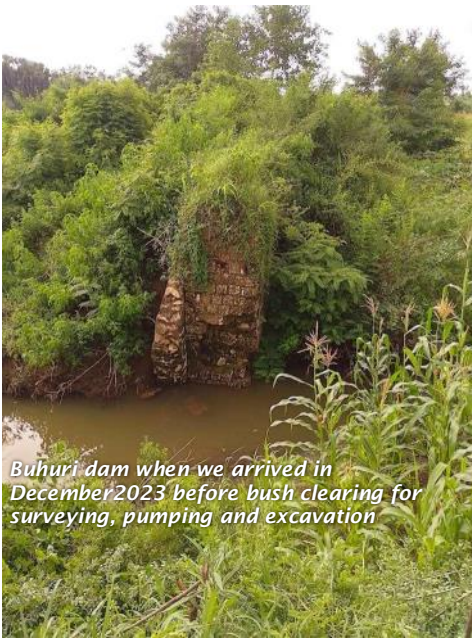
Buhuri dam is sited near Tanga and was originally built for sisal irrigation. It was rebuilt in the 1990s and again in 2003 for use by the Livestock Training Agency to water livestock. The dam failed in 2017 and since then the Agency has been paying the Municipality of Tanga for piped water which is expensive and less reliable. Hence there is a business case for reinstating the dam. Water would also thereby be restored to the local community for irrigating crops downstream.

Ian and Nezia Rankin visited in September 2023 and prepared a report. I joined Ian in December 2023 for a second visit. This time we carried out

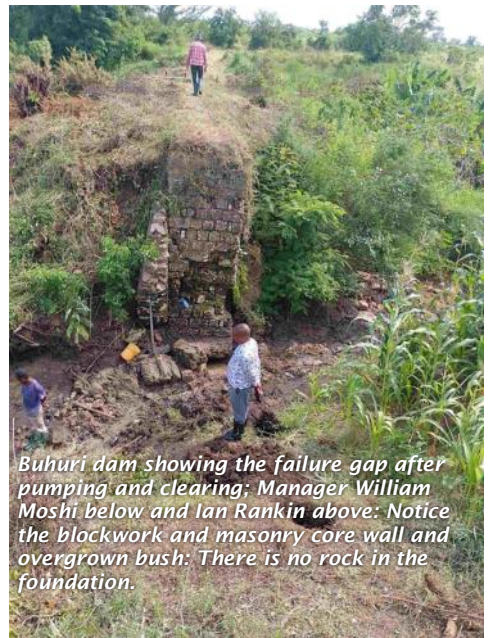
a survey, dug trial pits and took soil samples for laboratory testing. The dam crest was found to be 100 metres long and 5 metres high. Local community volunteers worked hard clearing bush and excavating by hand to enable us to survey as much as possible during the visit.

After surveying the crest and the spillway it became clear that the main reason for failure was the inadequacy of the spillway. It is too small and has very little freeboard below dam crest level. We now know that the freeboard on the present spillway (picture opposite) of 7.4 metres width is only 0.8 metre. This is certainly insufficient for a volume of 95 cubic metres per second which we have estimated as the maximum flow for use in design in view of the risk to lives and properties downstream if the dam were to fail again.

Below a dam it is always necessary to cut off the possibility of significant seepage under the dam wall. The Buhuri structure has very little in the form of foundations, this probably being another reason why it has failed about three times. Damage to the upstream face of the dam due to wave action also needs repair and



Buhuri dam when we arrived in December 2023 before bush clearing for surveying, pumping and excavation



Buhuri dam showing the failure gap after pumping and clearing; Manager William Moshi below and Ian Rankin above: Notice the blockwork and masonry core wall and overgrown bush: There is no rock in the foundation.

Spillway looking upstream: this is at the other end of the dam, far away from the failure. It is too small and too high.



this can be done as part of raising the dam and extending the upstream slope. The first picture opposite shows what could be seen of the dam and its masonry core as we started. The second picture shows more clearly, after extensive excavation, how much the masonry core of the dam has become distorted.

The upstream face of the dam is to the right in both pictures. It can be seen that a small masonry wall has been built against the downstream face of the blockwork core. This may have been part of one of the earlier repairs.

The cost of repair had been estimated by a local contractor at about £5,000. However, he proposed simply to restore the original geometry without any improvement in flood capacity and that would leave the dam at risk of another failure by overtopping or structural movement.

CED's preliminary proposal for enduring restoration includes a much bigger spillway (30m wide), an improved upstream slope, and a raised crest to increase freeboard to at least 1.5 metres. Those are the features which would be visible. Just as important is extension of the core wall in the failure zone down into

the ground to at least the same level as the remaining core wall. An excavation should explore whether there is more impermeable material at greater depth in the foundation to minimise seepage. Our current estimate for all this is about £40,000.

When the dam failed in 2003 it was reinstated using funds from the Tanzanian Government and the Buhuri-Bromyard Community Link, about half from each. The Link has contributed £4,000 for the repairs now needed. An application has been submitted to the Government for the balance which is still pending.

CED is still considering whether this is a project which is suitable for our further involvement. If it proceeds, we recommend not starting work until after the rainy season. This means not starting before June 2024 or June 2025, depending on when funding is available. It would be good to allow a full dry season to complete the work.

Rob Wakeling

A Fortnight with CED in Rwanda

Rwanda has a marginal reputation. Dark memories of the terrible genocide of 1994 – yes it really was 30 years ago! – press reports of human rights abuses and then there is the whole refugee debacle! During my recent fact finding trip I travelled widely, North, South, East and West. On all our travels we saw many people singly and in groups along the roadside. We also met with quite a lot of Churches, schools, communities and individuals.

This was my second visit and I can only report on what I saw. Generally we travelled on good sealed roads; there was not a hint of trouble or any feeling of insecurity. Is it a 21st century European country? Certainly not, but given their not too distant history I think great things have been achieved in terms of progress and stability.

My impression is that most people are



Ferry to Nkombo Island

genuinely happy with the way things are and the direction of travel, i.e. towards improved services and facilities.

We travelled as a merry band of four: Rob Hoy, now on his 23rd visit and our master planner, myself and Rob's cousin Peter and his wife Jacquie who were on a very different sort of holiday. We travelled to visit numerous communities that Rob has worked with in the past, to see how they were getting on, to check that they remembered how to use and service the many Grifaid filters he had distributed over the years and to inspect the plastic and ferrocement tanks that had been installed. We also visited a number of individuals, in their mud brick homes, whom Rob clearly had a great heart for.

Phase 1 was to go North to Byumba where we stayed in the Diocesan guest house. We visited their vocational training centre where Rob had built three tanks as part of a training programme with the intent that the folks there would go on to build many more. No further progress had been made, but encouragement was given and we hope that the tank building programme will expand. The private school we visited was quite impressive with its range of classes and activities and its eye to the environment. While they would have many wants, they certainly were not in great need and, encouraging as it was to see, it is unlikely that we would be looking to offer further help there. Clambering up the steep 200m climb to the hill-top village of Ryandinda it is difficult to imagine doing this



Rainwater tank near Byumba

with 25L of water on my back, or a load of cement of bricks – but this is how people live: everything has to be carried in. Here we would like to see the Diocese improve water security by building two 5000L ferrocement tanks.

Phase 2 took us to Kamembe, where we stayed in the Peace Guest House run by the Diocese. Kamembe sits on the shores of Lake Kivu and is a beautiful place, contrasting starkly with its neighbour on the other side of the water, the Democratic Republic of the Congo where personal security has little certainty. We made several trips from here:

South to the Burundi border to visit a community who had been issued with filters in Cyrukara near Bugarama.

North to take a short ferry onto Nkombo Island visiting a number of households who had been given Grifaid filters – these were clearly in daily use and were reported to have been transformational to health and consequently life. The crossing of some 700m was in an open hand-made timber boat with some 30 passengers. Life jackets were handed out but they were pretty flimsy. Before we set off I calculated I could swim half the width if needs be and saw that there was a generous amount of freeboard. It was a calm day but I was still pleased we were not doing the longer multi-kilometre crossing from the town.

Next day we went East, visiting a primary school at Gashirabwoba and a church at Gisakura which was in the process of building its own primary school. This day took us through extensive tea plantations. We also visited a number of Rob's old friends and one who appeared very special, Bernadette. We sat and talked in her mud-brick, mud-floored living room. She had a very healthy avocado tree



from which she gave each of us 2 avocados - she was an irrepressibly happy person.

Phase 3 took us back to Kigali from where we made a day trip South and back to Mayange with Pastor Charles Semwaga of Faith Centre Ministries (who will be Bishop by the time you read this!). I had visited 18 months ago to carry out a project completion audit at Kavumu village. We looked at a few of the properties we had previously helped: some had made good progress, making the most of the help they had been given, but a few had sadly let things slide. Charles outlined his vision for the area to include the completion of the primary school which needs doors, windows and desks; purchase of some land to allow for a playground and parking; improvements to one additional house that had not been included in the previous project.

Phase 4 took us a long way East, to the far end of Lake Muhazi for Charles to show us two church projects. One in particular could do with a large 20,000L rainwater harvesting tank, proposed to an innovative design expected to cost in the region of £2,000, which would serve the surrounding community.

Cancelled flights, lost luggage and many miles later I have returned home after two weeks away in a hot humid and beautiful country that is reaching out for help to further strengthen the progress it has made. I will be back!

Angus Armstrong



Tanzania, Developing a Rainwater Harvesting Programme

The Tanzania Rainwater Harvesting Programme continues to grow in interesting ways.

We have designed a training course that, in the latest iteration, delivered training to 13 masons over 11 days at a cost of around £1750 to CED with the Diocese paying £1250 for materials for 3 tanks. We are grateful that the local churches recognise that the training is a real benefit to the students, in contrast to the practice where NGOs attract students through generous “per diems”. As I am delivering much of the training personally, I get to know both the trainees and the church administration which is helpful for our ongoing relationship. The training model represents excellent value and can be replicated elsewhere.

As the programme develops, we are looking out for other organisations doing similar work. I attended a 3-day water conference in Dar Es Salaam at the end of January where two of the speakers are building Calabash tanks (similar to our pumpkin tanks but using clay blocks to build a mould rather than a steel skeleton structure. <http://degevuldewaterkruik.nl/manual>). We also hope to raise the profile of our programme through presenting a poster at the forthcoming Loughborough University Water Engineering and Development Centre

conference in September. CED Director Richard Franceys is working with our Kagera Diocese development manager, Thomas Shavu, on that.

We are looking at the programme as somewhat similar to a franchise (e.g. McDonalds). The Franchisor, CED, is responsible for ‘product design and development’ (in our case the rainwater tank and associated works), training programmes for local masons, developing ever-improving construction techniques, quality assurance and marketing support. The Franchisee, the church implementing group, is responsible for ‘delivering the right product to the right customer in the right way’. This includes determining those most in need, motivating local support, acting in purchase and delivery of materials, ensuring masons/volunteers are doing the job in the right way, managing (very occasional) water testing, ensuring the system is working, reporting back any problems/ improvement ideas, assisting with any needed repairs. Unlike a normal franchise, with this scheme it is the Franchisor who makes payments to support the Franchisee rather than the other way around. The Franchisee maintains a good level of autonomy as the church group is free to develop their ministry in ways they see fit and to disengage if they



Graduation Day, training course at Muleba for the Lweru Diocese, February 2024.

are dissatisfied with what the Franchise offers. The church group is responsible for delivering tanks economically and enjoys the benefit where they make savings e.g. by building several tanks at once in one place. CED is offering a set grant. It is up to our partners to control the total cost of a tank. CED provides grant funding for a batch of tanks agreed with our partner then, when complete, the next batch is funded.

The current programme developed from successful training workshops in Rwanda and the Tanzania coast. To date we have built:

- Kagera: 50 tanks
- Biharamulo: 36 tanks
- Musoma: approx. 8 tanks
- Lweru: 3 tanks

The programme has developed organically from small beginnings in a way that would not have been possible with a pre-funded grant aided initiative. I am grateful for CED's decision to allow the programme a further £10,000 last November. However, this will not go terribly far now we have 4 active partners all building tanks. We are very much trusting

that our tap-twinning scheme will inspire more people to contribute (see NL 118). Under the scheme a 1000 litre is built for someone who has little or no means of their own and the cost is covered by a donor contributing £120 + Gift Aid. The donor receives a personalised fridge magnet to celebrate the link with Tanzania. Please pray that this initiative builds some steam. As is often the case, we had a good response in the first couple of months but this has slowed down. Is this an opportunity that you would like to join with, or invite friends to contribute to? More information at <https://ced.org.uk/projects/tap-twinning-initiative-in-tanzania/>

Ian Rankin



Sierra Leone: Manowa Update

- ◆ The water storage tower is complete with the tanks in position (see front cover).
- ◆ All 31 tap points are complete (see below).
- ◆ The remaining work involves the supply

and installation of the solar pump and panels and completion of the distribution pipework.

Please continue to pray for the team involved in the final phase of this project.

Alan Michell



Tap stand, Manowa

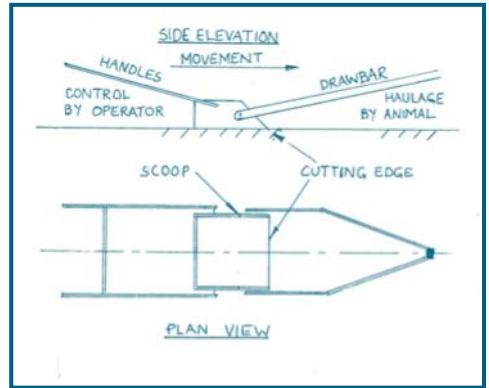
Moving the Earth, a Suggestion

Newsletter No. 118 includes an article by Alan Chadborn describing a simple road-grading device developed by students about 20 years ago to do for rural by-ways and tracks what the conventional mechanical grader does for more important roads. He has been sufficiently impressed to make one himself! Sadly, the design has not apparently been taken up as its originators would have hoped but that doesn't mean a useful advance has not been made. Let's pray that it would be shared more widely and be of real use, delivering the benefits Alan describes.

Alan's simplified road/ track grader is an example of development driven by a desire to make some of the merits of more advanced technology available to those who cannot afford the modern kit or don't need all its sophistication.

Another item of earthmoving plant we might want to try to simplify in the same way is the mechanised scraper (see box below – apologies

for the snow!), heavily used for the whole of my lifetime at least. Scrapers used to be seen on embankment construction and in opencast coalmines but have become less common in the UK. They remain popular elsewhere.



There have been several intermediate technology designs of earth scoops which enable animal power to be harnessed. They are generally of a pattern similar to that illustrated above. A human operator is needed

How a Scraper Works



The example shown is a four-wheeled scraper with a drawbar but scrapers can also be two-wheeled with the swan-neck (1) articulated on the back of a tractor. For movement between locations, empty or full, the side-arms (2) hold the bowl (3) well off the ground.

On reaching the borrow pit, the bowl is lowered so that the cutting-edge (4 – hidden by the snow) creams off soil. To allow this the gate (5) will have been partially opened. The operator matches forward speed, cutting-edge depth and gate opening to achieve optimum performance.

When the bowl is full, it is raised for travel to the deposition site. There the operator again juggles forward speed, gate opening and bowl level with the speed at which the ejector plate (6)

but has to contribute much less energy than without the animal. The device allows earth to be accumulated in a small quantity and carried a short distance.

The wheeled scraper does much the same on a larger scale but can also be used to transport the earth over great distances and to deliver it as a uniform layer on a structure such as a road embankment or a dam. Could the animal-hauled scoop be adapted to perform at least one of these additional tasks?

Spreading the earth in a layer does seem rather complex and perhaps has limited application for a small farm or a community water impoundment, but anything which makes for easier *haulage* of the scooped earth looks very attractive so let's look at that.

What about giving the earth scoop wheels which would simplify the haul or allow a much longer distance? That would surely be relatively straightforward and very helpful. Could those same wheels also contribute to making the scooping task easier? Could they also make it easy to tip out the contents at destination?

Does any reader want to make this a little project? New thinking needed!

Dick Waller

Open Day and AGM... Save the Date!

We are planning to get together on Saturday 5th October but as yet have not settled on a venue. As always, there will be a mixed programme of speakers and workshops as well as the formal business of the AGM itself. Please come!

Ian Rankin

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Front cover: water tower at Manowa.

This picture: another day's RWH training complete; Muleba, February 2024