



## CHAPTER FOURTEEN

### Trevor Field on Saving Lives



---

There are a lot of charities out there, and no shortage of places for you to donate money. But few organizations are as effective or innovative as PlayPumps International. It's hard to imagine a better use of money than bringing clean drinking water to people in villages in sub-Saharan Africa who desperately need it. And PlayPumps does it in a unique way: by driving the pumps with merry-go-rounds or roundabouts, which the children in the village play on. Not only does this give clean water—which both nourishes the people and prevents water-borne disease—but it also frees up women, who in many villages have to literally spend their entire day fetching water, often from polluted sources. Trevor Field, the founder of PlayPumps, inspires us not just because he does great work, but because he does it through great innovation, engineering, and teamwork, which is why part of the proceeds from every copy of *Beautiful Teams* sold will be donated to PlayPumps International. We had the privilege of speaking to Trevor about his organization.

---



*Andrew: So first of all, thank you so much for talking to me. Jenny and I are really impressed with everything you guys have done. Since this whole book is about engineering teams and how to make them work better, it occurred to us that you had put together more than just an organization that does really good things in the world; really, it amounts to a major civil engineering effort. We wanted to talk to you about how you put it all together, the history of it, and the challenges you faced.*

*If you could start by giving us a little bit of a background: tell us how you started PlayPumps, and a little bit about what the organization's about.*

**Trevor:** Water is the source of life on this planet, and it's always been very interesting to me. Some years ago my father-in-law came up to visit me with his wife. While my wife and my mother-in-law went out shopping, I took my father-in-law to an agricultural show in Pretoria, which is about 50 kilometers north of Johannesburg.

At the show, there was a guy called Ronnie Stuiwer. He was a driller, showing a drilling rig and compressors, that kind of stuff. And he had a model of a PlayPump system. It was a different one to the ones that we've got now, but I saw the concept—I saw how this could possibly work. The problem he had with it was that it had a lot more steel attached to it, and when compared to a hand pump like an Afridev or a Mono Pump, the price was just ridiculous. I'd been involved in outdoor advertising and advertising in magazines for a long time, and I just loved the idea of this thing. I approached him and got him to give me the exclusive rights to sell the idea. And it was born from there.

I thought that the easiest way we can make this work is to get the private sector involved. And the way to do that was to be able to pump the water into an overhead storage tank, and then put advertising messages around those tanks. Rural people are not exposed to television or the Internet or magazines or newspapers. You go into the very rural areas, and there's no advertising whatsoever.

A water pump is like the focal point of the community. If we could put messages up there that advertise the kind of stuff that local, rural people bought—sugar, tea, coffee, and these days, cell phone rechargers, and all that kind of stuff—it should work. That's what we did; that's how we started.

And it's grown hugely from there. We bought the patents from that chap, Ronnie Stuiwer, and we redesigned and reengineered the whole thing. We've got our own factory in a place called Modderfontein, just up the road. And we employ 36 people in my factory. The factory's capable of producing a hundred units a month with ease. That's how the concept basically started.

*Andrew: When you reengineered the pump, what needed to be done? Was there an interesting or difficult design challenge?*

**Trevor:** It was that the chap had made a model. From a model we had to actually design the actual working unit, which is what we did. He actually made some units for us in the early days. But Ronnie, you know, he was a farmer, with a workshop on his farm. He used to build things by hand, and hammer them out—it wasn't polished.

We were concerned with the equipment. It was OK here in South Africa because we could maintain the equipment ourselves. But when you're looking to export into other countries, you need an export-quality product. So we bought the patent from him, and we reengineered the whole thing—not from scratch, but basically we had every piece tested for stress and tolerances. And we made a new model that we were confident that we could go and put into the bush and leave it, and it would work.

So that was the challenge there.

**Andrew:** *A lot of people who read this book who build software will definitely recognize that—the idea of starting with a prototype, something that they've built themselves, and having to harden it in order to get it to the state where it can be shipped out to people who will use it in the field every day.*

**Trevor:** That's exactly what we had to do. I mean, you have to leave this thing in the middle of nowhere and just hope that it's going to continue to work. Plus, you've got a responsibility to the kids. I've seen 70-odd children on one of these roundabouts, all piled on top of each other. The average weight of a child that's playing on a roundabout is about 30 kilograms. You've got 20-odd, 30 children of 30 kilograms each and you're talking tons of momentum. You've got to make sure that the thing doesn't break. So we had to make sure that all of the bearings and all of the moving parts were extremely strong and all had tolerances way in excess of anything that the kids could throw at it. I think the main bearings have a breaking strength of about four and a half tons; huge compared to what it's actually going to receive.

**Andrew:** *And I'm sure the kids are going to play with things in ways that you never even thought of, right?*

**Trevor:** Absolutely. That's why we use a positive displacement cylinder. Without getting technical, the thing goes up and down. As the kids turn round and round, the mechanism transfers that motion into reciprocal vertical motion, so the pump goes up and down. You do get pumps that go round and round, such as an Archimedes screw principle. The problem with that is that they only go in one direction and you can't reverse it, because if you reverse it, it just undoes all the piping.

And if you put a brake on it—well, that's exactly what the kids are going to do. They're going to try and brake it, because they want to go the other way, you know.

**Andrew:** *That has to be enormously motivating for everybody who was working on the engineering, and for the guys in the factory actually building the pumps. I mean, you don't get a lot of products where you're actually doing real, honest-to-God good for the world.*

**Trevor:** It's a shame that you can't come here and see a real one, because we could take you to the factory. We've got guys at our factory who are just pop-riveting steel onto frames, and it doesn't look like anything to them. So to motivate them we had posters of the PlayPump blown up. You know, we did have an outdoor advertising company, a professional one that used to do huge billboards on the side of the road. (We sold it and disposed of all our assets to concentrate solely on PlayPumps.) We printed these massive

posters of what these PlayPumps looked like, and we hung them up in the factory so the guys who are actually making them get motivated.

And you know, my partner's a bit of a creative guy, so the pumps get painted red, yellow, green—bright, bright colors, the kind of stuff that kids like. So we painted the whole factory like that. All the handrails are red, yellow, green. I mean, it looks like Charlie and the Chocolate Factory!



*The PlayPumps factory*

**Andrew:** *It's one challenge just to get the pumps to the point where you can manufacture them and they can stand up to the punishment of being left to do the job. But getting them out into the field, that's got to be a challenge, too.*

**Trevor:** That's a huge challenge. I mean the fuel price alone—I don't know what a gallon of gas costs in California these days, but in New York it's going to cost more or less the same. Problem with Africa is it's difficult to transport this stuff around, and it's heavy. Very heavy.

The price of fuel in South Africa is about \$1 a liter or thereabouts. But the price of fuel in Uganda, for instance, is more like \$7 per liter. You can't plan anything with those kinds of variables. It really does mess up the logistics in a big way.

And in places like Zimbabwe, they've got no fuel at all. That's one of the reasons why we're not there, apart from, well, obviously Mr. Mugabe's going to have to disappear before we go there at all. And that's a pity, because we want to help the people in Zimbabwe. They're suffering, and it's not their fault. They were just born in the wrong time zone. And it's our neighbor. I could drive to Harare from here; it's like driving to the coast for Christmas holiday. The roads are good, but the border guards want a 35% import duty on a gift. Well, not in my lifetime, we're not going to do that.

**Andrew:** *It sounds like working with other countries and their governments and borders brings its own set of challenges.*

**Trevor:** We get import waivers from all of the countries that we're working on because we raise funds from America, Britain, all over the world, and we make these pumps and we actually give them to the recipient communities within that country.

We insist that the government gives us a customs duty exemption. So that's one challenge, getting that import duty exemption. Another is getting through the borders, because all the borders have some very cavalier ideas on what's supposed to happen with imports and exports.

And then you've got other problems, as well. The road system is not really great in other countries. For instance, I think you'd call it an 18-wheeler, a big double semi truck; it carries two containers, a 40-foot and a 20-foot. We would call that an interlink. You can't put an interlink on the road, because they won't allow them in Mozambique. And they won't allow them in Zimbabwe because they damage the roads so much. We could get 25 units in an interlink, but we can only get 11 on a semi, which is a fixed-body truck. So consequently, you know, you've got to send two, which doubles your costs.

We've just done a deal with Malawi, so I've got a Malawi MOU, Memorandum of Understanding, with the government. They're very happy to accept the pumps, and they've given us the customs duty exemption. But to get to Malawi from here, we've got to go through either Mozambique or Zimbabwe. And that's a challenge: the fuel's a problem, and the costs vary from one transporter to the other hugely, with massively different prices.

**Andrew:** *I was just thinking about the kinds of administrative and bureaucracy issues software people face in their jobs. The next time I find myself groaning about having to come up with a report for Bob from accounting for my project, I'll remind myself that at least I don't need to negotiate a Memorandum of Understanding with a government. You must get caught up in a lot of red tape—and language barriers, to boot.*

**Trevor:** Yeah. Well, with respect to the people I deal with, the majority of them speak pretty good English, because they are at a ministerial level. But there are still idiosyncrasies that they don't understand.

And you have to spell it all out, physically go there to sit and take time, explain the whole process and how it is going to work, where we're going to put these PlayPumps, and when they arrive in a country who's going to store them. We want to know if it's secure, because we don't want people running off with bits and pieces. Because every part of the machine is put together at our factory, and every nut and bolt is counted and double-counted and checked into a nylon sack that's got all of the little bits and pieces in it. You don't want an installer to be 300 or 400 kilometers from Dar es Salaam in the bush trying to install this thing, and then he finds in his sack that he's missing two bolts.

That makes it a tad of an operational problem, you know. We have to send up spare units and spare parts for the installers. The model we use is basically the same in every country as it is in South Africa.



*Installing a PlayPump*

**Andrew:** *Do you do most of your work in South Africa? How does installation work? Maintenance? It's got to be a challenge.*

**Trevor:** How it works is that in South Africa you've got nine provinces. We work in five main provinces: the Eastern Cape, KwaZulu-Natal, and Mpumalanga, Limpopo, and Northwest. Those are provinces that are historically the most deprived from a facilities point of view.

We've got an installation crew in each province. What happens is that we'll send a truck with, say, 25 units on it to KwaZulu-Natal. It usually goes to the municipal buildings in that area, where we'll store the equipment. Our installer in KwaZulu-Natal will go in every day, load up a couple of pumps, go out to the sites, and start the installations.

**Andrew:** *Maintenance has to have its own challenges. Have you had to get creative to handle those challenges? How does that all work?*

**Trevor:** When the installer finishes the installations, he becomes the maintenance guy for those pumps. On the tank stand itself we used to put a free phone number, our 0800 number. So if a pump broke down, a person could write that number down on a piece of paper and go to a telephone, go to a local store or a spaza shop, get hold of a telephone, make a free call to our offices in Joburg, and report the pump out of order.

But that was an absolute disaster, because what happened was in reality a pump would break down, the guy who got to the pump would write down the telephone number for

the pump repair, go to the phone, and phone us up. We'd ask, "Which pump is it?" And he'd say, "I don't know, it's the one by the school," you know. And we'd say, "Which school?" And he'll say, "Ambabulla School." And we'd look on our database and we haven't got an Ambabulla School because they've got seven different names for the same place.

That was a real problem, one we really wrestled to try and overcome. Eventually we cracked the idea of using text messages on cell phones. Because it didn't matter which rural province you're in, or how poor the people are, somebody's always got a cell phone. It's amazing.

So what we do now is we've got a number on the tank. Well, we've always had numbers on the tank to identify them—in KwaZulu-Natal it would be KZN001, for instance. That would be the unique number for that particular pump, which is GPS'ed on our database so we know where it is within 5 meters, and we see it on Google Earth, too, so that's another, you know, advantage.

What we came up with was that we'd say, "SMS or text this number, KZN001, to this phone number." That way, we'd see which pump number it is on the message, which means we could identify it straightaway. And then we can phone the guy back, because our phone identifies his phone, his phone number, so we can communicate with the person who is reporting the pump out of order.

That worked a lot better. And it's a simple thing, but it took a bit of working out, I can tell you.

**Andrew:** *Sometimes simple, elegant solutions to complex problems are the hardest ones to come up with. And it worked well?*

**Trevor:** Yes, it worked really well. The only saving grace was that you know when a pump does break down, because it is a person's supply of water. You get way more than one or two calls, you get lots of them.

**Andrew:** *In addition to the organization that gets the pumps out into the fields to deliver the water, you're also running a charitable organization. I'm sure that had a different set of challenges, establishing PlayPumps and getting it all set up. Was this something you'd done before?*

**Trevor:** No, I'd never done it before.

**Andrew:** *So you had to learn a lot to do this.*

**Trevor:** What happened was that in 1999, about eight, eight and a half years ago, we were running a fully commercial operation called Roundabout Outdoor, which we still run today. We were selling the advertising on all four sides of those water towers for commercial gain. We had a launch in the south of Johannesburg at a place called Reitfontein. Former President Nelson Mandela was there—there was huge excitement, thousands of people turn up whenever he's around. He came and looked at the pump. That was the first and only time that I actually shook his hand. A whole lot of different people were

there, from the World Bank, from UNICEF and CARE and Planet International, all sorts of different people.

I was talking to a guy from the World Bank, a guy called Dr. Ross Paul, who's retired now in Australia. I asked him, "How can we get, you know, funds for this system?" And he said to me, "There's a competition called the Development Marketplace Competition. Why don't you enter that?"

So we did in a very, very rushed fashion—the deadline was approaching for submissions. I went to his office and spoke to him about what we did, and he typed it in on his computer, and we put the online application in to the competition. We got short-listed, and I went and presented it in Washington, DC. We won the competition. They gave us—I think it was \$165,000 in those days. We used that money to put more pumps in the ground. That's how it started.

But what happened after that was that people had seen the system. Instead of us amortizing the advertising against the cost of the equipment, people started giving us money out of the blue. One guy from Ireland gave us like 10,000 pounds, and somebody else just sent us money in the post, another did transfers into our bank account. We were a for-profit organization accepting donations. It was getting a bit awkward.

So I spoke to the Ministry of Water at the time, a guy by the name of Ronnie Kasrils, and I asked him what he thought we should do. He referred this to the Finance Department, and they wrote letters between each other. Then I was called into the SARS in South Africa—you'd know that as the IRS. I almost had a heart attack when they gave me the call, because I thought it was my personal tax they were looking at. But they wanted to talk to me about the structure of the company.

I went there and basically they said, "What you want? What do you want us to do?" And I said, "I want you to work out some sort of incentive that would enable or encourage a company to give us more money, because when we make a pump we're going to put it in the ground. It's not mine, and it's not the company's, it's not Anglo American's [a South African mining company that contributes to PlayPumps]. It belongs to the people. So where's the inducement to get Anglo to give us more money?"

I was anchoring for them to give us a tax incentive. And they did! They worked out a structure: they said, "OK, you need to open another company and make that an NGO." Then they said that Ministers want to do this so much that they'll make it a PBO, a Public Benefit Organization, because the work we do is ostensibly what public works should be doing.

We opened up the NGO and we called it Roundabout PlayPumps. We kept Roundabout Outdoor, our original company, because we have telephone numbers and faxes and computers on all the business cards and letterheads. The NGO accepts the donations from various quarters, and Roundabout Outdoors was designated the implementation organization for that NGO. So that's how the structure works. But yes, we've had challenges like you can't believe.



*Andrew: Wow. It sounds like you've really come a long way. That's really inspiring. Do you have any advice for someone who wants to do good things, but might be a little intimidated by the size of the problem? How did you keep motivated, even when you weren't sure how it was going to turn out?*

**Trevor:** Well, look, from a motivational point of view, I'd come up with this idea in 1989, and my wife actually put the first two pumps in the ground in KwaZulu-Natal in 1993. I couldn't give up my day job at the time—it's the same old story, you know.

How anybody gets anywhere is that you just have to adopt the Nike slogan: just do it. You just go do it, and that's what I did. One day I walked out of the job that I was in, and decided I wanted to do this full-time.

We had two pumps then, and lots of people laughed at me. "Ha, ha, ha, a children's merry-go-round that pumps water, yeah, yeah, sure, OK, you know. You will be all right, just keep taking the pills, whatever."

Well, they're not laughing now. We had First Lady Laura Bush, Bill Clinton, and Steve and Jean Case from the Case Foundation standing on the stage at the Clinton Global Incentive, in the States, awarding a \$16 million investment into PlayPumps globally for a 10-country expansion.

So from two pumps that we started with in 1994 to 4,000 pumps across Africa affecting 10 million people. Yeah, you've just got to stick to your knitting and just make it happen. And that's exactly what we've done.



*Kids playing on a brand-new PlayPump*

