

GLOBAL HEALTH

Innovation Insight Series



Photo courtesy of www.playpumps.co.za

Children pose for a photo on the PlayPump device

PLAYPUMPS INTERNATIONAL: Gaining User Buy-In

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TREVOR FIELD, FOUNDER

THE PROBLEM/SOLUTION SPACE

884 million people worldwide do not have access to clean and safe water. Of these individuals, 37 percent live in Sub-Saharan Africa.¹ Meanwhile, half of the hospital beds in the world are filled with patients suffering from a water-related illness.² In developing nations, up to 80 percent of diseases are associated with poor water sanitation.³ Diarrheal illness, which is frequently transmitted by contaminated water, is the second leading cause of death among children under age five, and kills more young children than AIDS, malaria, and measles combined.⁴

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Even without drought or contamination, collecting water in rural regions of the developing world is rarely easy. Well-developed infrastructure for transporting water is frequently lacking and many residents must pump and carry water long distances by hand. According to the United Nations, people living in Sub-Saharan Africa spend 40 billion hours each year collecting water.⁵ Clearly, any innovation able to supply clean water to rural communities in this region and ease the burden of collection could save many lives and improve quality of life.

ABOUT PLAYPUMPS INTERNATIONAL

The idea for PlayPumps originated in 1989 near Johannesburg, South Africa. An engineer and professional borehole-driller had come to care for the rural children who often gathered to watch his drilling machinery in action. After recognizing that there was a scarcity of play equipment for these children and that it was also difficult for them to collect clean water, the engineer set out to develop a tool that could address both problems. It was at an agricultural fair that he unveiled his invention: a merry-go-round attached to a water pump that could pump water from underground to the surface.⁶

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The device caught the attention of Trevor Field, a retired British businessman and outdoor advertising executive who cared deeply about giving back to the community. Field was concerned that in many rural villages of South Africa, women and girls shouldered the burden of collecting water. Every morning he would see them making long treks to the nearest borehole to collect water, where they used leaky and

often dirty hand pumps. Then they would carry water through the wilderness back to their homes. The buckets known as “jerry-cans” could weigh as much as 40 pounds and cause injury. Fields strongly believed that there was a better solution. “The amount of time these women are burning up collecting water, they could be at home looking after their kids, teaching their kids, being loving mothers.”⁷

Fields licensed the merry-go-round water pump technology from its inventor in 1994 and renamed it “PlayPump.” As he explained, “I just thought it was a really cute idea...a very simple way, and an environmental friendly way of providing water to people. If you look at rural African schools, they haven’t got swing sets and the kind of playground equipment that European and American kids have got. So it was like killing two birds—or, since then, about six birds—with one stone. That’s what turned me on to pursue it.”⁸

Each PlayPump system consisted of the merry-go-round like wheel (where children could play) attached to an underground water pump. The pump was designed to extract water from as deep as 40 meters using kinetic energy supplied by children spinning the wheel. Each PlayPump also included a 2,500-liter water storage tank raised seven meters above ground. Drawing on his outdoor advertising expertise, Field modified the large water storage tank to also serve as a four-sided advertising panel. He used two sides of each tank to advertise commercial products, thereby providing revenue to pay for pump maintenance. He dedicated the other two sides to providing health education such as public health messages about HIV/AIDs prevention.



A traditional hand pump

In 1997, Field founded the company Roundabout Outdoor to manufacture, install, and maintain PlayPumps throughout sub-Saharan Africa and it did not take long for this initiative to show significant growth. In 1999, Nelson Mandela visited an elementary school where a PlayPump had recently been installed. In 2000, Roundabout Outdoor was awarded the World Bank Development Marketplace award, which provided funding to install 40 PlayPumps in sub-Saharan villages. Publicity from these developments helped Roundabout Outdoor to win a grant in 2004 from the Kaiser Family Foundation for installation of an additional 60 PlayPumps as well as a matching grant from the South African Department of Water Affairs and Forestry. That same year, Roundabout Outdoor established PlayPumps International, an NGO to facilitate worldwide partnerships with business, nonprofits, and governments.

More support quickly followed. In 2005, the World Food Programme, UNICEF, Canadian Development Agency, Lemelson Foundation, and Mozambique Departments of Education and Water Affairs partnered to bring PlayPumps to Mozambique. In 2006, the Clinton Global Initiative and First Lady Laura Bush announced a \$16.4 million grant for PlayPumps. President Bush's Emergency Plan for AIDs Relief (PEPFAR) and the U.S. Agency for International Development (USAID) each awarded PlayPumps an additional \$10 million and the Case Foundation provided another \$5 million. MTV also produced a documentary about PlayPumps and hip hop artist Jay-Z raised money at a concert in New York. With all the excitement and widespread support for PlayPumps, it seemed that the initiative could only succeed.

Field's overarching goal was to drive widespread adoption of PlayPumps in 10 sub-Saharan African nations and make PlayPumps a leading solution to the region's water problems. By 2008, a total of 1,000 PlayPumps had already been installed in five southern African countries. Field's target was to install another 4,000 PlayPumps in Africa

and serve more than 10 million people by 2010. He hoped that after achieving this goal he would be able to establish a “franchise-type model” to expand adoption of PlayPumps to India, Pacific Rim nations, and other developing regions throughout the world. His vision was to eventually “franchise the concept and the know-how and the IP to other groups” to enable them to “change this water shortage problem that the world is facing in a much bigger fashion than what we would be able to do on our own.”⁹

ONE CHALLENGE: GAINING USER BUY-IN

Despite these initially promising results, subsequent evaluations of the PlayPump project revealed multiple problems leading to low user acceptance of the product. When Fields licensed the technology, he made a few small technical changes to the design, including increasing the diameter of the wheel to accommodate more children and enabling the wheel to rotate in both directions. However, no fundamental design changes were made before mass production to address sub-Saharan user preferences, behaviors, or the cultural context within which they gather their water.

Several concerns soon became apparent after installation. The merry-go-round-like design did not protect children from falling and the base of the wheel was concrete. Some children suffered bruises, cuts, and fractures after falling off. School children also reported that they would become tired quickly after pushing the wheel. “No children reported that they had been forced to ‘play’ but several complained of getting dizzy... There were also several reports of both children and women vomiting after spinning on the pump carousel.”¹⁰ Smaller children reported that one minute of rotation was enough to make them dizzy and want to stop playing with the pump.

Because of these difficulties, PlayPumps were often left idle. The Swiss Resource Centre and Consultancies for Development (SKAT), an independent evaluator, conducted a technical and social evaluation of PlayPump use in Mozambique. It noted that “in most schools visited, children were not always moving the playwheel—they often enjoyed the PlayPump as a gathering place, just sitting on it and chatting.... As soon as the evaluation team walked towards the PlayPump, the children rushed to the pump (like they have been told), showing their ability to rotate the play wheel at an enormous speed.” Eventually, however, the children became exhausted and lost interest in PlayPump.¹¹

An aid worker with Engineers Without Borders Canada (EBC) made similar observations in Malawi: “Each time I’ve visited a PlayPump, I’ve always found the same scene: a group of women and children struggling to spin it by hand so they can draw water.” Yet, “as soon as the foreigner with a camera comes out, kids get excited. And when they get excited, they start playing. Within five minutes, the thing looks like a crazy success. Kids are piling on top of each other to spin around on the wheel.” Soon, however, “the excitement wears off and the pump reverts back to its normal state....kids do occasionally play on it even without camera-bearing foreigners around, but not long enough to make a serious dent into filling the storage tank.”¹² Both accounts from Mozambique and Malawi shed light on why PlayPump proponents may have mistakenly overestimated the enthusiasm for PlayPumps among children.

When the children were not interested, women would try to operate PlayPumps in order to collect water but it was exhausting for them as well. “It turned out to be very heavy to operate the pump.”¹³ Users in Mozambique complained that after installation of Play-

Children operating the PlayPump



Photo courtesy of www.playpumps.co.za

Pumps, the time needed to collect water increased from 47 to 114 minutes “due to the heaviness of the pump and low yield.”¹⁴ UNICEF also raised concerns that the PlayPump was mechanically inefficient due to its short pumping stroke. Its evaluators encountered some communities that needed to continuously rotate the wheel at a high rate for several hours each day in order to collect enough water.¹⁵ The same EBC aid worker serving in Malawi videotaped the time needed for an able-bodied adult male to fill a 20-liter bucket with a PlayPump, which was 3 minutes and 27 seconds. In contrast, the individual required only 28 seconds to fill the bucket using a traditional hand pump.¹⁶

Physical limitations aside, most women did not feel that operating PlayPumps was a socially acceptable activity. “They got embarrassed where the people watching them did not know the linkage between the ‘merry-go-round’ and the water pumping.”¹⁷

In combination, these difficulties had the unintended consequence of disrupting communal water collecting customs. Individuals in rural villages would traditionally collect water together and help each other. “In all communities visited, [the evaluator] found that women [were] now pumping alone without supporting each other... women [pumped] alone only as much to fill their own jerry-can,” which left “pregnant women, elderly, disabled, and sick people without water because they [were] not able to join in operating the pump [which was] too heavy and provoked back pain.”¹⁸

In addition to these design problems, PlayPumps also faced user acceptance issues that stemmed from an implementation strategy that was not viable. Many rural communities were already satisfied with the performance of their traditional hand pumps. A significant proportion of community stakeholders felt that PlayPump International had not provided a technology choice between the PlayPump and traditional hand pumps and had not adequately consulted them on site selection for PlayPump installation.¹⁹ There

were numerous reports of PlayPumps being hurriedly installed (and hand pumps removed) without full community approval.

These problems were compounded by loose accountability for installation and maintenance. The PlayPumps themselves were robust and had a low rate of malfunction compared to hand pumps. However, RoundAbout Outdoor contracted out installation and repair to “operation and maintenance” (O&M) teams. Each O&M team was responsible for 100 pumps but there was no onsite supervision or quality control system to verify proper workmanship. Because Roundabout Outdoor was in Johannesburg, there was usually significant lag time before it learned of problems. Of all the PlayPumps in Zambia evaluated by UNICEF, 75 percent carried no contact information for O&M. UNICEF found that 64 percent of communities did not know who to contact for help in the event of malfunction and 25 percent of PlayPumps were already in need of repair.²⁰ Of all users surveyed, 63 percent preferred to return to their original hand pumps, a sentiment validated by other independent evaluators.^{21,23}

Perhaps the most fundamental problem with the PlayPumps strategy was that it never targeted the right need.

The cost of installing each PlayPump system was also high. According to a WaterAid report on the viability of PlayPumps in the field, “You could provide at least four conventional wells with hand pumps and associated safe sanitation and hygiene education for the cost of one PlayPump.”²³ Both users and donors came to realize that multiple hand pumps could provide water for a larger population than a single PlayPump. PlayPumps soon developed a reputation for being a wasteful investment.

When the headmaster of an elementary school in Malawi was asked in 2010 how he felt about the prospect of an additional 100 PlayPumps being installed in his country, his immediate answer was “stop immediately.”²⁴ He warned that Malawi was already a poor nation with limited resources and that PlayPumps were making life more difficult.

Perhaps the most fundamental problem with the PlayPumps strategy was that it never targeted the right need. Supplying mechanical energy to power pump handles has rarely been the primary obstacle to supplying water in Africa. There have been many more fundamental barriers to international water aid, including financing, maintaining adequate water supply infrastructure, improving water quality, and water scarcity itself. PlayPumps did not address any of these challenges.

THE SOLUTION: ACTING DECISIVELY IN THE FACE OF FAILURE AND GIVING USERS A CHOICE

After realizing the many problems that were discouraging users from accepting the PlayPumps product, PlayPump International acted decisively. Rather than persisting with an unsuccessful business model, the organization donated all of its assets in 2010 to the nonprofit Water for People. With this move, Water for People would “offer PlayPumps as part of a larger portfolio of water solutions from which rural communities in Africa can choose.”²⁵

The PlayPumps initiative was an innovative and technically interesting attempt to harness for the first time the power of children at play to increase the supply of clean water in Africa. While this particular project did not materialize as planned, the lessons are

invaluable for informing future efforts. As the Case Foundation concluded: “We learned that PlayPumps perform best in certain community settings, such as at large primary schools, but they are not necessarily the right solution for other communities. And more broadly, we learned that however creative PlayPumps might be, they really are just one element in a larger portfolio of possible solutions that can be tailored to meet the safe water needs of specific rural communities.” The report continued: “Low moments [require] fresh, new thinking and important course corrections. But if the philanthropic sector is transparent about mistakes and lessons along the way, and adapts as the situation calls for, hopefully we’ll all end up a little wiser and a little closer to solutions that can more effectively address the daunting challenges of our day.”²⁶ ♦

NOTES

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