

# HOW IDE INSTALLED 1.3 MILLION TREADLE PUMPS IN BANGLADESH BY ACTIVATING THE PRIVATE SECTOR : THE PRACTICAL STEPS

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## THE ROWER PUMP PHASE

IDE's work in manual irrigation in Bangladesh began in 1984 not with the Treadle Pump, but with the Rower Pump, designed by George Klassen as a volunteer in Bangladesh for the Mennonite Central Committee. UNICEF had introduced some 90,000 cast iron #6 pumps for drinking water, and farmers started to use some of them for irrigation. Because the Rower Pump used a rowing motion instead of the bent arm action of typical handpumps, it was much more efficient biomechanically for long term pumping. Treadle Pumps, which were beginning to be introduced in Northern Bangladesh, were also more efficient, but IDE felt that Rower Pumps were easier to manufacture in volume with high quality.

The Mennonite Central Committee (MCC) had installed some 2,000 Rower Pumps over several years, and IDE was impressed with the contribution that affordable small plot irrigation could make to improving the poverty and hunger of small farm families. We felt that if 2,000 Rower Pumps could produce a positive impact in opening opportunities for small farmers work their way out of poverty, 50,000 Rower Pumps could produce an exponentially greater positive impact. We decided to try to accomplish this by harnessing the potential in modern marketing methods by adapted to the rural context of Bangladesh.

### Steps in Scaling Up Rower Pump Adoption

- 1. Initial Organizational Meeting.** IDE convened a two-day meeting of all the key players in the preceding Rower Pump project, to brainstorm about how to go forward. We set a goal of installing 20,000 Rower Pumps a year within three years. Funding for the project was obtained from CIDA Canada in the amount of approximately 200,000 (Can) per year for three years.
- 2. Removal of Subsidies.** Shortly after setting up an office in Bangladesh, IDE established a regular Manual Irrigation Coordination Committee meeting attended by all the organizations promoting manual irrigation in Bangladesh. Some of these agencies provided free well-drilling and other incentives to lower the effective cost of Rower Pumps for poor farmers. Because this undercut the private sector marketplace, IDE used the coordinating committee as a forum to promote the gradual removal of all subsidies for manual irrigation pumps, and this was successfully accomplished over a three-year period.
- 3. Centrally Controlled or Free Market Manufacturing?** For the manufacturing of the first 2,000 Rower Pumps, the Mennonite Central Committee had worked with a

local technical school and training center, Mirror Agricultural Workshop and Training Services, (MAWTS), headed by Ikrimullah, a dynamic Bangladeshi engineer. As the demand for Rower Pumps increased, we were faced with a dilemma. MAWTS was interested in doing all the manufacturing, aided by small workshops started by its students. IDE, on the other hand, wanted to continue the participation of MAWTS and its students, but at the same time to open the market to competition. This resulted in a stalemate for the first year and a half, after which other players gradually entered the market.

4. **Quality Control** IDE implemented 100% quality control procedures in the initial phases of expanded Rower Pump promotion, to ensure that initial installations worked effectively. Full time IDE field technicians made sure that pumps were installed properly with no leaks, and made follow-up service calls.
5. **Facilitating a Dealer/Pump Installer Network.** IDE selected village dealers who sold Rower Pumps with a reasonable margin, and trained well drillers to install them correctly. At the same time, marketing staff who worked for IDE called on small farmers and encouraged them to buy Rower Pumps, and when a sale was made, it was made through the private sector dealer.
6. **Rower Pump Marketing Promotion Activities.** During the period from 1984-86, the foundation was laid for the rural mass marketing approaches that were eventually implemented for the Treadle Pump. A large billboard portraying a farmer operating a Rower Pump was placed on the main road from the airport in Dhaka, where it was seen by policy makers, government officials and businessmen on their way home from the airport. Calendars, leaflets, and posters were designed and distributed. Rower Pump demonstrations were put on. As a result of all of these activities, Rower Pump sales passed 1,000 a month in the third year of the program.
7. **Rower Pumps or Treadle Pumps?** In 1986 IDE was contacted by the Bangladesh Tobacco Company a parastatal organization that contracted with small farmers to produce tobacco. This company provided agricultural inputs and technology on credit, and was interested in including Rower Pumps as part of its inputs package. But there was a catch. Because there was a great deal of farmer interest in Treadle Pumps, and the company wanted to include Treadle Pumps in the program. In the end, IDE agreed to install 75 Rower Pumps and 75 Treadle Pumps for farmers under contract to the company.

After a season of use, the farmers reported a strong preference for the Treadle Pump. They said that it was cheaper, easier to operate than the Rower Pump, and produced more water. After looking into it and thinking it over, we decided that the farmers were right. IDE was now faced with a major identity crisis. We had seen ourselves as a Rower Pump organization, and even carried pictures of Rower Pumps on the sides of our two vehicles. Were we a Rower Pump organization, or an organization dedicated to opening access to affordable irrigation water to small poor farmers?

We decided we were dedicated to affordable small plot irrigation water for poor farmers, and changed our focus from Rower Pumps to Treadle Pumps. This meant we were willing to change again new better option came up.

## **INSTALLING 1.3 MILLION TREADLE PUMPS THROUGH THE LOCAL PRIVATE SECTOR**

- 1. Original Work Done by Rangpur/Dinajpur Rural Service (RDRS)** Gunnar Barnes, a Norwegian volunteer for RDRS, and his colleagues had designed the Treadle Pump on the sensible notion that a small farmer should be able to buy a manual irrigation pump for a price equivalent to the value of a sack of rice. The pump was tested in the shallow aquifers of these two provinces in northern Bangladesh, and farmers liked it. RDRS supported the development of 4 workshops that manufactured it, and put on demonstrations promoting its use, but limited its activities to Rangpur and Dinajpur. IDE agreed to promote the technology in the rest of Bangladesh
- 2. Learning from the Rower Pump Experience.** We did not abandon our Rower Pump promotion and about 5,000 Rower Pumps a year continue to be installed in



Gunnar Barnes, a Norwegian engineer who developed the Treadle Pump. It took several years, and contributions from many individuals, like Mr. Dev from Kurigram and Dan Jenkins from USAID,

Bangladesh to day. But when we shifted our major focus to the promotion of Treadle Pumps, virtually all of the experience in the promotion of Rower Pumps proved directly applicable to the promotion of Treadle Pumps as well.

- 3. Building an Effective Private Sector Dealer Network.** In the beginning, IDE played a direct role in the supply chain by acting as a wholesaler. We bought Treadle Pumps from partner manufacturers, conducted 100% quality control procedures, put an IDE Logo on pumps that passed inspection, selected village dealers, and took a 10 % commission for our work, which was used to cover part of our costs. We quickly learned that selecting effective dealers was an art. If the dealer was too small, he usually couldn't afford to pay for a small inventory of

pumps, and may not hold a position of respect in the village. If he was too big, on the other hand, the profits from Treadle Pump were not large enough to be attractive. We developed criteria for selecting well-respected dealers who already had a successful track record in marketing and had sufficient funds to buy a small inventory.

- 4. Mistri Training.** Well drillers, or mistris are village mechanics who install Treadle Pumps. It is critical that they install each pump correctly if it is to work effectively. If the sand layer in the well that the Treadle Pump pumps from is not developed properly, for example, the pump will be hard to operate and will produce less water. If there are leaks in the connections, the suction mechanism that the pump depends on fails. In both instances, the customer is likely to blame the poor results on the pump rather than on the tubewell installation.



A mistri installs the pump and is often a convincing salesman, as he knows the farmers very well.

To ensure proper installation and strengthen Treadle Pump promotion IDE conducted ongoing three-day training courses for well drillers with a diploma for successful completion. This program trained thousands of well drillers, who also usually become active promoters of Treadle Pumps in their village. Mistris attach themselves to one or more dealers, and make a separate contract with the farmer to drill the well and install the pump when the sale is made.

- 5. A Strong Emphasis on Quality Control in the Product Introduction Phase.** In the product introduction phase, it is essential that each installed pump works perfectly so that it can generate more sales. For this reason, IDE implemented 100% quality control of Treadle Pumps, and conducted mistri training programs, and fielded staff members who could support private sector dealers by checking on the effective operation of installed pumps and following up initial installations.
- 6. Recruiting, Hiring, and Training Effective IDE Field Staff.** IDE field staff who focussed their efforts on Treadle Pump marketing at the village level usually had at least a high school education, exhibited a high energy level and knew how to motivate farmers put Treadle Pumps in the ground. They worked with private sector dealers to build sales in each village to pass the volume threshold for sales take-off. Other field staff had technical skills that enabled them to make sure that

Treadle Pumps were installed properly, and working well at follow-up. After a year or two in a new area, the IDE field staff would taper their involvement and move to a new area.

**7. Early Trials With the Direct Provision of Credit.** In an experiment supported by SDC in 1988, we implemented a trial program in which IDE made credit available directly to Treadle Pump customers to finance their purchase of Treadle Pumps. We learned that the real cost of providing small loans in Bangladesh required an annual interest rate of 40%, and that administering credit directly was a complicated business. Although the direct credit program produced reasonable repayment rates, we decided to focus IDE's efforts on the promotion of Treadle Pumps, and to collaborate with existing micro-credit program like the Grameen Bank and Proshika to facilitate customer access to credit

**8. A Variety of Promotional Activities** After two years, we learned from market studies that most small farmers had never heard of Treadle Pumps and didn't know what they were. It clear that it would be important to initiate a number of activities to increase product awareness linked to providing specific opportunities for customers to get on a Treadle Pump and try it out.

**1) Calendars, Leaflets and Posters** Since many people in rural Bangladesh don't read it was important that each of these promotional tools was understandable without words through strong attractive visual images.



Village drama about an ugly moneylender who wants to marry the beautiful daughter of a small farmer. The treadle pump allows a "happy end". 200 performances were attended by 5'000 farmers each: more than a million farmers were "entertained".

A typical performance in an open air setting draws an audience of 3-5000, some of whom have been attracted to the event by common practice of “miking”, a rickshaw with a microphone announcing the coming attraction. A full-length feature movie costs about \$25,000 to produce and plays to an audience of several hundred thousand people each year. Because of the success of the initial movie, IDE has produced a new feature promotional movie each year.

- 4) **Troubadours** Small farmers gather at local and regional markets and bazaars, and this provides an ideal opportunity for smaller events that introduce potential customers to Treadle Pumps. One effective strategy uses small bands backing up a singer who entertains the crowd with a song about the Treadle Pump, while in the background one of the players operates a Treadle Pump on a stand. Leaflets about the Treadle Pump are distributed to the audience.
- 5) **Rickshaw processions.** Prior to the regional market, a procession of 3 rickshaws, each of which carries a portable treadle pump being pumped on a platform at the back of the form a procession through villages attracting potential Treadle Pump customers to the upcoming event or demonstration. At the same time, the upcoming event is announced by microphone.
- 6) **Give the Customer the Opportunity to Touch, Feel, and Operate the Product** A critical component of the sales strategy for \$50,000 Kodak copying machines is to give the customer the opportunity to run some copies using the copier. Exactly the same is true for an \$8 Treadle Pump. A critical component of all demonstration and promotion strategies is to have a Treadle Pump available, and to encourage the potential customer to get on the Treadle Pump and pump water with it.
- 7) **Village Dealers Play an Integral Role in Promotion Strategies.** Village dealers play a leadership role in promotional activities. For example, when a movie performance is scheduled, Treadle Pump dealers bring potential customers to the movie, publicize the performance beforehand, and are responsible for converting the interest in Treadle Pumps generated by the movie into sales.
9. **Strategically Placed Demonstration Plots.** An important component of the marketing strategy is the establishment of highly visible demonstration plots where real farmers make money from crops grown with Treadle Pumps. The demonstrations are linked with dealers, so that a dealer can take a potential customer to a small farm where a Treadle Pump is being used, and the customer can ask the farmers questions about his experience. In the early 90’s, for example, IDE established a demonstration program using 300 exemplary farmers in highly visible locations to encourage small farmers, not only to purchase and install

Treadle Pumps, but to provide critical information about diversified high income crop strategies that could optimize their income.

**10. Is the Treadle Pump Project Too Single-Minded?** From the beginning, IDE has been criticized by the development community for being too narrow. Our single minded focus on putting Treadle Pumps in the ground flew in the face of integrated rural development practice, and our support of the profit making private sector generated criticism from members of the development community who often saw businesses as major contributors to the oppression of the poor. In response, we have pointed out that poor farmers are entrepreneurs themselves, and when they double their income, they can implement their own integrated rural development programs. At the same time, we have been willing to broaden our approach when it appears likely to be in the interest of our small farmer customers to do so.

**11. IDE Directly Participates In Only 25% of the Treadle Pump Marketplace.** An important factor in making the private sector supply chain for Treadle Pumps economically sustainable is that for most of the time it has worked in Bangladesh, IDE has been involved directly with only 25% of the private sector players in the market. Our role has been to facilitate, stimulate, and shape the market, but as soon as a vigorous private sector marketplace for Treadle Pumps was established, it was impossible, much less desirable, to control it.

For the first four years from 1984 to 1989, IDE was in a much more controlling role focussing on 100% quality control. By 1989, sales had risen exponentially to 60,000 per year, and IDE had handed over its direct role as a wholesaler to private sector distributors. 50% of the marketplace now consisted of new producer/dealer networks that entered the marketplace without IDE's involvement because they saw an opportunity to make a profit. After 1989, the part of the marketplace without IDE's direct involvement stayed at 65%-75%.

**12. Issues of Quality and Affordability in a Mature Market** One type of new market player was the small, fly-by-night copycat who made a few hundred very poor quality pumps that failed after a week or two, and disappeared before customers realized they had been fleeced. IDE quickly learned that it was impossible to control these fly-by-night copycat operators. It was possible, however to educate customers to differentiate between high and low quality products, and make an informed decision about their purchase.

But some of the small producers made a very constructive contribution to the marketplace. They introduced Treadle Pumps that lasted two years instead of the seven years of the high quality pumps, and sold at a significantly lower price. We learned that these lower standard pumps were the product of choice for many thoroughly informed customers, and this forced us to expand the product line we promoted.

**13. Defining Three Levels of Quality Standards for Treadle Pumps.** From 1989 on, IDE promoted three different quality levels of Treadle Pumps in Bangladesh, based primarily on the thickness of the sheet metal used to produce the pump. The cheapest model used 18-gauge steel, was rated by IDE to have a two-year life, and was the cheapest model recommended by IDE. The most expensive model had an expected life of at least 7 years. To our surprise, the cheapest, 2-year life model instantly captured about 50% of the Treadle Pump market, and has remained the highest volume seller.

After re-examining our assumptions, we came to the conclusion that once again, the farmer was probably right and our assumptions about quality were wrong. Small farmers in Bangladesh are always short of cash, because they have so many competing demands for it. If a 7 year life Treadle Pump is not affordable, it makes very good sense to buy the cheaper 2 year life pump, and use the \$100 to \$500 new net income it generates to upgrade at the end of two years. We concluded that it was important to introduce several levels of quality and price for products we promote, and to simultaneously implement educational initiatives that support the customer's capacity to make an informed choice

**14. Lowering the cost of the tubewell.** While IDE's main efforts focussed on the Treadle Pump, two-thirds of the price of \$25 for a Treadle Pump installed on a tubewell comes from the tubewell and not from the pump. Because affordability is so critical to small farmers, we looked for ways of effectively lowering the cost of the tubewell.

We carried out field tests of Treadle Pumps using diameters of PVC tubing that varied from three-quarters of an inch to one and a half inches. To our surprise, we found that operators reported that pumps on one-inch tubing were easier to operate than pumps on one and a half-inch tubing! Apparently, water in the pipe in one inch tubing had to move faster between pump strokes, while the water in 1.5 inch tubing moves more slowly and tends to stop between strokes, requiring more effort to overcome inertia. The results of these tests culminated in a major product launch for one-inch tubing in Bangladesh, which has effectively lowered the cost of installed Treadle Pumps by 20%.

**15. The KB Experiment.** In the mid 90's, a group of IDE staff formed a separate staff-owned for profit company marketing Treadle Pumps and related products. The company has been successful and is now profitable, and it has expanded its product line to include the fabrication and marketing of handpumps. While the company has been successful, the 10,000 or so Treadle Pumps it sells each year now represent only a small portion of its sales. A realistic problem for the company in its transition to profitability is that the margins for Treadle Pumps are relatively low, requiring the company diversification to higher margin products to achieve economic sustainability.



**16. Influencing Policy-makers and Government Officials.** An important part of IDE's promotional activities has been to persuade key decision-makers to support the Treadle Pump program. In this arena, Swiss Development Cooperation has played a major leadership role. For example, in recognition of Switzerland's 700<sup>th</sup> birthday, SDC held a two-day Anniversary Celebration at the top hotel in Dhaka that featured the Treadle Pump program.

A premiere of the newly produced Treadle Pump film was aired, and an all day symposium on the Treadle Pump was held, where papers were delivered on the Treadle Pump by individuals like the head of the extension department in the Ministry of Agriculture. SDC donated 700 Treadle Pumps to key Bangladesh organizations to stimulate their participation in Treadle Pump promotion activities. As a prelude to the main evening ceremonies, the Prime Minister of Bangladesh pumped water from a model of the Treadle Pump installed in the hotel vestibule.

**17. Working with and through NGO's** A critical part of the process facilitating Treadle Pump adoption was the careful design and implementation of a strategy to collaborate with and support other organizations in Bangladesh who were interested in incorporating Treadle Pump projects as part of their programs. The Grameen Bank, for example, launched an initiative, which at its height installed 25,000 Treadle Pumps one year, facilitated by credit available through the organization. As part of this effort, the Grameen Bank set up their own Treadle Pump manufacturing enterprises

**18. Having the Right Product.** Bob Nanes, the IDE country director during the period when annual Treadle Pump sales broke through to 60,000, pointed out that even if a program establishes high initial product quality, implements a variety of highly effective marketing and promotion activities, and an effective a private sector supply chain, all of these activities will fail unless they are linked to an outstanding product. By a combination of good luck and good choices, the Treadle Pump has been an outstandingly attractive product for poor farmer customers.

### **THE ULTIMATE OUTCOME- OPENING ACCESS TO AFFORDABLE SMALL PLOT IRRIGATION FOR POOR FARMERS IN BANGLADESH**

Twenty percent of the 1.3 million small farmers in Bangladesh who have purchased Treadle Pumps earn a new net income of \$500 a year, and the rest have increased their income by \$100 a year or more<sup>1</sup>. At the same time, the purchase price of the cheapest diesel pump in Bangladesh has decreased from about \$500 when the Treadle Pump program started in 1984, to about \$175 for a 3 hp Chinese diesel set to-day. It is reasonable to assume that poor farmers prefer pumping by machine, if they can afford it, to working hard on a Treadle Pump. For this reason, it is also reasonable to

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<sup>1</sup> Tushaar Shah, Souci-economic Impact Study of the Treadle Pump

assume that the 250,000 or so small farmers in Bangladesh who now have \$500 a year more to spend have likely been key contributors to the recent exponential increase in the sales of low cost diesel pumps in Bangladesh.

Most owners of diesel pumps also become water sellers, or rent out their diesel pumpset when they don't need it. Since Treadle Pump owners also are active water purchasers, the 1.3 million Treadle Pump owners in Bangladesh have also increased the demand in water markets, and increased the income earned by diesel pump owners from water sales. While the resulted exponential increase in the sale of diesel pumps has produced competition for Treadle Pump sales, the ultimate impact of strong sales of both diesel and Treadle Pumps has dramatically expanded the access of small poor farmers in Bangladesh to affordable small plot irrigation water.

When the Treadle Pump program started in 1984, there was a huge gap in the market for affordable small plot irrigation devices between buckets and \$500 diesel pumps. It is likely that the exponential sales of Treadle Pumps has leveraged a corresponding exponential sales curve for diesel pumps. This, in turn, has supported a rapidly expanding water market in Bangladesh, which paradoxically has become a major source of competition in the marketplace for Treadle Pumps. The outcome of all this has been the rapid expansion of access of small poor farmers in Bangladesh to affordable irrigation water, which has been the main goal of the Treadle Pump program in Bangladesh all along.