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Pump It Up

Developing a Pro-poor Mobile Pump Market

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SUMMARY

Poor farmers need affordable and appropriate irrigation technology to improve their livelihoods through increased rice productivity and diversified cropping. After being tested and refined, the International Development Enterprises (IDE) disseminated mobile pumps in Barisal district in the coastal area of Bangladesh, where tidal canal water is readily available. The mobile pump is a more durable metal modification of the bamboo treadle pump, and it is mobile. To create a supply chain, the international NGO IDE trained and established links between a producer, dealers and installers. Public and private sector helped in creating a market. Apart from the local entrepreneurs, the Department of Agricultural Extension (DAE), the local government and local NGOs also promoted the technology, with some of the latter facilitating access to credit for farmers. Full cost of a pump was Tk 1,650 (US\$ 29). After two seasons, 157 poor farmers had purchased a mobile pump, of which 72 were made available at subsidised rate for demonstration purpose. We believe that for high volume marketing, both end users and manufacturers will need access to credit. This case study recommends strengthening and building upon existing local business chains. Developing a pro-poor enterprise for mobile pumps is as much about pumping up water as about pumping up confidence.

TECHNOLOGY

The mobile pump is a foot-operated metal device for lifting ground water or surface water from ponds, canals, rivers and streams for irrigation. But above all, it is an affordable technology for poor farmers. It can easily be moved between plots and is easy for women and children to operate (about 30% of the pumps are operated by women). The users can make simple repairs themselves. Mobile pumps can be locally manufactured, distributed and maintained, as described in this chapter.

The mobile pump competes with the diesel-operated low lift pump. But farmers say that with this heavy pump timely irrigation is not always available, as four or five farmers may compete for access at a time. With the mobile pump a farmer can apply water as needed and easily move the pump from one plot to another. Apart from its longevity and suitability for surface water, this is one of the major advantages over the treadle pump, which uses a fixed bamboo structure (see also Box 13.1).



Mobile pump



Treadle pump



Low lift pump

ACTORS

IDE, an international NGO based in the USA, has worked in Bangladesh since 1984 (see www.ide-bangladesh.org). IDE specialises in the transfer of appropriate, affordable and sustainable technologies to the private sector and facilitates rural mass marketing to create sufficient demand for a new product (IDE, 2003). This in turn acts as a stimulus to local small businesses to produce and market such products.

Box 13.1 More on the Mobile Pump

Water source: Surface water or ground water

Discharge capacity: 0.9 to 1.1 liter/sec

Pump head: Tk 1,050 (US\$ 18.5) or Tk 1,250 (US\$ 22.0) depending on diameter

Cost of accessories such as suction hose: Tk 600 (US\$ 10.5)

Lifting capacity: maximum pumping depth is about 7 metres

Irrigation coverage: 0.2 ha for rice and 0.4 ha for vegetables

Weight of the pump: 18 kg

Life span: 4 to 5 years

For example, IDE facilitated the production and marketing of the treadle pump (another manually operated irrigation device) through the establishment of 72 pump producers, 1205 pump dealers, 4000 well drillers. It has worked with over 246 NGOs. Since the early 1980s, when treadle pumps first became available in Bangladesh, about two million treadle pumps have been installed worldwide (Orr et al., 1991). It is this expertise that IDE brought to the production and marketing of the mobile pump.

The local area network for producing, distributing and marketing the mobile pump was established by IDE with one part time manager (the senior author) and one experienced IDE field officer.

The DAE and the local government helped in promotion, information dissemination and assistance in selecting farmers for demonstrations. Various NGOs (VOSD, BDS, Proshika, Caritas, BRAC and ASA) played a similar role, and added the potential of providing poor farmers access to microcredit.

The other major actors were a producer, dealers, mechanics and installers, and poor farm families in Barisal district in the coastal area of Bangladesh.

ESTABLISHING A LOCAL NETWORK

There are two preconditions for a sustainable market: (i) the existence of sustainable demand and (ii) the existence of an efficient supply chain. We developed demand through an awareness building programme and created a local production and distribution channel for the supply of quality pumps (see enterprise web in Figure 13.1).

Select suitable ecosystem

We used our existing experience for identifying an appropriate area and linked up with three villages in Uzipur upazila in Barisal district. This was the first systematic programme for establishing a mobile pump network in the coastal area of Bangladesh. Earlier on in an adjacent district, an IDE-linked producer of treadle pumps had already manufactured some mobile pumps, some of which had found their way to Uzipur. We talked with local dealers and one of the NGOs about the large potential of the mobile pumps in their locality. After all, Uzipur had ample canal water that was suitable for this simple irrigation technology. This suitability was further reflected in a review workshop with researchers, local senior extensionists and NGOs: "As surface water is available, the mobile pump was seen as

Farmers like the mobile pump, because it does not need fossil fuel and they can easily take it from one field to another. Every evening they can take it back inside their house to prevent theft.



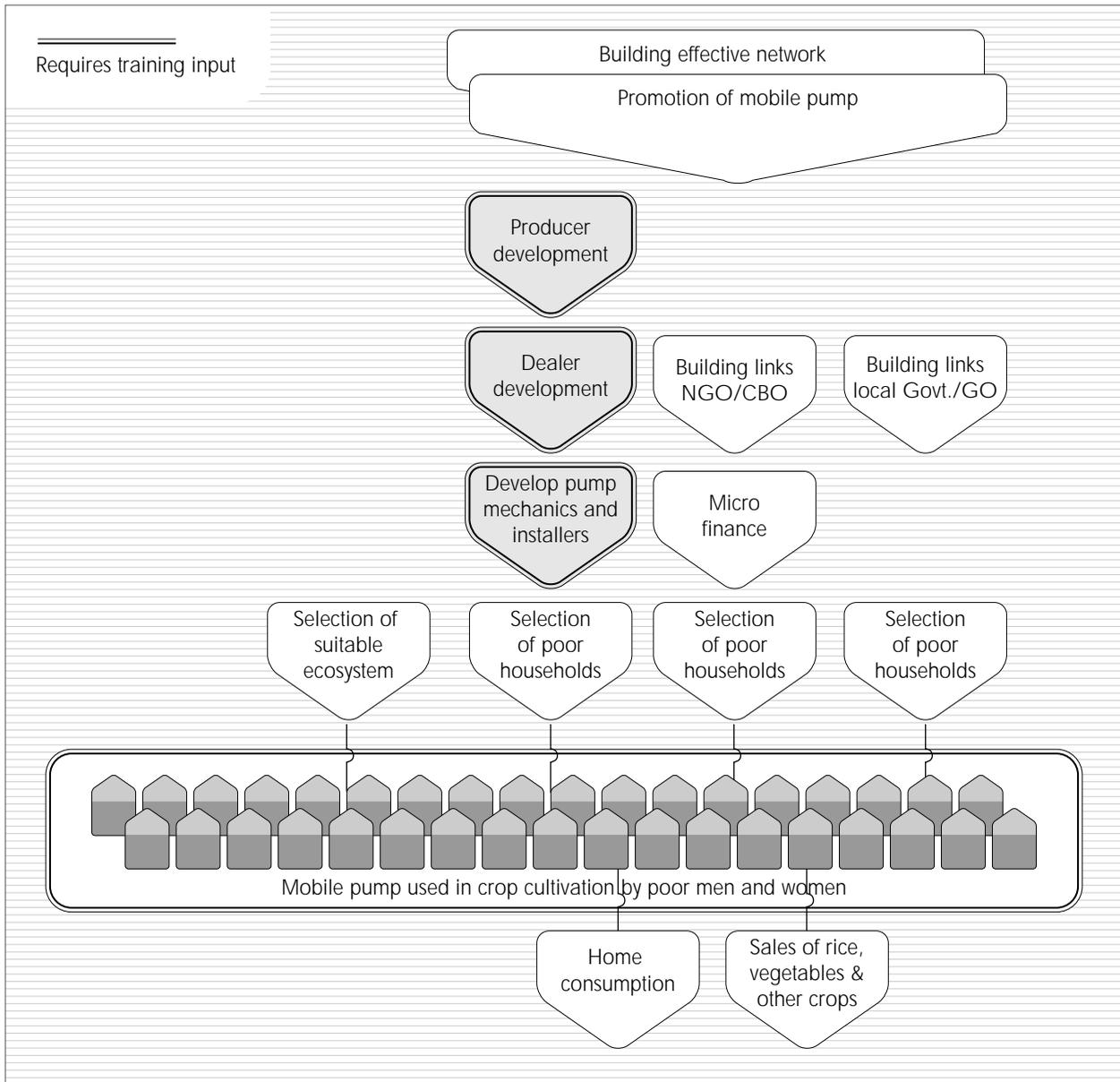


Figure 13.1 Enterprise web for mobile pump uptake for poor men and women

highly suitable for greater Barisal for cultivation of boro rice (November - May), supplementary irrigation of aman (July - November), vegetable cultivation and for nurseries" (PETRRA, 2003).

Establish an effective network

We then contacted the DAE government extension offices, the local government, and potential partner organisations that were already active in the project area. The NGOs VOSD and BDS showed most interest, while Proshika, Caritas, BRAC and ASA received awareness training.

The links between actors are essential for ensuring timely access to mobile pumps. The supply chain includes three network partners, namely producer, dealers and installers. By 2004, in less than two years, we established one producer, three dealers and 20 installers in the project area, with DAE block supervisors and six NGOs promoting the pumps. As none had any expertise in mobile pump technology, we trained about 30 people as a first step in building skills and confidence.

Each network member in turn promoted quality pumps to farmers, with two NGOs making them available through microcredit. The other NGOs mainly engaged staff in the project, because of NGO solidarity and the good relationship they have with IDE. Badrul Alam (the senior author) helped out the other organisations on several occasions, and they were happy to return a service. One of Badrul's friends, from the time he was at University, holds a senior position in Proshika. Partnerships glued by people with a common history and interest often last longest.



Hardware shops are part of any market in rural Bangladesh. But only by becoming part of a local network, dealers can see their customer base expand.

Periodic pre-season workshops and motivational meetings for farmers with the producer, dealers, mechanics, NGO and DAE staff are crucial to consolidate the network. After the project, IDE will continue providing low level support to the network through its Business Development Services programme that is operating in the region.

Promote the mobile pump

Advertising and market promotion activities are essential in creating a market. Prior to the establishment of a local producer and developing the skills of dealers and installers, only a very small number of mobile pumps were available in the locality. Essentially it was a new technology for farmers.

Market creation in Uzipur aimed at raising awareness among farmers, producer, dealers, mechanics and local organisations. This 'new' irrigation technology would provide an alternative to: no irrigation; the indigenous swing basket method; or low lift pump irrigation. The activities also enabled farmers to identify and gain confidence in quality mobile pumps so that they were not to be cheated by unscrupulous dealers.

Other promotional activities included: display of the mobile pump in the market; motivational meetings; one to one contact; farmer field days; promotion through 'miking' (using a microphone on a rickshaw to send out message, see photo Chapter 9); distribution of leaflets and promotional cotton bags; rickshaw and roadside signboards; and display in a local agricultural fair.

By promoting the pump through all channels, and maintaining satisfactory profit margins, each network member contributed to the sales (Table 13.1).

Table 13.1 Number of mobile pumps sold by network members to poor farmers

NETWORK MEMBER	SUBSIDISED DEMO PUMPS (N=72)	PUMPS WITHIN PROJECT AREA (N=74)	PUMPS OUTSIDE PROJECT AREA (N=11)
Producer	-	-	11
Dealers	23	19	-
Mechanics	19	17	-
Demonstration farmers	-	7	-
NGOs (BDS and VOSD)	17	25	-
DAE	11	5	-
Union Parishad member	2	1	-

Select demo farmers

Figure 13.1 shows that selection took place through three different means: private sector entrepreneurs; NGOs and community-based organisations; and the local government. Based on PETRRA's requirements and IDE's experience, with each of these partners we selected farmers who:

- have food security for three to eight months of the year

- own up to 0.4 ha of land
- have land free from tree shade
- have a plot near a roadside with easy access to many people
- are willing to cooperate with IDE
- agree to keep records as per project requirement
- are willing to motivate other farmers
- will use the pump at maximum capacity.

But we also took into account more personal characteristics (see Box 13.2).

Mr. Mozahar Hawlader, from Uzipur upazila, Barisal is 48 years old and poor. But he is enthusiastic, dynamic and jolly-minded and was therefore selected as a mobile pump demo farmer by Mr. Joynal Boati, one of the dealers. Although the total installation cost was Tk 1,400 (US\$ 25), Mozahar could buy it at half the price in December 2002, under the condition of becoming a demo farmer.

"I own 60 decimals of cultivable land (2,400 square m). However, due to lack of irrigation facilities my land remained fallow during the boro season (November - May). After installation of the pump and receiving technical support from the DAE Block Supervisor, I cultivated half my land with rice and the remainder with vegetables," he says. Now, Mozahar not only has rice for the whole year, but also earned Tk 15,500 (US\$ 273) from his tomato, eggplant, pumpkin, cabbage, lady fingers, puishak, lalshak and datashak. Mozahar rented out his mobile pump to his neighbours at the rate of Tk 10 per hour (US\$ 0.18), earning him Tk 600 (US\$ 11) in one season. Through his advocacy, five neighbouring farmers purchased pumps.

The additional income from vegetables allowed him to connect to the electricity grid, buy new clothes for his son and wife, repair his house and install a hand tube well for drinking water. Mozahar concludes: "My family enjoys better hygiene now, because we have access to clean water for bathing and washing, and can afford soap. We are no longer dependent on the water lord and are more confident about the future of our family. We now play a role in the development of our community and have gained the confidence of other villagers. We feel good about ourselves."

Box 13.2
I Feel Good

Barisal being a district where strict religious and social rules prevail, we first asked any potential demo farmer whether they would allow their daughter or wife to operate a pump during field demonstration days. Although all of them agreed to it, not all kept their promise. But still, our focused gender approach resulted in at least 30% of the demo farmers being women, which in turn stimulated other farmers to bring their women along to the field days. After all, their wives or children could easily operate the pump.

Identify and develop producers

As recommended by Mr. Joynal Abedin, a seller of hand tube wells at Shikarpur



The mobile pump network and mobile phones go hand in hand. Hardware dealers prefer keeping small amounts of many different items. Being part of the local network, they can quickly forward demand to the manufacturer, who lives only 15 minutes away.

bazaar, we contacted Mr. Salahuddin at the Sumon engineering workshop as the potential local producer for mobile pumps. Mr. Salahuddin already produced manufacturing grills and treadle pumps, and repaired agricultural equipment. He had a good reputation in the area. After he showed enthusiasm in expanding his business, the IDE technical team decided to train him as producer of mobile pumps. Although Salahuddin had most tools and accessories required for the production available in his workshop, he still needed about Tk 30,000 (US\$ 528) for the cost of jigs and fixtures,

dies for piston plates and a rolling machine for the cylinder. He obtained all from various suppliers, partly on credit.

In two seasons, Salahuddin produced 116 pumps, of which 11 were sold by himself directly outside the project area. The others he supplied to the selected dealers through the local network at a net profit margin of Tk 150 per pump (about 15% of the total cost price or US\$ 2.64). He earned Tk 17,400 (US\$ 306) additional income and clearly wishes to continue producing pumps after the PETRRA project ends.

Mobile pump production is a seasonal business from November to February. Working capital can be a constraint which can lead to a backlog during the peak period. This is discussed further below.

Establish local network of dealers

Dealers form a critical link. We selected and trained three dealers who were already in the hand tube well business, well known in their own locality, motivated to sell mobile pumps, willing to store a small number of mobile pumps as per demand of poor farmers and prepared to work through the local network. Although they lived in a neighbouring upazila from the producer, it was only 15 minutes away, and after we built the network, they remained in regular contact through their mobile phones.

The dealers played an important role in creating demand, in encouraging mechanics to promote the mobile pump, in training unskilled mechanics and in ensuring information flow among the network members by contacting the NGOs. But they also ensured availability of pumps and spare parts as per demand, and provided after sales service at a reasonable price. As they had a direct stake, dealers shared in the costs of the promotional activities by training farmers free-of-charge during field days.

The dealers had a capital investment of Tk 246,000 to 354,000 (US\$ 4330 - 6230) in their business, of which less than 10% comprised mobile pumps. Clearly, they sell

mobile pumps along with other things such as hardware and sanitary materials, motor parts, hand pumps and tube well pipes. But small orders of five to ten pumps were often made to the producer with a week's notice. This demand-led production eliminated the need to involve a distributor or stockist in the local network.

Table 13.2 shows that each dealer was actively marketing their latest technology, making a net profit of 160 Tk per pump (US\$ 2.82).

Table 13.2 Net profit of dealers after selling mobile pumps for two seasons

NAME OF DEALER/SHOP	NO. OF PUMPS SOLD	NET PROFIT IN TK (US\$)
Md. Joynal Boyati, M/S Bhai Bhai Sanitary	48	7,680(135)
Md. Shekander Shikder, M/S Shikder Machinery	36	5,760(101)
Md. Kazi Kamrul, M/S Zayed Enterprise	32	5,120(90)

Train pump installers

To install mobile pumps accurately and for repair and maintenance we trained twenty pump installers. The majority install pumps as their main occupation and are linked to dealers (see Box 13.3). As a rule, we work with installers who are also farming themselves and have more than ten years of experience in installing pumps, either hand tube wells, shallow or deep tube wells.

Shajahan Boyati from Mundopasha village in Uzirpur upazila is a very good tube well mechanic, renowned in the region with his 10 years of experience. He is working for M/S Bhai Bhai Sanitary shop of Md. Joynal Boyati. But in the winter season he sometimes was without work, which kept him poor. With his twenty decimals of land (800 square meters) he could hardly grow enough rice to feed his family for three months of the year.

When IDE approached him to receive training in the installation, repair and maintenance of mobile pumps, Shajahan enthusiastically accepted this technology. IDE also invited him to participate in different promotional activities as they had learnt that installers were crucial for promoting the technology. The shop sold twelve pumps thanks to Shajahan for which he got a commission of about Tk 25 or US\$ 0.44 per pump.

During one season, Shajahan installed fifteen pumps in farmers' fields and trained them in repair and maintenance. For each installation he received Tk 150 (US\$ 2.64). He also made Tk 1,200 (US\$ 21) for repairing and maintaining pumps. So his total extra earnings were Tk 3,750 (US\$ 66). Since he started promoting and installing mobile pumps, he is eating fresh and healthy food, repaired his house and his children are better dressed. He will work hard to further increase sales of mobile pumps in and around Uzipur. After all, he is the mechanic of his own future.

Box 13.3
The Mechanics
of a Bright
Future

Finance the end-users of mobile pump

Mobile pumps are especially suitable for marginal, small, landless and resource-poor farmers, but many do not have the cash to buy one and rely on relatives or credit suppliers. Provision of credit clearly had, and will continue to have, a great impact on the market for mobile pumps. In Figure 13.1 this is an activity limited to NGOs.

Table 13.3 shows that even when pumps were sold at 50% subsidised prices to marginal farmers, about a quarter required credit from outsiders. When sold at full cost, about half of the farmers took credit from NGOs (BDS and VOSD) or dealers.

Table 13.3 Sources of capital for procuring mobile pumps

SOURCE OF CAPITAL	SUBSIDISED DEMO PUMPS	PUMPS AT FULL COST
Own and relative	53	46
NGO	9	25
Dealer	10	14
Total	72	85

Training

We trained all partner organisations in the supply chain, including 72 demonstration farmers. Every cropping season, for four to five hours, we taught farmers to install, repair and maintain pumps by themselves. Old pump users trained newcomers free of charge.

During the last phase of the project six partner organisations contributed twenty five staff members as facilitators during field sessions, also without receiving any payment. This was based on the principle of reciprocal support, as described earlier on.

KEYS FOR SUCCESS

The marketing of mobile pumps to poor farmers was successful because:

- The mobile pump technology was suitable for the tidal ecosystem, which resulted in irrigation water being readily available
- A systematic programme of raising public awareness ensured demand for the mobile pump and trust in quality of the products. (This approach also proved its value in promoting modern seed to the poor, as illustrated in Chapters 18 to 20.)
- Local leaders (DAE, local government, NGOs) were convinced of the suitability of the mobile pump for their locality, and helped in market creation (most case studies presented in this book show a similar approach)
- Training local entrepreneurs added more worth to existing businesses

- The producer was recommended by a local dealer and hence an existing local business chain was strengthened and incorporated in the expanded supply chain
- The mobile pump technology was promoted to local NGOs as having potential for their clients
- IDE was experienced in the establishment of local networks for other irrigation technologies and transferred that skill to mobile pump distribution.

Clark et al. (2003) found that sales of treadle pumps by IDE in Bangladesh were 10-fold those in West Bengal, India, although these areas are physically and socially very similar. IDE India had decided to manage quality control through centralising pump manufacture and establishing retail chains, whereas in Bangladesh manufacturing was decentralised, with quality monitored through the supply of pump machine tool templates. The result was that in Bangladesh manufacturers were able to innovate with pump types and sizes, and deliver customer-tailored pumps.

DIFFICULTIES, RISKS AND ASSUMPTIONS

Availability of working capital for the producer and the price of inputs for the mobile pump are constraints at the production level. The enterprise web in Figure 13.1 does not show the link of producer to microcredit, because it did not occur in our project.

Building a large stock of mobile pumps at the beginning of the dry season requires a huge capital. Often, small producers cannot do so due to the shortage of working capital. This causes a backlog of orders by the dealers and as a result an inadequate supply of mobile pumps may occur in the peak season.

Pump production costs increased to a great extent. The major raw materials for mobile pumps, namely metal sheets and metal rods, are mostly imported and the prices doubled from 2003 to 2004. As these materials have diversified uses, they are sometimes in short supply and this destabilises the market.

A third constraint is access to credit for marginal farmers. The expansion of the mobile pump sector needs to be linked to microfinance activities of NGOs. Rather than providing credit ourselves, which would result in conflicts of interest, IDE addressed this issue by careful engagement with local NGOs from the beginning.

Access to credit for both end users and manufacturers will be critical for high volume marketing. In North Bengal, India, van Steenberg (2003) found that the sales of treadle pumps were hampered by an undercapitalised private sector. But to overcome this, they only experimented with subsidies, not considering private or public credit suppliers.

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CONCLUSION

IDE built the capacity of producers, dealers and installers who are now able to produce, market and maintain mobile pumps by themselves. Each indicated that the profit margins were acceptable. Poor women, as well as men, received training in pump operation, repair and maintenance; early signs indicate a positive impact on their livelihood. IDE strengthened the local network by linking skilled artisans to NGOs and local government. The strategic integration of the private and public sector during project implementation is key to the sustainability of the local enterprise web.

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