



Title: Irrigation technology transfer in support of food security. (Water Reports - ...)



---

## The experiences of IDE in the mass marketing of small-scale affordable irrigation devices, L.A. Egan

*Lawrence A. Egan and staffs/International Development Enterprises (IDE)  
Lakewood, Colorado, USA*

---

[Technology](#)  
[Marketing](#)  
[Constraints](#)  
[Concluding comments](#)

---

Food security is a major concern for most developing nations. The ability to feed all its people is a desire that every country's leadership envisions as a major legacy. Hunger and malnutrition still plague millions of people.

Increased agricultural production will put more food on the table, decrease hunger and bring food security closer to being a reality. One of the major ways to increase agricultural production is to provide irrigation in areas hitherto not irrigated or to provide dry season irrigation to areas that only grow crops through rainfed irrigation.

A number of irrigation technologies exist: drip, sprinkler, deep tube wells, shallow tube wells, low lift and mechanical pumps, wells and dams. These technologies are all part of the solution. This paper examines one solution - low lift treadle pumps, which work from tube wells or standing water sources.

The introduction of affordable, small-scale, sustainable irrigation technologies requires two elements: suitable affordable technology and a successful mass marketing strategy and programme. Both elements are essential. Both require time, constant effort and continuing evaluation. One without the other will not produce the desired result. Technology without a mass marketing programme will not reach the vast numbers of small farmers who need water for irrigation. A marketing programme without the right technology will not accomplish the task either. A successful programme requires a workable amalgamation of the two elements.

### Technology

The technology of small-scale irrigation pumps exists and has proven successful in various parts of Asia, Africa and Latin America over the last fifteen years. There are various types of pumps, each with a specific use. Using the correct pump is a major part of a training programme for both farmers and technicians. [In north Viet Nam people did not need an irrigation treadle pump but a cast iron hand household pump for drinking water and supplying water to small household gardens. Quantity of water was not an issue nor was prolonged daily use because of the small plots and year round minimal rainfall. Demand was for cast iron pumps despite the fact that the treadle pump were better and less expensive.]

Treadle pumps come in various types, sizes and are made of diverse materials. The three most common types of treadle pumps are:

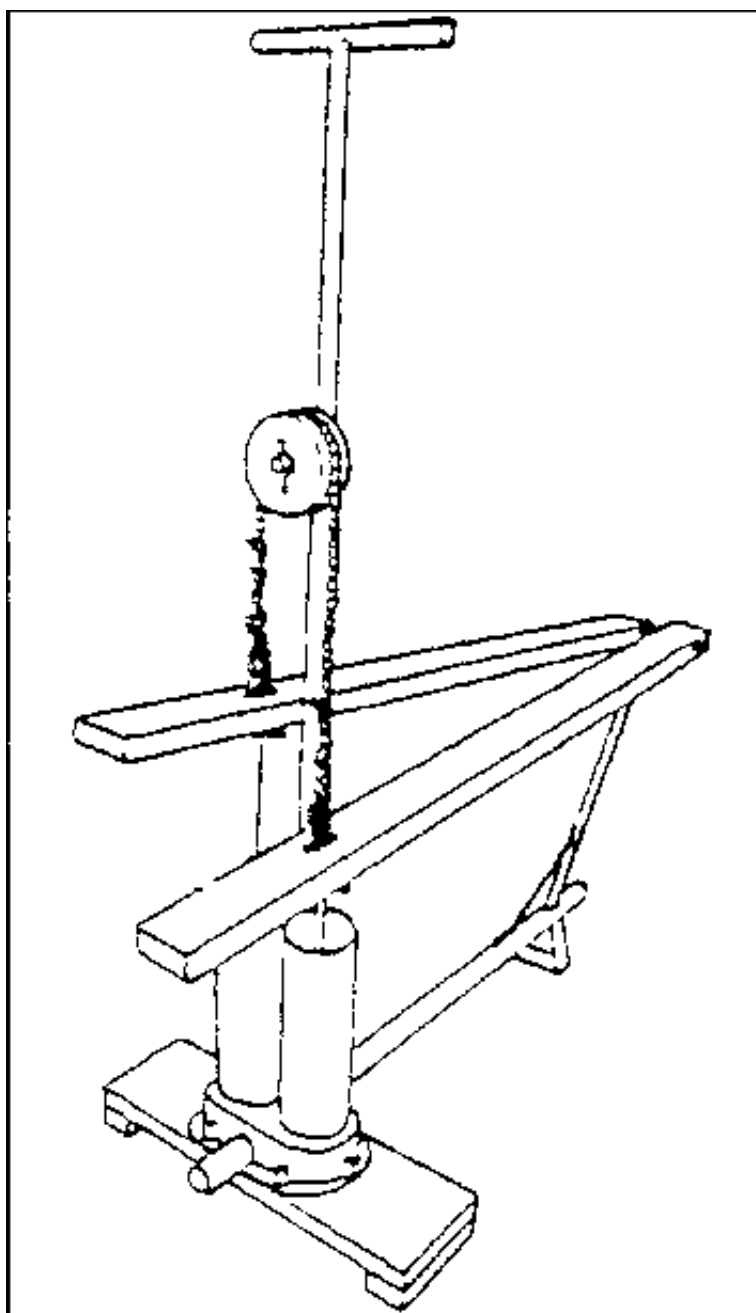
### **Treadle pump attached to tube well**

There are many models and sizes of this basic low lift pump. It may be made of various materials: sheet metal, plastic or cement. But all models and types basically irrigate 0.2 - 0.4 ha of vegetables or grain. The static water table must be within 7 metres of the surface.

The most common size is the treadle pump with 9 cm twin barrels. This pump produces approximately one litre a second or 136 litres a minute from a depth of 7 metres. Larger diameter 12.7 cm barrels produce more water but will only lift from 5 metres.

While this pump is normally attached to a tube well, it may also be used with an open well in dambo and other areas.

### **Complete treadle pump**



### **Portable river pump**

This is the same treadle pump described above with a slightly different configuration for people who have a year round source of water (such as a river, lake, pond) and require a lifting and allocation water device. The pump is portable and can be moved from one location to another. It is ideally suited for areas where the soil or water tables are unsuitable for tubewells and where constant surface water sources are available.

Generally if a tube well model and a river pump work in the same area, over time the tube well model is a better choice. This choice is due to price and the availability of a constant, certain water source throughout the year.

### **Pressure pump**

This has been successfully used on a small scale in West Africa (Nigeria, Chad, Senegal). There are several types currently used in small-scale demonstration projects in Zimbabwe, Zambia and Kenya. Currently, the Bielenberg version seems to be the best, although there is another version being developed in Kenya by Approtec.

The pressure pump is only needed in areas where the water has to be moved either from a standing water source or a tube well to areas uphill from the source for more than seven metres (23 feet). In many cases better land management or location of wells would alleviate the need for a pressure pump and permit the use of a normal treadle pump which can be placed at the top of the plot with a flexible tube from the pump to the water source. This advantage is important since the pressure pump costs on average 2-3 times as much as a treadle pump. However, in some places only a pressure pump will work.

### **Conclusion**

Determining the right type of technology for each situation is important. However, the major task is still to be faced if there is to be mass marketing of the technology in addition to the installation of a few pumps in a few select places or projects.

## **Marketing**

Most organizations spend the major portion of their time and effort on technology. While it is obvious that the correct technological innovation is crucial, many organizations consider the job completed once the technology is available. It is assumed that the technology will be sold without a marketing strategy. IDE's experience suggests that only a concentrated mass marketing strategy will produce a sustainable programme for large numbers of farmers.

Pumps must be marketed. The marketing process requires a sales network which includes manufacturers (large and small-scale workshops), retail dealers in various locations, teams of trained well drillers and installers and finally the customers, the farmers. The customer must be met and the utility and profitability of the pump must be demonstrated.

Even in the case of affordably designed technology, inherent constraints have often led to very poor marketing efforts. Ben Franklin once said, "the one who invents a better mousetrap will be found even in the darkest wood". With due respect to Benjamin Franklin's other contributions, such a statement is wrong: never has a mousetrap been sold without marketing.

The pumps described above (treadle pump attached to tube well, portable river pump and pressure pump) are viable agricultural products and should produce a net return of 100% in their first year of use. If the buyer requires financial assistance, this should be provided in the form of credit or an installment purchase.

Making credit available to farmers may be essential but the credit programme should

be separate from the treadle pump programme one to avoid conflicts of interest. If a credit programme for agricultural products already exists, then the treadle pump should be one more item for which a farmer can obtain credit.

Government and NGOs are viewed as helpers of the poor and it is assumed that farmers cannot or will not pay. NGOs consider the people as "beneficiaries" and subsidize the product. There is a reluctance to see our target groups as "customers". In reality most poor developing country farmers are willing to pay for an affordable technology that delivers water. Various farmers in East and Southern Africa indicated that they would sell an animal to buy a pump that worked.

These are some of the reasons why so few rural products have been marketed successfully. Whether one thinks of solar heaters or agricultural implements or bio-gas plants or family planning devices, all these goods have been targeted to beneficiaries with subsidies or without sense of urgency. The approach is one of a promotional nature rather than a professional business approach, oriented to the consumer. If the design is poor or inappropriate, change is not needed as long as the promotion scheme is in place. Consequently, subsidies are increased for the very products which do not meet the needs of the customers. Instead, the suitability of the products should be improved, but this is rarely done. This is perhaps why so many development schemes fail, as there is usually little market input.

A useful rural product must be environmentally friendly and have significant advantages over competing products. The advantage may save water or labour. Such products should also in principle increase social equity or be beneficial to society.

The treadle pump is specifically geared towards the needs of small and marginal farmers and is uneconomical for a larger farmer. However, no one can guarantee that the additional income from a treadle pump is invested in the children's education or improving the quality of life of the family rather than in non-productive activities. The social awareness of the customers may be raised through NGO or government interventions. However, these interventions are often paternalistic or are not always effective. Organizations should, therefore, develop social and gender awareness components in their marketing operations.

The following may be considered the "ten guiding principles" of a successful mass marketing programme. The emphasis here is on marketing pumps to a large number of people in a given area or country. It is not to sell a few pumps to a few people in a few selected areas or projects. The aim is to make the pumps available to as large a population as needs them. Many times an organization distributes a product in the area or to a group but often there is no large-scale marketing of the products.

### **Ten guiding principles of treadle pump mass marketing**

**Make them affordable (affordable cost):** It is unfortunate that the world's best designers and engineers focus on developing products for the most affluent 10% of the world's population. Very little is geared towards mass consumption for the vast majorities of the world's population with limited purchasing power. It is a paradox of the market economy which stresses the benefits of mass consumption that there is a high competition in the successful marketing of luxury items for the wealthy few, whereas little is done to explore and penetrate rural markets with products which poor people can afford.

In Zimbabwe and other Eastern and Southern African countries, often more is done to provide agricultural implements for the large scale plantation farmer than for the poor individual smallholder.

A distinction is often made between durable and consumable goods. A durable good is one which costs several months salary or more than US\$ 200, whereas a consumable is one which costs less, usually under fifty dollars. These figures apply to developed countries. In Africa the figures will be less. A treadle pump is a durable

good for a farming family

One of the most important elements in the success of the treadle pump is that the cost of one installed should be less than US\$ 50. This has been the experience in Asia. Fifty dollars is a significant investment for any rural family. During a two-month visit to Africa in 1996, the author after discussions with farmers in four countries, concluded that approximately US\$ 50 was also a comfortable range for African farmers. The crucial price needs to be determined for Africa, but until then US\$ 50 is a useful estimate.

**Sell to individual farmers (target group):** Another guiding principle is that the individual farming family is the prime customer. There has been a tendency to market technology to groups of people or communities. This distinction has been made because of cost and local communal systems. However, in some countries of South East Asia where there is a long local communal tradition, the individual farmer seems to want to control his or her own destiny. The farmer wants his or her own pump. Communal irrigation pumps are not popular. Deep tube wells in Asia have generally failed because organizing forty families to share the water does not work in most cases.

**Do not give subsidies (non-subsidized):** A major constraint for NGOs and governments is their implicit tendency to operate non-profit organizations. This tendency leads to a top down, subsidy driven approach, which views the "target population" primarily as beneficiaries rather than as customers. "Beneficiaries" perceive governments and NGOs as "free" delivery channels and consequently no-one would be willing to pay.

There is a tendency for urban bureaucrats, technical experts or politicians to make decisions for the farmer. The experts pretend to know what is best for the poor uneducated farmer. If the product is given to farmers they will not complain, even if it does not meet their needs. However, if the farmer has to pay for the product, it quickly becomes apparent whether it is needed. If it is not needed the farmer does not buy the product.

While NGOs may subsidize different aspects of its operation, the point is that the farmer has to buy the pump rather than receive it as a free gift.

**Sell a viable product (viability):** Any product which does not have a fast payback period is not viable. If the economic returns are only marginal then poor people will not invest money or effort, nor will they take the risks to adopt the technology. Returns must be sizeable and visible. As a general rule the pay back must be less than one year and product durability should be five times the payback period.

**Use local manufacturers:** To ensure long-term viability, spare parts availability and replacement pumps local manufacturers must be a part of the project from the beginning. Importation of the first 100 or so pumps is necessary but after that dependence on imported pumps or parts is not viable.

Durability and quality control are essential to this process. In the beginning quality control requires a major expenditure of effort and time. There is always going to be a tension between quality, price, demand and durability. There is no perfect solution to resolve this tension.

There must be more than one manufacturer to avoid lack of competition and one entity determining price. Hence IDE's current work in Zambia with manufacturers. It is also crucial that there be manufacturers who can make pumps available once people's expectations have been raised. [However, there are some cheap poor quality pumps in the market that only last one season or one year. Although these pumps do not fulfill quality control criteria, farmers still buy them. As the pumps are paid back in a three or four months and provide returns in the 300% range, the farmer can throw the pump away and buy a better one for the next season. This is due partly to the fact that the tubewell materials and installation cost more than the

pumphead and last indefinitely. The pump head is the cheapest part of the investment.]

**Work with the private sector:** While NGOs and government entities have a tremendous role to play in promoting the pump, ideally pump manufacture should be in the hands of the private sector. Multiple and preferably small workshops can be the mainstay of a programme. This involvement of the private sector also supplies jobs for the local economy.

In reality only private sector entities will devote the time and energy to establish the network of dealers and well drillers since they are vital to the profitability of the enterprise. A private sector based project will go out of existence if it does not succeed. The private sector does not concern itself with blame laying if something does not sell, but rather tries to solve the problem as its economic existence depends on being successful.

A private entity also views service as a vital part of its work. If service and maintenance of its product are not available then word spreads and future sales are in jeopardy. The private enterprise does what is necessary to ensure success.

Government agencies and NGOs associate failure with experience and move on to the next project. Their existence does not depend on marketing.

**Develop a critical mass:** Experience has shown that sales increase exponentially, once market penetration has reached a critical mass. It is a well-known that farmers do not buy anything unless they have seen it. The best salesman for a pump is still the neighbour who has bought one.

It appears that somewhere between 20-50 pumps in a large village creates the critical mass at that level, or in a number of villages in an area or district.

**Advertise:** Professional type advertising and use of the mass media is vital. Besides making the product known, it also creates the image that this is a class product and not some inferior one. In Asia IDE has used videos and even soap operas to reach the wider marketplace. They have been very successful. However, the dealer network is crucial since farmers quickly get frustrated if they see or hear about the pump but it is not readily available. This is why one has to be careful about raising expectations and not being able to fulfill them. Farmers often say "You are the third (or fourth or fifth) group who has visited and talked to us. When is someone going to do something."

**Provide service and maintenance:** This is an area that cannot be over-emphasized. Ongoing maintenance and product improvement is essential for the long-term viability of pumps. If the farmer knows that when something goes wrong there is someone to whom he can turn for help, his confidence increases. If the product is guaranteed and service and maintenance are available, then the farmer becomes interested and will purchase.

**Have a coordinating agency:** There is a need for an organization, preferably an NGO, to take the lead to ensure that the pumps are manufactured and marketed. Various NGOs and government agencies will have a major part in promoting and marketing the pumps, but they need a single entity which will: a. ensure that the pumps meet the minimum specifications; b. train staff to market, install, and repair pumps.

Unless there is an organization dedicated to mass marketing as its exclusive objective it will be impossible to mobilize the efforts of all the government and NGO groups. There is a need for a responsible entity which has a narrow, focused concern of affordable irrigation products. The organization ceases to exist if it does not sell pumps.

However, a pump programme will always be part of another NGOs and government

programme, whether for increased agricultural output or income generation. These groups need pumps that will be off the shelf items for them. There is also a need for the corporate mentality and ethos among its members. The local effort needs the support and experience from the national and international organizations.

What is needed is a focused, market driven, rural marketing entity with a human face but with organizational horsepower to reach out on a large scale. Such a body has market economy experience and a sound research and development base for continual development and service. This organization can cooperate with government, other NGOs, agencies and private sector players.

## Constraints

### Lack of supply channels

In most countries moving from command to market economies, there is a lack of systematically targeted markets for agricultural implements. In the past one entity produced something and another distributed it to the beneficiary.

Experience with the treadle pump shows that a genuine interest and motivation to active rural marketing must be present, as opposed to the passive attitude that many companies use in focusing on government supplies in the past. Building rural marketing structures for low-cost products does not appeal to many due to costs and more lucrative alternative investment possibilities.

Smaller populations, higher material and labour costs in Africa will heavily affect the price of the pump and also adversely affect the supply chain.

### Lack of manufacturing marketing experience

Research and development capabilities are very limited and research is often not customer-oriented. Research and development is useless unless driven by the needs of the users. Many manufacturing entities are used to being distributors rather than marketers to customers who can freely choose between different types of the same product. Rather the manufacturers have supplied the only product available and it has usually been a subsidized one.

### NGOs

NGOs usually have difficulties in disseminating products on a large-scale. They tend to perceive their target groups as beneficiaries and will not charge for their services. NGOs are motivated by idealism and ideology. Their zeal to help and do something good is usually incompatible with cost recovery and profit. At times they have an anti business mentality.

### Government

Government entities have the same approach as NGOs. In many transition economies the bureaucracy is overwhelming with political influence which leads to paternalism. Government officials often think they have the answers and know the farmer is unwilling to pay for something. Discussions with farmers often reveals the opposite.

International funders as well often have the same attitude. Bilateral funding often slows the process down because of its non-market approach. If funders, government and or NGOs are heavily involved, farmers have a perception that this will be a handout programme and will tend to wait before they buy.

### Private sector: short term and for the few

Private sector marketing has concentrated on short-term profits and tackled the easier tasks first. They have not made the cumbersome task of rural marketing a

priority. Sophisticated urban consumers appear to be an easier market than conservative, slow to buy rural consumers.

### **No wholesale or retail produce marketing networks**

At first the additional crops grown can be consumed by the growers or sold in local markets. However, as more and more farmers begin to use treadle pumps the amount of additional vegetables and grains produced needs to be marketed. Usually the most remote farmers are the first buyers of pumps. They need roads and a rural marketing network to sell their excess produce.

### **Donor ambivalence to market approach**

Donors and other entities often profess to be interested in promoting the private sector and private marketing efforts. However, market principles and holistic ones are not the same at all times. Some hindrances seem to prefer to have fifty pumps with community participation and involvement rather than a thousand pumps installed in a market context. This preference is a philosophical/theological issue. While one does not have to take either side of the issue it is good to at least recognize its influence. While succeeding in getting pumps on the ground, the market approach does not always satisfy the ideological need for holistic and integrated development required by NGOs, donors and governments.

## **Concluding comments**

Today in Bangladesh there are more than one million pumps in operation. If each pump is able to generate US\$ 200 - 500 in additional wealth each year (as various independent evaluations have shown), simply by adding one winter crop which would not be grown otherwise, the concerned small farmers in Bangladesh create an extra value added equal to a quarter or half a billion dollars of agricultural GDP. This additional GDP is more than the whole modern industrial sector produces. Each farmer can grow 2 more tons of rice a year which translates into an additional 2 million tons out of 15 million tons which are grown annually.

Based on IDE's initial assessment and work in various parts of Africa, it seems clear to IDE that the potential in many parts of Africa is great. There are many areas where the existing technology can be used. In others some adaptation is needed. Generally the lesser populations will reduce the individual country mass market but selling 100 000 pumps over 5-10 years in a country with a ten million population has the same effect as selling a million pumps in a 100 million population country. But the same principles of mass marketing are involved in a country of ten million or one of a hundred million.

This paper has tried to describe the key elements of a successful mass marketing programme for treadle pumps. It is based on IDE's experience which has resulted in over 1 million pumps being sold and installed in five Asian countries in 12 years. Mistakes have been made. The paper tries to explain the reasons for success and the lessons learned. None of it is infallible and the methods can be improved. IDE would be eager to hear from others and share experiences so all can be more successful in raising the quality of life of poor rural people.

