The Nicaraguan rope pump

by Peter Sandiford, Hans Alberts, Juan Guillermo Orozco, and Albert Gorter

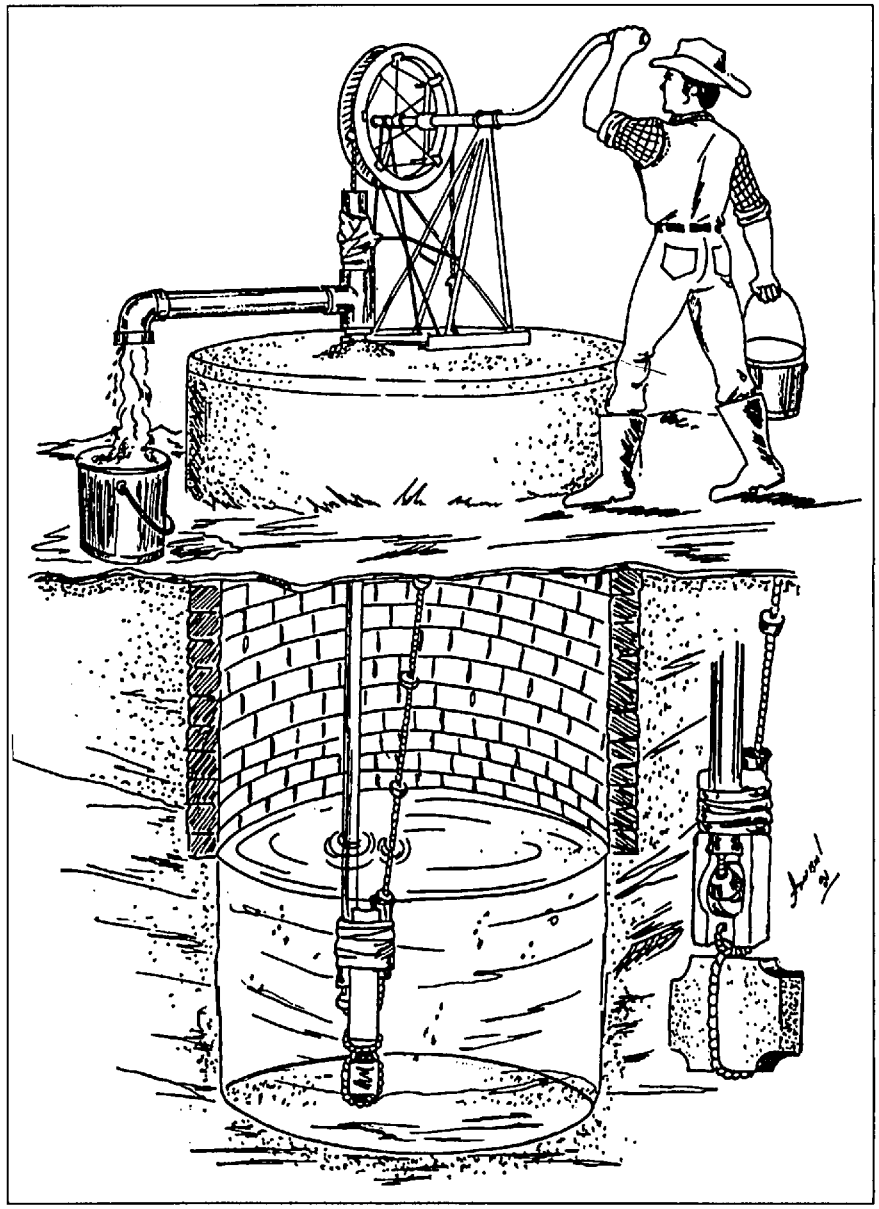
Despite numerous setbacks, the rope pump's development in Nicaragua has finally fulfilled its promoters' expectations. Even pumps installed during an emergency in an area without access to spare parts are still working.

ALTHOUGH THE FIRST rope-and-washer pumps appear to have been introduced into Nicaragua about 20 years ago, it was not until 1983 that a Belgian technician named Jan Haemhouts seriously began to develop the rope pump in Nicaragua. He had been involved with a peasant self-development project in Haiti in which the rope pump was one component, but the political situation there finally made further work impossible and he left the country. He believed that the rope pump, a technology that could be produced by peasants themselves, could serve as a catalyst around which the people could organize themselves to resolve their problems and improve their lives. His experience in Haiti, however, had convinced him that such a process could only be successful when set within a supportive political environment.

He turned instead to revolutionary Nicaragua, which at the time seemed to be the ideal setting to try out these ideas. He felt that before the rope pump could gain acceptance it needed to be developed to a stage where it could be presented as a highly reliable yet inexpensive water supply — in other words, as an appropriate technology. The development of the rope pump began in Nicaragua at the Appropriate Technology Research Centre of the Agrarian Reform Institute (CITA-INRA). CITA-INRA brought together professionals who were enthusiastically promoting a whole host of technologies including biogas, windmills for both electricity generation and water pumping, and hydraulic rams, and put them to work on the rope pump. Nicaraguan versions of the rope pumps evolved and a major effort was made to demonstrate that peasants were both interested enough and capable of building the pumps themselves. Training materials, including a video and a cartoon booklet, were produced at this time.

Despite some notable successes, CITA-INRA was disbanded in 1985, as civil war began to take its toll on the country's fragile economy. By that stage serious limitations had become evident. Too much effort had been put into the scientific development of technologies, while insufficient attention had been given to their dissemination within the ministries and the institutions responsible for their application on a large scale. Nevertheless, the experience in CITA-INRA had demonstrated the acceptability of the rope pump within the Nicaraguan peasantry, and those who had been involved with it from the early stages continued to seek opportunities for its further promotion as a component of the rural development projects being undertaken at that time.

The fact that rope pumps are still being made by local carpenters in the



The Nicaraguan rope pump has overcome numerous setbacks and is now a popular and reliable technology.

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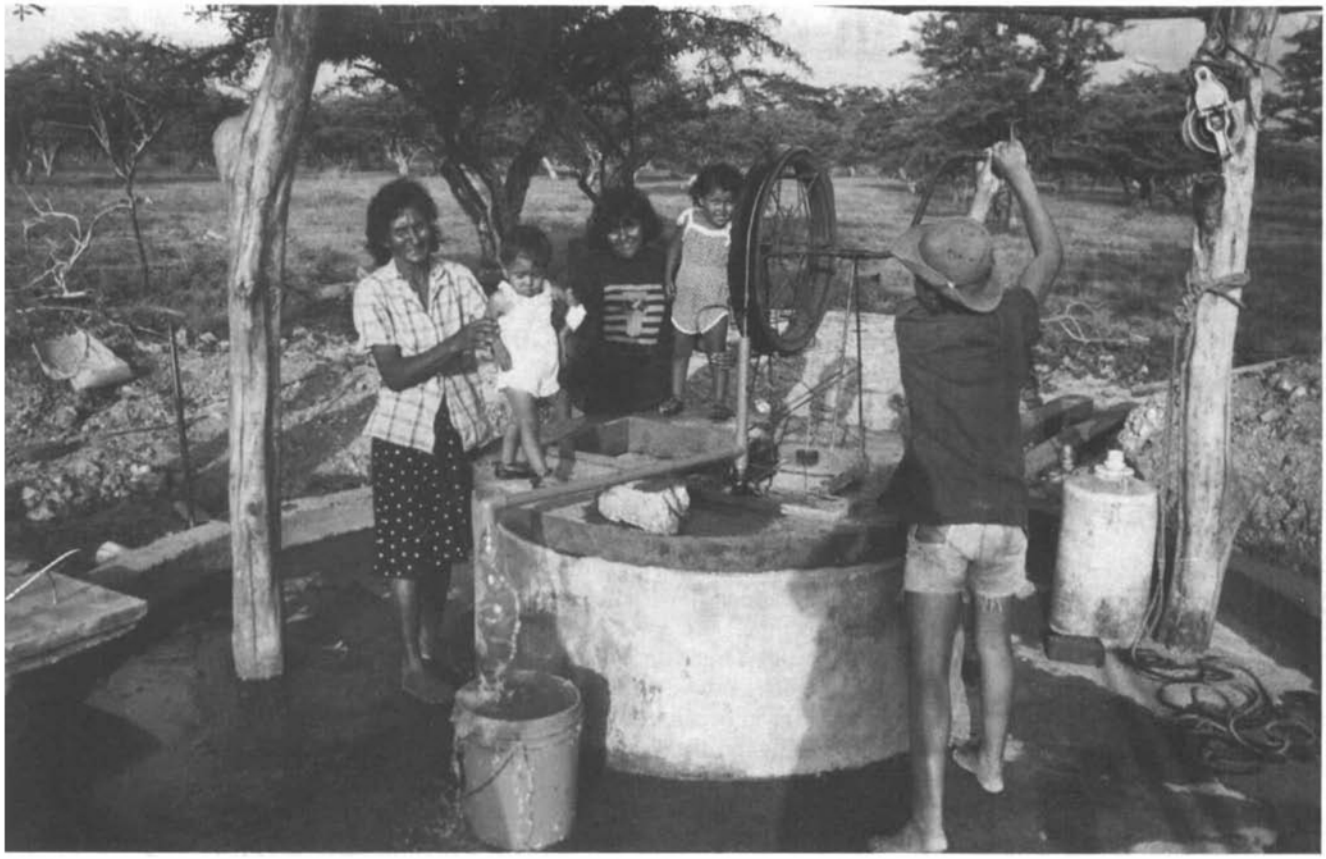


This one rope pump provides more than enough water for this Nicaraguan family.

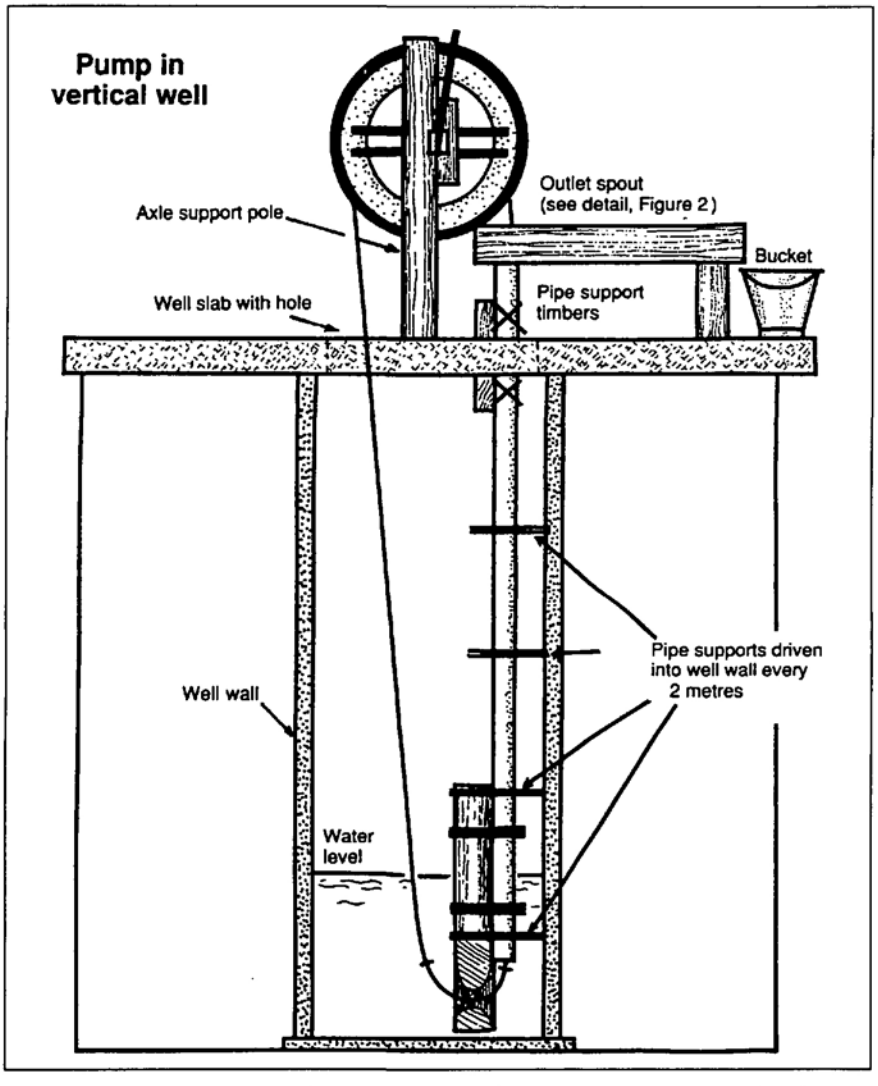


Figure 1. A typical design for a rope pump for use in a vertical well. (Figures 1 to 4 are from How to make a rope-and-washer pump, *IT Publications, 1990.)*

area surrounding the CITA-centre, without any institutional promotion since 1985, demonstrates the impact of those activities during that period. An accurate estimate is impossible to obtain because the pumps were installed all over Nicaragua and made by different people, but well over a hundred pumps must have been produced by these artisans.

Try again

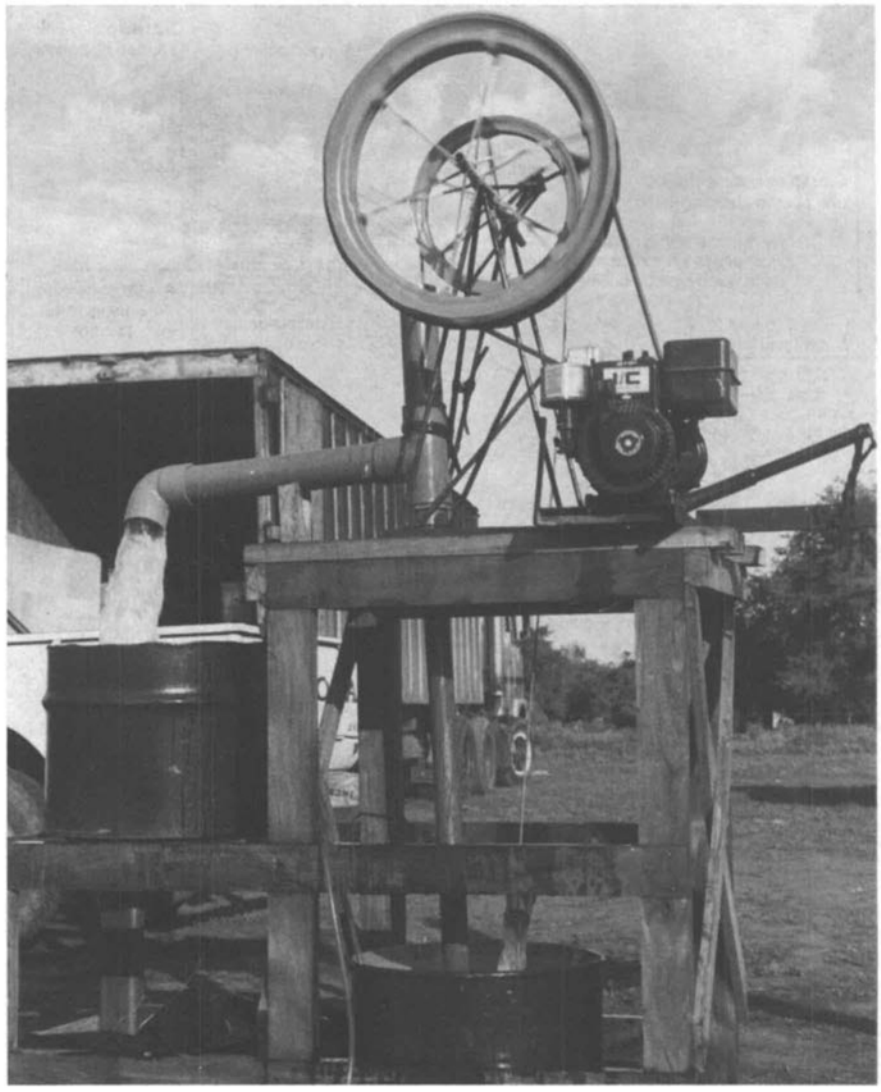
A significant turning point in the fortunes of the rope pump took place in 1987. Juan Guillermo Orozco, a Colombian sanitary engineer working as a consultant in the recently established Environmental Engineering Programme (INGAM) of the National Engineering University, together with Haemhouts, was looking for opportunities to continue to promote the rope pump in a setting without the problems of war and institutional politics which had plagued the project in CITA-INRA. They started work again with a small family-based co-operative in Monte Fresco, a village some 30km from the capital, Managua. The setting appeared to be perfect — the San José co-operative had been founded by peasants who did not have sufficient land to work on, and who had therefore taken to producing brooms, brushes, and other domestic articles. The co-operative had some equipment and staff and it seemed that, with a little training and investment, it could produce rope pumps and perhaps even

realize Haemhouts' vision of peasant self-advancement. The idea was that the rope pump would be just one, though the first, of several technologies which would be developed and then produced on a larger scale in the co-operative.

Seeding finance of about $10 000 was obtained from the governments of New Zealand and Holland. The intention was to use this money to develop, produce, and install one thousand pumps in the hand-dug wells in the surrounding area. Once built, it would be possible to study and perfect the pump.

The project quickly made some significant advances. In the initial stage a number of technical improvements were made to the prototype pumps, effectively transforming them from a 'Heath Robinson' endeavour into a truly appropriate technology, although still lacking in important respects. The project was starting to stagnate in much the same way that it had in CITA-INRA, however — over 50 prototypes had been made without anyone daring to take the plunge and start production on a commercial scale.

It was an ill wind, however, that blew good fortune to the project. In September 1988 hurricane Juana struck Nicaragua, devastating much of the Atlantic coast of the country. A total of about 200 rope pumps were sold to the international organizations which were providing emergency aid to the victims of the disaster on the eastern seaboard. For the first time, the co-operative was forced to enter into production of the rope pump on a significant scale.



The rope pump can even be attached to a small engine if large quantities of water are needed.

Work under pressure

It did so with considerable success. Interestingly, at least 75 per cent of those pumps were still functioning perfectly two years after their installation, despite the fact that no backup had been provided and that the supply of replacement parts to the isolated Atlantic coast is notoriously difficult. The causes of failure in those that did break down have now been identified and have been resolved in the more recent improvements to the design.

Unfortunately success does not always breed success. At this point, there emerged a serious rift between the philosophies of the two key protagonists of the rope pump project: one saw a role for the university in providing technical assistance and an opportunity for the environmental engineering students to learn from the practical application of appropriate technologies, while the other felt that technical assistance was unnecessary and that the peasants themselves had sufficient innovative ability to develop the pump to its final stage. According to the latter view, the involvement of the students would only detract from potential innovation. While one felt that the future for the project lay in selling pumps on a commercial basis, the other thought that this would destroy the potential of the rope pump to serve as a catalyst for peasant self-advancement. In the end, these philosophical differences led to the complete collapse of the relationship between the San José Co-operative and the Environmental Engineering Programme.

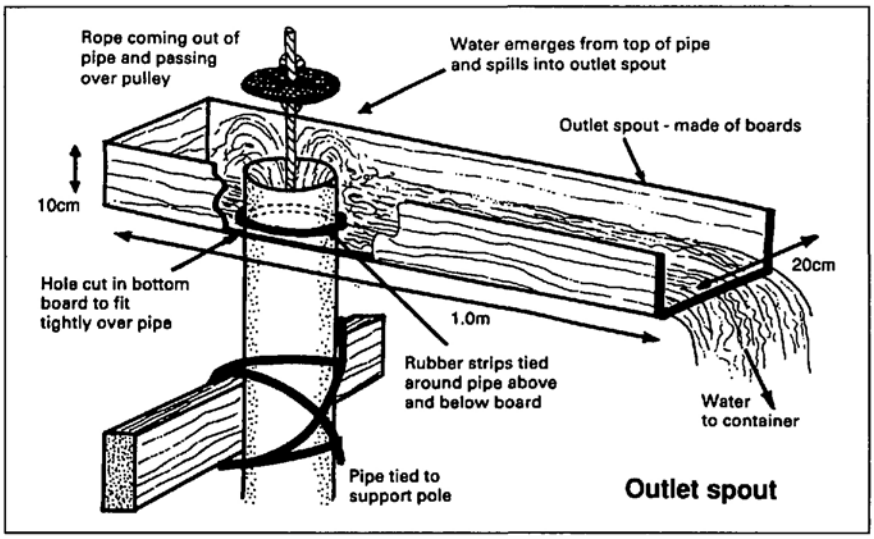


Figure 2. If used in a vertical lined well, the pump will need a suitable outlet spout. If a pre-formed spout is not available, this design can be used.

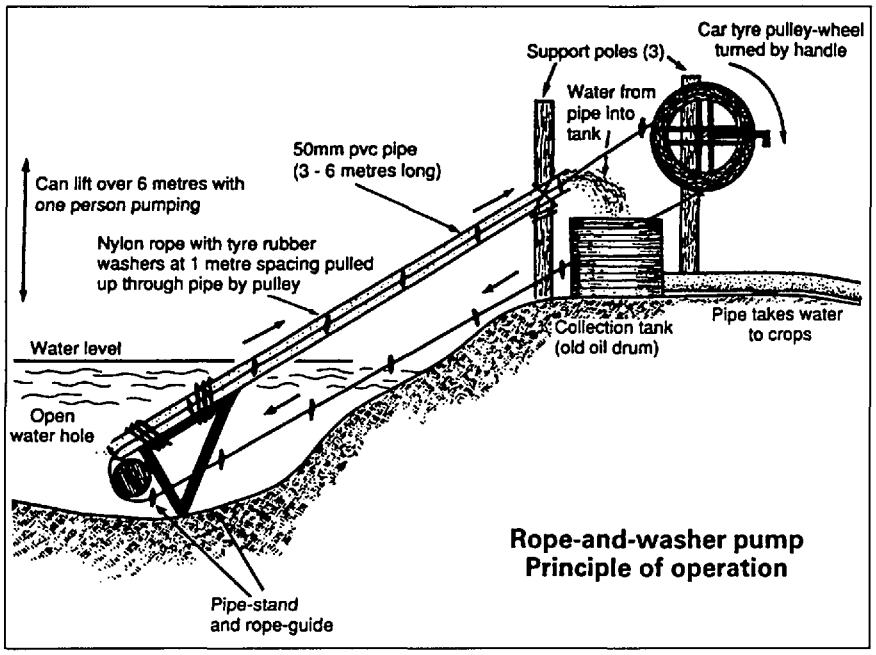


Figure 3. The rope pump can be used to deliver water for irrigation to nearby fields.

New supporters

Before that took place, however, both UNICEF and a Dutch volunteer organization had seen the potential success of the rope pump project. The Dutch group, who were undertaking a water and sanitation development project in one of the regions of Nicaragua, opted to use the rope pumps rather than the imported handpumps that they had originally intended to use. In this project the pumps were to be installed on communal wells, and the organization felt it important to ensure that microbiological quality was adequate. They therefore focused on ways to prevent the introduction of external contaminants through, for example, the use of well-head covers.

Meanwhile, UNICEF planned a new project which was to be executed by the Environmental Engineering Programme. The rope pump was initially a key component of this project, but in time it was relegated to an increasingly peripheral role as it was considered inappropriate for a university to be involved in industrial production. The university's role was restricted to one of determining guidelines and producing prototypes.

By this stage the co-operative was no longer producing rope pumps — it had never developed the skills to market the pump — and the university had effectively lost interest in working with the co-operative. Formal agreements between the co-operative and the university had failed to provide an adequate foundation for further work. Neither the co-operative nor the university had the skills required to market the pump effectively, to provide the backup services, or to manage the resources involved in production.

Unable to rely on the continued supply of the rope pumps, the INGAM/UNICEF project decided in early 1990 to discontinue promoting the pump and to concentrate on their new role in developing policy guidelines. This left two rope pump promoters without jobs and a number of disgruntled families in the area who had been promised rope pumps by the UNICEF/INGAM project.

In February 1990 an historic meeting took place between the two pump promoters, the UNICEF/INGAM's project administrator (who had also been laid off), and a Dutch physicist who had previously worked in Nicaragua producing wind-driven water pumps. The feeling which pervaded this meeting was 'let's do it ourselves — independently of any bureaucracy'.

Here started what became, in August 1992, Bombas de Mecate S.A. (Rope Pumps Ltd), a small cottage industry producing rope pumps for the Nicaraguan population. Beginning on a small scale it placed a heavy emphasis in the initial stage on promoting the pump, taking advantage of the various fairs and exhibitions about the country to demonstrate its worth and thereby obtain sales. Advertisements in newspapers and on the radio were also used. Now it employs a dozen workers and installs on average 60 rope pumps each month. As the pump became better known, the need for active marketing diminished and most sales are currently derived from the recommendations of other pump owners. Sales have increased steadily and Bombas de Mecate is now operating commercially without any external subsidies. There are plans to establish branches in different parts of the country and perhaps even outside of Nicaragua. The Dutch group has also had some success. Following the example of Bombas de Mecate, they have started to sell the pumps on a commercial basis. Some of the components of their rope pumps are sold to them by Bombas de Mecate.

So what are the lessons from this story? Why has the rope pump proved such a successful technology while other hand pumps have been such dismal failures? Why has the rope pump so stubbornly re-emerged from the institutional mires which have threatened to sink it? Surely this is the test of a truly appropriate technology — one which overcomes the inevitable obstacles which are placed in its path. The ease of operation, low cost, simplicity of maintenance, ready availability of spares, and high efficiency are undoubtedly important factors. They have perhaps ensured that the rope pump did not fade into obscurity in Nicaragua. ●

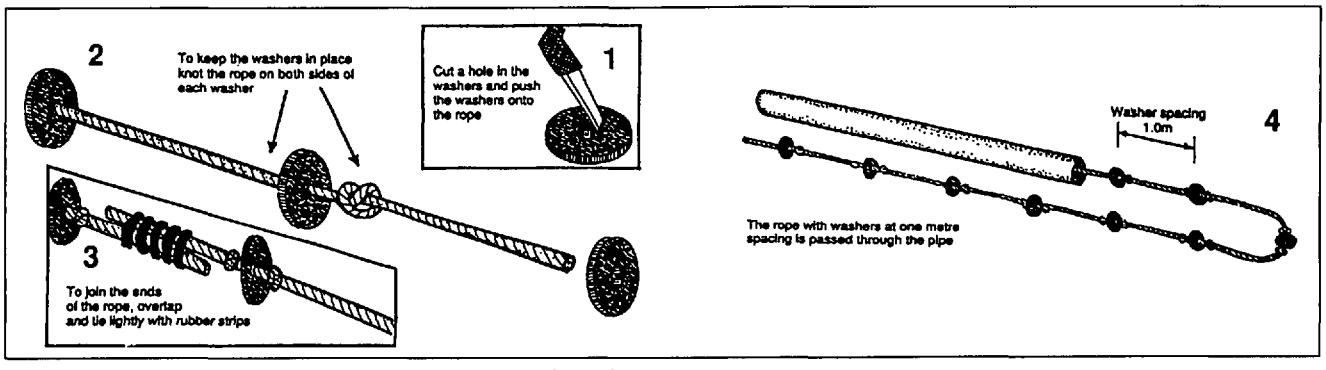


Figure 4. Tips for constructing your own rope-and-washer pump.