

# Low-cost water technologies from Latin America

## Manual well drilling

### **Baptist and Emas Bolivia. Clay/sand/small stones.**

Technology to drill 2 to 3 inch wells of 20 to 90 m deep. Drilling time 2 days/ 10 meter, and the technology becomes so popular that training programs can hardly cope with the demand. Even poorer families are paying the cost for their own waters stem.

**The Baptist** well drilling is similar to the Indian handsludging method with the difference that the valve is placed at the bottom of the drill stem. The technology is disseminated by Baptist missionaries who train well drillers and supply them with a 150US\$ drill equipment. Families that want a well form a water club and assist the well driller.

Over 1000 wells have been drilled in the last 3 years.

**Cost** : Around 2 US\$/Meter (incl.salary well driller, 1.5 Casing, filter and PVC pump)

**The Emas** method from north Bolivia is similar but uses a mud pump. The Emas pump can pump up to 30 meter above ground level. The Emas school has trained hundreds of well drillers in the last 10 years, also in other countries, and over 20.000 systems are installed.

**Cost**; 6 US\$/ Meter ( incl. Drilling, casing, filter, PVC pump, tubing and tank in kitchen)

**Users**: In both cases users are rural families using the pumps for domestic purposes but especially the Baptist pump is now being used for small-scale irrigation of 0.1 to 0.5 Ha.

### **The Stonehammer Nicaragua. Compact ground /stone layers**

A new manual well drilling method that consist of a heavy hammer hitting directly on a hollow drill head. It is being developed by the Dutch Practica foundation and field tests in India (Euroconsult) and in Nicaragua (Cesade/ ICCO ) seem promising. Compared to traditional well digging by hand, this method can save between 30 and 60% in time and cost, especially for wells deeper than 10 meter.

## Water pumping

### **The Ropepump. Central America. Domestic use**

Traditional piston pumps for rural water supply often are costly and have problems with (the organization of) maintenance. A new option, both for communal and domestic use, is the Ropepump. It can pump from wells down to 70 m deep, is very simple and has a high pump volume. The simplicity make it easy to maintain. 90% Of the pumps stay functioning, even after many years of operation which was confirmed by evaluations of IRC\* and others. The pumps are commercially produced by some 15 workshops. This technology choice raised rural water supply in Nicaragua from 10 to 40% in a few years, now being the highest in Latin America. Organisations like UNICEF, etc. now use this pump in their projects

Even if just used for domestic purposes, access to water is “moneymaking”.

This was confirmed by a recent investigation of Cesade (J v d Zee et al) which indicated that families with a Ropepump had 220US\$ more income per year than families without.

**Costs**: 30 to 90US\$, depending pump model, well depth and production conditions.

**Users**: Over 50.000 rural families in Nicaragua and some 5000 in neighbouring countries.

### **Ropepumps Nicaragua irrigation**

For irrigation up to 2 Ha there are Rope pumps driven by a motor, animal traction or windmills. The windmills are based on a Dutch design and more than 220 are installed.

A Ropepump with a small gasoline engine is being developed and will cost aprox. US\$300.

## **Water storage and low pressure drip irrigation**

### **Nica-australian tanks, Nicaragua**

**Water storage:** Combined with windmills and in some case hand Ropepumps in Nicaragua, circular watertanks are constructed.

After basic instructions these are made by users using natural or construction stones, cement and thin wire as reinforcement. A few hundreds of these water tanks have been constructed.

### **Home made drip irrigation (Low pressure) Nicaragua**

Besides the commercial available Bucket and drum kits another option in Nicaragua is using commercial available low-cost plastic hose of 0.5 to 2 inch diameter. Holes of 1.5 mm are made by hand with a small punch and hoses are connected with PVC pieces. Advantage of these systems is that the users can expand his system according to his situation. Since the pressure needed for this system can be as low as 0.5 meter, water tanks do not need to be elevated and can be directly filled up with for instance a standard Ropepump. Since holes are big, clogging is less a problem. This technology is still being tested by the Nicaragua organisation Cesade.

## **Water filter**

### **Filtron filter Central America. Domestic use**

Diarrhoea, often caused by contaminated water, is the world no 1 “baby killer”.

Water can be made potable by boiling, adding chlorine or using household water filters.

However good water filters are expensive and the cheaper ones sometimes are “complicated” to maintain or do not eliminate bacteria. A new option is a ceramic filter that was recently improved in Nicaragua. Now over 30.000 of these filters are in use in Central America and production is starting in 6 other countries. Tests in Bangladesh, Mexico and a recent USAID funded investigation in Nicaragua, (Ms Lantagne of MIT university), confirm that this filter removes turbidity and 98 to 100% of the bacteria that cause diarrhoea, cholera and other waterborne diseases. The filtering element is a porous clay “vessel” which is treated with colloidal silver (Microdyn). This bacteriostatic ingredient acts like a magnet on the bacteria. This filter meets the potable water requirements of a family of 6 persons.

Organizations like RED CROSS and UNICEF now utilise this filter in their programmes.

**Costs:** From US\$5 in Bangladesh to US\$ 15 in Kenya. The ceramic part costs 2-4 US\$

**Users:** Rural and urban families in Nicaragua, Guatemala, Bangladesh and other countries.

### **Information:**

Most of these technologies are relatively new developments, and web information is still being improved. Websites are:

Well drilling: Baptist [www.geocities.com/h2oclubs](http://www.geocities.com/h2oclubs)

Emas: [www.emas-international.de](http://www.emas-international.de)

Rope pump-Handpump model water/sanitation projects

[www.ropepump.com](http://www.ropepump.com)

Ropepumps, Motor, pedal, animal and wind driven

[www.ropepumps.org](http://www.ropepumps.org)

Low-pressure drip irrigation with Ropepumps

[www.ropepumps.org](http://www.ropepumps.org)

Waterfilters

[www.potpaz.org](http://www.potpaz.org)