Jetting

Drilling a 35 deep bore hole in one day to provide water access

Product Sheet

Manual drilling has proven to be a successful, lower-cost approach to machine drilling and hand digging. Drilling these 'shallow' water wells by hand reduces the price of a well by a factor 4 to 10, enabling rural people to have access to water independently through the private sector and development programs to expand their reach.

Context

Jetting, also called Wash Boring, Rotary Jetting and Hand Turning is a very rapid technique to make affordable tube wells. The method requires low initial investment, is easy to understand and can be transferred to local enterprises. Jetting is being used up to depths of 25-50 meters in sandy soils.

The method is being practiced in a wide range of varieties. The most simple, so called 'Farmer' or 'Rapid Well Jetting' consists of driving a plastic pipe down with water pressure from a motor pump (with no drill bit or rotation). Other systems make use of extendable plastic or galvanized pipes with a drill bit and are rotated during drilling, so called 'Rotary Jetting'. With these systems greater depths are reached and more professional potable water wells can be drilled.

Technology

Bore hole drilling must (a) break or cut the formation, (b) remove the cut soil from the hole, and (c) provide support to the walls of the hole to prevent collapse during drilling. **Jetting** is based on water circulation and water pressure. Water is pumped down the drill pipe and the 'slurry' (water and cuttings) is transported up the borehole between the drill pipe and the borehole wall. A motor pump is used to achieve an adequate water flow. Thickeners (additives) can be added to the water in order to prevent hole collapse and reduce loss of working water (drill fluid).

Advantage: Very quick in fine and medium sand formations.

Disadvantage: Generally limited to sandy soils. To prevent collapsing fluid-drilled boreholes must be kept full of water during the entire drilling and well installation process.

Limitation: A large amount of working water needs to be available on the drilling location.

The facts	
Application	Without rotation: Unconsolidated formations: Sand, silt and soft clay. With rotation (including a drill bit): stiff clays.
Range	Jetting can be used up to 25-50 meters, depending on the geology.
Costs	Costs of 30 meter bore holes vary from about US$ 100 – 2500, depending on quality, application, geology and country.
Speed	1-3 days for a 30 meter bore hole, depending on geology, tools, logistics and experience of the drilling teams.
Equipment	Equipment is relatively cheap and can be produced locally, except motor pump
Country	Main application in Nigeria, Niger, Madagascar, Chad, Senegal, Burkina Faso, Uganda, Kenya, Soudan, Benin, Sri Lanka and western countries.
Example	About half of the 43 PRACTICA-trained manual drilling enterprises in Chad are using the Jetting technique to drill high quality potable water wells for UNICEF.

Support

PRACTICA assists NGOs and governments with the design and implementation of manual drilling projects. This includes feasibility and mapping studies, hands-on training and technical support to the local private drilling sector (technical capacity building) and guidance of the implementing organizations to scale up their water supply programs. We can help get broader water access for cheaper, while building local technical and managerial capacity

The experiences

The Jetting method has proven its wide applicability in many different countries, such as Chad, Nigeria, Madagascar and Niger examples of use include:

In Chad, PRACTICA and UNICEF launched a large scale capacity building program to increase the quality of manual drilling enterprises and quality control, creating a professional manual drilling sector. Over 1000 UNICEF wells will be produced by 43 independent enterprises. The Chad example shows how manual drilling could significantly contribute to reaching the Millennium Development Goals in the water sector.

PRACTICA Foundation develops and disseminates low-cost appropriate technology in water and renewable energy in developing countries. We focus on technology that responds to local cultural contexts, can be locally produced and maintained, and leverages existing market systems.

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