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**DELIVERING WATER, SANITATION AND HYGIENE SERVICES
IN AN UNCERTAIN ENVIRONMENT**

Manual drilling in Africa; let us go beyond advocacy

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This paper presents suggestions for the advancement in the adoption of manual drilling approaches in Africa. The objective of this support is to contribute to enabling African countries attain the Millennium Development Goals with more emphasis on rural water supply. The outline of the discussion is a self interrogation of why, despite advocacy for manual drilling approaches, the rural water supply coverage trends remain unchanged. It further outlines a number of ways in which manual drilling could be mainstreamed in the current water sector programmes. Whilst borrowing so much from previous experiences in manual drilling, the paper suggests a blend of both new and adopted social marketing approaches to advance the manual drilling agenda.

Historical perspective

Manual digging to produce wells to access water has been practised in globally for ages. The *Wikipedia* reports that the oldest well, dating 7500 BC in Cyprus¹. In the bible, wells are mentioned severally in Genesis 21:19, Genesis 26:17-32. When African governments got independence in early 1960s and 1970s, the trend was to go for mechanised drilling. The justification at that time was that it was faster and more cost effective to the small populations that existed then. At that time, major drilling works were the prerogative of governments, bilateral aid agencies and faith-based organizations. In the 1990s the World Bank and other development actors introduced the structural adjustment programmes (SAPs) that led to most governments in Africa, scaling down on human resource employment and technical skills development. With the rapid growth rate experienced from the 1990s to date, it is now evident that universal water supply cannot be achieved by governments alone. The current economic recession in Europe and America has led to the scaling down of bilateral aid support to Africa, especially in development sectors such as water, health and food security. Surface water is continuously being abstracted as the most preferred water supply schemes, followed by deep boreholes with pipeline extension schemes. These two methods are quite expensive in terms of the initial capital investment and subsequent operation and maintenance. Moreover, these schemes are usually governed by very long bureaucratic procedures of procurement and tendering, mostly with politics taking centre stage. In rural areas without access to electricity, the use of diesel generators proves not only to be an expensive affair (high cost of fuel) but also cumbersome. Some development has been noted in the use of renewable energy sources such as solar and wind power but on a very low scale.

The evolution of the manual drilling sector

The push for the attainment of the Millennium Development Goals (MDGs) led to a new school of thinking that manual drilling (also referred to as low-cost drilling) could significantly assist developing countries to attain their MDG goals for both water and sanitation. Most European countries such as Sweden (SIDA), Norway (NORAD), Netherlands (Akvo/IRC), Denmark (DANIDA), Belgium (MSF) and Germany (GTZ/GIZ) to name a few, were the front liners in advocating and implementing manual drilling in Africa on a bilateral technical support arrangement. A few countries like Zimbabwe and Madagascar institutionalised the process leading to the home-grown development of the *bush-pump* and *Canzee* pump respectively that sustained manual drilling.

In early 2000s the Rural Water Supply Network (RWSN) mainly funded by the SKAT Foundation developed strategies for low-cost drilling, particularly the formation of the hand-drilling cluster group. This

was more on technical advisory role. On policy advisory, UNICEF/WHO pioneered the Joint Monitoring Programme (JMP) on water and Sanitation using country level indicators but weighted on a regional and global index. The analysis conspicuously pointed at the huge gaps and disparities amongst developing countries in terms of safe water supply and sanitation. This led to the development and the formation African Ministers Council on Water (AMCOW) as a peer support policy lobby group in April 2002.



Photograph 1. Manual drilling in Kenya (IWP)



Photograph 2. Multiple uses of manually drilled boreholes (IWP)

On the other hand, UNICEF in collaboration with Practica Foundation and Enterprise Works/VITA developed a Toolkit for the Professionalisation of Manual drilling in Africa. This was based on successful experiences in Niger, Chad and Senegal, for the promotion of a local professional manual drilling sector. Currently this initiative has been implemented in over 20 African countries with considerable success. It should be noted that countries like those coming out of long civil wars (Chad and South Sudan) or having a social capitalist autocratic leadership (Niger, Madagascar, Zimbabwe, Senegal, Uganda) seem to institutionalise the manual drilling approach much faster than politically stable governments. Other development actors such as MSF, Bushproof, Medair, CARE, Lutheran World Federation/Dutch World Service (LWF/DWS), Oxfam and the Catholic Church (CRS/CARITAS) have initiated pilot manual drilling programme and built capacity of local enterprises to sustain the approach.

Contextual perspective

Despite all these rosy developments in the manual drilling sector to compliment governments mandate for water supply and sanitation to its citizens, most of the countries in Africa will not be able to obtain the 2015 MDG goal of halving the population without access to safe water and sanitation! This is a resounding warning bell. African governments can no longer rely on western governments to develop their water sector. They need to be innovative and generate long term sustainable approaches for rural water supply. The starting point should be manually drilled boreholes. The Professionalisation manual drilling toolkit (UNICEF 2010), elaborates the following as the comparative merits of manual drilling over machine drilled boreholes.

- *Can compete with existing options* because the manual drilling techniques are a more cost effective option than a machine drilled borehole of the same depth;
- *Can complement existing options* by enhancing the opportunity of reaching out to small, remote rural unserved communities where other options are simply not economically feasible;
- The lightweight nature of manual drilling equipment means that *it affords easier transportation and access to target village sites far from main tarmac or paved roads*, which is typical of most rural areas in the country, is easier for this technology than for boreholes that need large drilling rigs or materials for concrete lined hand-dug wells
- Competent tools for the *technology can be fabricated locally*;

- *Can enhance employment opportunities for local rural enterprises* because a comparatively small initial investment is anticipated for an enterprise to begin operations;
- Manual drilling, by substituting labour for capital investment, *can contribute to shifting enterprise in the water drilling field in favour of local rather than foreign contractors;*
- Where suitable ground conditions exist, the technology *should save project implementation time* compared with concrete lined hand-dug wells and may therefore contribute to accelerating the timely realization of rural water supply programmes' objectives.

The general rule of the thumb is that, If the water table is shallow and the rock is soft then manual techniques should be favoured (Wurzel, 2001).

Which way forward for Africa in terms of manual drilling?

Mapping

Feasibility for manual drilling relies on a hydro geological suitability (i.e. rock formations), topography and previous drilling experience in the area (e.g. borehole logs of completed wells), (Wurzel 2001). Most African countries do not have an updated groundwater resource maps/database. Since the attainment of independence, very little effort has been made in updating the groundwater maps. This makes drilling in Africa a trial and error method, making it very expensive. Outdated groundwater prospecting tools and technologies such as the divination, resistivity and conductivity are still being used. Most of them lead to erroneous results, (*ibid*).

Moreover, for existing boreholes, there are no national standards of borehole logging and documentation. This makes it hard to map out areas feasible for manual drilling. It is advised that all the water point mapping activities, shuttle radar topographic mission (SRTM), and satellites, and regional geological reports be harmonized into a one-stop data reference centre.

Incorporation of the large drilling enterprises

The global market economy has in the recent past displayed a radical shift in the normal way of conducting business. To cite a few examples, the giant Nokia Company in the wake competition with phone manufacturers from the far-east, has been forced to produce cheaper phones to meet the low end market. The giant Unilever and Pfizer-Cussons group are now producing smaller quantities of their products such as soap, detergents, cooking oil *etc* in order to make it affordable even to those living below the poverty line. Ford, Toyota and Nissan motor vehicle companies in the wake of escalating fuel prices have developed low capacity engines vehicles hence making them affordable in the developing countries. Some are even running on bio-diesel as evidenced in Brazil and India.

When it comes to manual drilling, we are still stuck to post World War II, with large and bulky diesel-engine-powered drilling rigs? These are expensive to maintain and difficult to mobilize in rural areas without paved roads. In Kenya, for example, only rigs mounted on truck are registered. The logbook of the truck is the only criterion for registration. Any other rigs are simply not recognized. At the same time most government initiatives towards reducing the cost of drilling always *exclude* the contribution of large scale drilling enterprises, in their stakeholder processes. Empirically it is easier for well established drilling enterprises to scale down to manual drilling than training a bunch of uninterested villagers through grants to professionalize manual drilling. Therefore the way forward is to encourage large drilling enterprises to create small scale manual drilling units.

Capacity building

Whilst advocating for the increased uptake of manual drilling approaches, professionalization of manual drilling will also help in curtailing rogue and shoddy contractors. Regulation of the drilling industry needs to be guided by a code of practice, with the government taking up the enforcement role. There is need to build the capacity of local community based groups to take up manual drilling as a vocational career. The best approach is to use the good old diffusion principle. Identify those already in the informal sector i.e. involved with fabrication, masonry plumbing *etc.* and support them so that they can diversify. Common interest groups should not be confused with common vulnerable groups. Capacity building in the manual drilling sector should focus on the entire value chain.

Institutionalization

With varied experiences from Zambia and Kenya, it is evident that even in the water sector, manual drilling is always relegated to the periphery of other government programmes. A government technical officer would rather supervise the building of a dam or drilling of a deep borehole than conduct a community training on manual drilling. Manual drilling is viewed as what can be done when there is nothing else to be done. The allegation is that manual drilling per se is not included in their annual performance contracts. Their participation in manual drilling programmes is linked to incentives and allowances mainly paid for by NGOs. This becomes unsustainable when the NGOs pull out. To this effect, the authors would advice development partners to institutionalize manual drilling approaches in governments especially at SWAP level, before implementing the programmes. This has worked in Tuberculosis eradication programmes in the Health sector, and universal, basic, school enrolment in the Education sector. Efforts need to be directed to help the public, NGOs, and private drilling organizations to understand each others' different problems and priorities, and to encourage them to work together for the common good (Robinson, 2006).

Steps to professionalize the manual drilling sector

Introduction to bulleted list:

Rural Water Supply Sector Assessment.

- Favourable hydro geological conditions for manual drilling.
- Substantial market for manually drilled wells.
- Dynamic private sector to support manual drilling enterprises.
- National policy open to manual drilling
- Selection of Drilling Enterprises.
- Identify experienced well drillers or well diggers.
- Mechanical well drillers interested in expanding into manual drilling.
- Businesses in related field.

Training of Drilling Enterprises

- Well Drilling Techniques
- Hydrogeology for manual drilling
- Business management and Tendering
- Supervised practical field experience

Training of Supporting Businesses

- Quality control firms
- Social mobilization trainers
- Well drilling tool makers
- Pump installers and repairers

Certification Drilling Enterprises

- Nationally recognized certification
- Branding and promotion of certified drillers
- Use of certified drillers by other organizations.

Source: UNICEF/ENTERPRISE WORKS/PRACTICA 2010.

Social marketing approach

The advancement of manual drilling in Africa could be enhanced via a carrot and stick strategy. The carrot represents incentives and a conducive environment for scaling up manual drilling approaches. Previous successful social marketing initiatives like the Money MakerTM treadle pump, interlocking brick making machines and fodder chaff cutters could be emulated. The essence of any social marketing approach is to clearly articulate to the direct consumers of the product the opportunity cost of choosing one product over the other. The entire value chain for manual drilling needs to consider availability; and just like Coca cola®, should be everywhere. The stick strategy is government regulation or even self regulation through association of small scale drillers. Drillers tend to be practical, hands-on people and have even less patience with bureaucracy and administrative processes than most small businessmen (Robinson, 2006). This is further complicated by most countries considering that water drilling industry is both a high-value private enterprise and an important player in water resource development. The stick strategy should focus on careful auditing and taxation, and strict licensing and regulation.

Funding and sustainability

Without abdicating the role of government in safe water provision to its citizens, other complimentary approaches could be brought on board to bridge the funding gap for manual drilling. There is need for tax rebates for major companies investing in manual drilling approaches. An ideal example could be waiving off any value added tax on locally fabricated manual drilling tools and spares parts. On the other hand, most private sector companies have an elaborate social corporate responsibility (CSR) programmes. In most cases they will spend money on planting trees; collecting garbage on the streets, taking drinks/processed foods to some children orphanage etc. These are noble and should be recommended. However, CSR would have far reaching impacts if they were targeted at long-term strategies such as water, education and health. For example a joint lunch with orphans could be translated into one shallow well with a windmill and a drip irrigation kit for growing vegetables at the orphanage! This would virtually give them a “free lunch” every day of the year.

Water financing in Kenya

The World Bank WSP programme pioneered a WASH development loan facility about 5years ago. Two leading Kenyan banks namely Equity and K-Rep bank have been managing this loan facility under a product branded as *maji-loan (water-loan)*. Lately the Small Micro-Enterprise Programme (SMEP) – A Christian Church based Micro-Finance organization has commenced WASH facility lending for faith based self help groups. However all these approaches are anchored in urban and peri-urban areas leaving rural based groups with no alternative for financial support. In Kenya, the interest rates in commercial banks are as high as 23% with strict collateral and loan repayment options which are basically “beyond reach” of the rural based community groups. This then negates the principle of equity and the human right to water access.

In the short term “start-up seed grants/loans” for manual drilling are envisaged, but in the longer term Public-Private partnerships on an innovative business model hold the keys to sustainability.

Regional based learning and experience sharing

This paper has remained silent on advances made in terms of low cost drilling in Asia and South America. The reason is that countries in these regions have piggy-backed on ancient intrinsic knowledge sharing strategies. India, Bangladesh and Pakistan share both trade and learning ties. The socio-cultural parameters in South America (including language) has led to the fast adoption of the EMAS Baptist drilling method and ceramic candle domestic water filters in Nicaragua, Peru, Brazil and Honduras. Such regional ties are nonexistent in Africa. Blame it on trade sanctions and visa restrictions across African borders. There are currently manual drilling implementation programmes in over 20 African countries but no diffusion to neighbouring countries, yet we have the same geological conditions. UNICEF recognises manual drilling as a viable technology for rural water supplies (UNICEF 2010). As a global WASH Cluster leader, UNICEF could use this mandate to enhance the adoption and professionalization of manual drilling in developing countries of Africa. Linkages and informal networks between different stakeholders working to improve water well drilling policies and practices, including manual drilling have emerged and are active (e.g. specific exchange visits and consultation with experts in Bolivia, Uganda, Mozambique, Ethiopia, Nigeria and Sudan as well the hand drilling cluster group). They could be used for capacity building.

Name and shame

Just like we take seriously FIFA rankings in terms of Football development, a water sector name and shame initiative would go a long way in publishing those African countries with poor water supply and sanitation coverage. This could be leveraged through the African Ministers Council on Water (AMCOW), so as to rally external technical support to countries lagging behind in the ranking. So far, very few countries have honoured the *eThekwini* Commitments². Moving from the current implementation scale to wider application for all these groundwater techniques requires dedication, support, resources as well stakeholder cooperation and monitoring (Danert, 2012).

Suggestion on the way forward

This paper recommends the inclusion of manual drilling in vocational training colleges’ curriculum. The need to support Local NGOs and CBOs on any demand led training services on manual drilling cannot be

over emphasised. Where possible it is recommended that national and international manual drilling fairs/exhibitions are conducted, just as they are for livestock and agriculture. The development and aid agencies could play the lead role for national fundraising for manual drilling through the Water Sector Advisory Group (SAG) and the Sector Wide Approach (SWAP). The lobbying for the entrenchment of manual drilling in the various national legislative documents such as the Water Act, Employment and wealth creation, vision 2030 is necessary. Ultimately, the facilitation of manual drilling information sharing on a global platform and via social networking sites is recommended. The initiative of the Hand-drilling cluster group of the RWSN needs to be supported in order to lobby effectively with African governments.

In conclusion, manual drilling is a very low cost option which deserves more recognition (Danert, 2012). Linkages to other sectors like agriculture (irrigation and livestock), forestry, education (school WASH), and Health (Community/Health centre WASH) will make it more relevant and easy to sustain. The demand for manual drilling technologies will only be harnessed if the industry is professionalised, regulated and with a proven track record. The issues of spare parts and value addition to the process can only be handled once there is demand for manual drilling boreholes.

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Note/s

¹ Water wells www. http://en.wikipedia.org/wiki/Water_wells

² For more on eThekwini Commitments refer to:

http://www.africawaterweek.com/index.php?option=com_content&view=article&id=141&Itemid=162

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