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Towards sustainable handpump development in Nigeria

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NIGERIA HAS A population of 120 million based on 2002 estimates. About 60million live in rural communities of less than 5,000, and half of these in even smaller communities of less than 1,500. The country has a slow economic growth rate with GDP growing by 2.7% per year between 1989 and 1999, and a GNP per capita that drooped from US$599 in 1975 to US$310 in 1999. This reflects the poverty level in the country, which is even more severe in the rural than the urban areas. About 70% of the population now live on less than US$1 a day, and 90% on less than US$2 a day. The main economic activities in the rural area are agriculture and livestock rearing with about two thirds of the population engaged in smallholdings. The 1999 National Demographic Health Survey (NDHS) quoted in Children’s and Women’s Rights in Nigeria: A wake Up Call, put infant and under-five mortality rate at 71 and 133 per 1,000 live births respectively.

The country is noted for its two river systems: the Niger and Benue with their tributaries that drain half the area of the country. Sixty percent of the country is underlain by the crystalline rocks, 20% by consolidated sedimentary materials and 20% by unconsolidated sediments. The average rainfall of 500 mm/year in the north and 3,000 mm/year in the south recharge the surface and groundwater sources. Well yields are generally sufficient to sustain handpump operation where the static water levels are not below 45 meters. Groundwater quality is good with exceptions in some localities with high contents of iron, nitrate and fluorite above WHO recommended standards. Conventional water supply schemes (treatment water plants, reticulated borehole schemes) have proved not to be sustainable for the rural Nigeria over the years. This is due to high initial construction and operational costs, and the high technology associated with such schemes. The handpump option for the rural Nigeria is considered feasible and was introduced for the first time in the early eighties in the Imo State Water and Sanitation Project that was assisted by UNICEF. Since then, the handpump option has been widely used in all the 36 States in the Federation including the Federal Capital Territory, Abuja.

Existing situation

The current water supply coverage in rural area is nearly 39% for which groundwater source is the most widely used option. Groundwater abounds in most areas but at least half is classified as aggressive, having pH below 6.5. The handpump has emerged as one of the most cost-effective abstraction means of sustainable safe water supply in the rural areas. It is estimated that over 90% of safe water sources in the rural Nigeria are hand pump operated sources.

In realisation of this fact, the Government of Nigeria with the assistance of External Support Agencies (ESA), has undertaken several massive rural water supply programmes since the early eighties involving installation of large numbers of handpumps in rural areas to increase safe water supply coverage. This will very soon result in an increased density of handpumps in all the states of the country. The reality is that no one knows how many handpumps are installed in Nigeria! It is estimated that over 15900 handpumps have been installed over boreholes and dug wells in Nigeria. Due to poor data management in Nigeria, the percentage of functional handpumps is not known but estimated to be less than 50%. Major factors attributing to this low functionality rate are poor maintenance culture, lack of ownership, and absence of spare parts distribution chain. This paper will present issues that need to be addressed and give suggestions on improving on the present situation on ground for a more sustainable handpump development in Nigeria.

Acceptability of hand pump option

The projected per capita cost of mechanised borehole/reticulated schemes was US$455 (1994 Master Plan for Rural Water Supply) as against the per capita cost of handpump operated borehole of US$85 in 1982 which dropped to US$14 in 1989 (WES Section, UNICEF, 1989). Despite this advantage amongst others, there has been some resistance to adopt the handpump option when it was introduced on a large scale in the early eighties in Nigeria. People thought that the technology was drawing us backward and preferred the motorised/reticulated systems. The elite in communities continues to insist on the high and prestigious motorised option that often turned into ‘white elephants’ projects in the rural communities. The success of the handpump operated option in the Imo State WATSAN pilot Project led to the replication of the project in 5 additional States in 1989. By 1991, 22 States participating in the FGN/UNICEF WES Programme were already using the handpump option as a means of extracting water from shallow boreholes. The Federal Government of Nigeria, through its Directorate for Food, Roads and Rural Infrastructures (DFRRI) widely adopted the handpump option for its Rural Water Supply and Sanitation in 1986. Apart from supporting and participating in the FGN/UNICEF WES Programme for decades, the Federal Ministry of
Water Resources has in the past few years ordered thousands of handpumps (RUWATSAN 1 AND 11) for the rural water supply schemes. Through these interventions, handpumps operated boreholes are becoming common objects in the rural setting of Nigeria now. But much is yet to be done to ensure that the common rural dweller understands its actual value and accepts it as a vital implement to support provision of safe water.

**Hand pump procurement**

The various types of handpumps in use in the country are the India Mark 11, RUWATSAN 1 (India Mark 111), RUWATSAN 11 (Afridev), the direct action pumps – Nira and Tara, and the pedal pumps. The RUWATSAN11 and 11 are most widely used as the India Mark 11 is gradually being phased out. The FGN and UNICEF are encouraging local manufacturing of these two types of pumps. UNICEF in particular has provided substantial technical assistance to local manufacturers since early nineties to improve production levels and ensure availability of the pumps and spares. Despite these efforts, the local manufacturer is facing many constraints, and the local content in the handpump and component manufacture is still very low. As there is no incentive for local production of handpumps and components, importation of handpumps is less cumbersome and more cost effective. Essentially, UNICEF and FMWR import handpumps into Nigeria, mainly from India. This is so because even when local order is made, the local manufacturer imports most of the components for assembly.

The use of many handpump component options in Nigeria on a large scale, coupled with uncoordinated procurement has resulted in the fragmentation of the already limited market demand, and has also complicated local manufacturing, distribution and capacity building process (Mudgal 2002). The LGAs and communities do not know where to source for handpumps and spares even if there is demand. The State WES Projects have largely depended on UNICEF for supplies of handpumps since the eighties until 2003 when the FMWR has started moves to provide handpumps to States. Roles identified over the past years for all levels of participation (Federal Government, States, LGAs, and communities) under the FGN/UNICEF WES Programme are yet to be implemented. Due to this situation, communities, LGAs, and States are usually expecting supplies of handpumps from UNICEF, and do not own the sense of responsibility to procure handpumps, in particular, spare parts and tools from manufacturers for installation and repair.

**Community handpump management**

About 50% of handpumps installed in the rural areas of Nigeria are dysfunctional. This is an indication that there is a problem with the existing community management system for the handpump. Many factors are responsible for this amongst which are – poor programme design and implementation leading to lack of ownership, poor maintenance culture, poor handpumps spare parts distribution chain, poorly finished boreholes, absence of a cost recovery system to provide for repair expenses etc. In most cases trained personnel at State and LGA levels go straight down to communities to carry out repairs. Where the communities are not empowered to manage for their handpumps through the monitoring, provision of funds needed for routine maintenance and minor repairs, and training artisans and caregivers, optimal use of handpumps will hardly be realised.

**Handpump development**

In the mid 1980s, the Federal Ministry of Water Resources and Rural Development in collaboration with UNDP/World Bank Water and Sanitation Programme, UNICEF, Standard Organisation of Nigeria, and other agencies embarked on a handpump field testing project in Misau LGA, Bauchi State. The purpose was to evaluate and establish the viability of different types of handpumps for use in Nigeria and consequently to provide technical support to local manufacturers in the production of handpumps. The testing phase of the project was concluded in 1989 and two pumps, which met the Village Level Operation and Maintenance (VLOM) concept, were recommended for
National Standardisation. Thus evolved the RUWATSAN 1 (based on India mark 111), and RUWATSAN 11 (based on AFRIDEV) and their accessories for wide spread use and local manufacture. The report of the project recommended full support of the local manufacturers on a continual basis on production engineering, quality control and bulk purchase orders so as to create a stable in-country mass production technique for handpump manufacturing and ancillary capacity.

In the absence of long-term assurance of procurement from the local manufacturers, local industries are not willing to make large capital investment in equipment, and infrastructure, develop market strategies for marketing of product at community levels. The industries are neither assured of the economies of scale to bring the prices down. There is also no standard blueprint for a sustainable and effective handpump development project in Nigeria. Each situation requires a coordinated approach by all of the stakeholders to ensure that the handpump project reflects the true demands of all sections of the rural water supply sub-sector. Realizing these demands can involve a lot of preparatory time and effort, which was not the case in the past. There is therefore the need to ensure consistent involvement of FMWR, UNICEF and all the stakeholders. On the basis of mutual trust and in the spirit of friendly cooperation, the Federal Government of Nigeria through the FMWR has signed an aide-memoir for strategic partnership for an improved sustainable handpump project to last from January 1 2003 to December 31 2007. This is a very comprehensive document that details the objectives, strategies, the way forward, roles and responsibilities, programme principles, and a plan of action.

**The way forward**

To ensure a sustainable handpump development in Nigeria, all stakeholders – the Federal Government through the FMWR, State WES Agencies, LGAs, communities, external support agencies and the local manufacturers need to address existing problems and work together to bring about a reform. The author appreciates the move by FGN and UNICEF through the signing of an aid-memoir for an improved sustainable handpump project in Nigeria. The specific project objectives are to: establish sufficient local manufacturing capacity of handpumps and spares to match needs of the National WES Programme; encourage quality of products; develop and ensure adequate supply chains and the enabling environment for sales services etc. The roles of the FMWR and UNICEF specified in this agreement are vital to start off the reforms to improve handpump development in the country. One of these roles provides for the FMWR to ‘issue direction through policy to all state government and local government to procure handpumps, and spares from only FMWR/UNICEF certified manufacturers.’ It is further recommended here that the policy should recognise the need for the States and LGAs to be directly responsible to the implementation of handpump operated borehole projects.

The State Rural Water and Sanitation Agencies will also need to support and implement the ongoing reforms from FMWR by ensuring the following:

1. Issue direction through policy to all LGAs and communities to procure handpumps and spare parts and accessories from only locally licensed sources and dealers.
2. Facilitate the process to establish sales network for pumps and spares, linking with and developing local handpump maintenance systems, and other private sector companies to provide services directly to LGAs and communities.
3. Encourage LGAs and communities to procure their own handpumps, spare and tools.
4. Strengthen the ongoing decentralisation process in WES Programme to ensure that LGAs and communities are empowered to install and maintain their handpumps using local entrepreneurs.
5. Take full responsibility of data management of handpumps such as inventorsation of handpumps in all LGAs, status of functionality of all handpumps.
6. Be responsible for training of LGA handpump mechanics

The LGA WES units closest to the communities must play a very essential role to support the communities by:

1. Supporting to identify and train local entrepreneurs’ handpump mechanics for handpump installation and repair, as well as train community handpump artisans and women caregivers on routine maintenance.
2. Supporting the handpump spares distribution chain to function well at community level
3. Implementing policy issues relating to handpump development

The communities must take full ownership of their handpumps to ensure security, maintenance/repairs and ensure the following as well:

1. Report faults that cannot be repaired at the community level immediately to the LGA WES unit.
2. Participate in monitoring and reporting on handpump status to LGA WES units
3. Provide volunteer workers to be trained as handpump artisans/caregivers

**Conclusion**

The writer has attempted to provide a brief historical background on handpump development, highlighting where we are at present and what needs to be done now to improve on the present status. It is clearly evident that the handpump option is very cost effective, can be effectively operated and maintained by village level workers. This makes it feasible for use in the rural areas, as other options do not have these advantages as the handpump. It is therefore beneficial to use the privilege of the ongoing reforms in the National
WES Programme to improve on the handpump option for rural water supply.

References
3. Othniel Habila, November 2002: Rural Water and Sanitation Development in Nigeria

Abbreviations
1. WES Water and Environmental Sanitation
2. LGA Local Government Authority
3. WHO World Health Organisation
4. RUWATSAN Rural Water and Sanitation

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