



Technology Recommendation Borehole & Hand Pump India Mark II Torit County – Eastern Equatoria South Sudan

How can we understand whether the India Mark II hand pump is a sustainable and scalable technology to provide rural water service in many payams in Torit County, and if it meets users' needs?

How can we capture valuable learning and present experiences, drawing together all actors involved in an effective scaling up of the hand pump technology for a lasting water service?

These are questions the Torit County Rural Water Service Board seeks to answer in collaboration with VNG and IRC through a Technology Check (using the Technology Applicability Framework (TAF)¹).

This Briefing Note captures the findings of the Technology Check on the India Mark II hand pump in Okulu village, Ifoho boma, Imurok payam, Torit County.



Summary of conclusions

- Demand in communities for hand pumps is high and the technology will satisfy the water demands of most if not the entire community.
- The hand pump technology in general is aligned with the national policies, strategies and standards.
- Government institutions exist to support a rural water service to last forever.
- The present perceptions, attitudes and behaviours of the communities need to change to have their roles and responsibly on the hand pump accepted and made effective to get a lasting water service.
- Payment for water services by the users group is not the norm, and needs to be secured to ensure sustainability.
- As the present UNICEF-supported spare parts supply will stop, a serious vacuum will appear that needs to be filled by a stable, effective hand pump spare parts supply chain, possibly involving the private sector.
- The private sector in South Sudan does not produce the India Mark II hand pump or a derived product; however, a firm in South Sudan appears to sell the hand pump and its spare parts.



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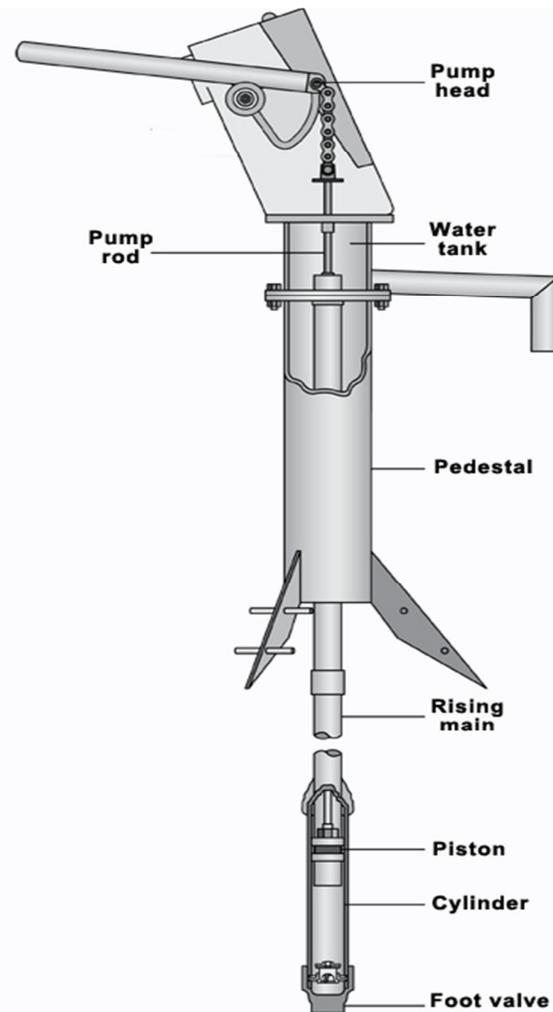
Introduction borehole with hand pump

Boreholes with hand pumps have been a common water supply for decades in South Sudan. Particularly during the civil war in the eighties and nineties, humanitarian aid organisations drilled on a massive scale boreholes and installed hand pumps, mainly the India Mark II, a standard in those decades. In recent years, development-oriented partners assisted the local government in increasing the access to safe and reliable water supply. Where geo-hydrological conditions allow, population densities are not high, and cattle-watering is not to be expected on a large scale, the favourite technology remains boreholes with hand pumps. In areas with large herds of cattle a solar-powered pumping for higher water production is considered an alternative option.

In Torit County, boreholes are predominantly equipped with hand pumps of the India Mark II type. It is manually operated and can lift water from up to 50 metres. The pump is designed to serve up to 300 people for a domestic consumption of 20-25 litres per person per day. It uses a piston housed within a cylinder to displace a column of water upwards to the surface through the rising main (pipe). The pump and spares are being manufactured in India, China and Uganda, amongst others.

The current indicative cost of an India Mark II hand pump in Torit County, including 50 metres of down-the-hole components, is approximately US\$1,000 (2014) or SSP 4,000. The total cost of the India Mark II hand pump plus a mechanically drilled borehole in Torit County is approximately US\$14,000 (2014) or SSP56,000. The annual OpEx (Operational Expenditures = management, operations, minor repairs and maintenance) are estimated at around SSP2,500-3,500 (≈\$700-1,000) per year varying by intensity of use, or some SSP 4-6 per month per household. If preventive

maintenance is not carried out, serious faults can develop that may be very expensive to fix.



Inventory of boreholes & hand pumps in Imurok Payam

In September 2014, the County Rural Water Service Board with support from VNG did an inventory of boreholes and hand pumps in Imurok Payam. The findings are given in the table below.

According to the population census of 2008, Imurok had a population of 6,138. According



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Boma	# Funct. HPs	Year range of Installation	# Non-funct. HPs	Year range of Installation	Functionality %
Isaloro	11	1983-2014	6	1980-2011	65
Central	5	1983-2014	3	1983-2008	63
Chuful	3	1984-2013	2	1984-2008	60
Ifoho	2	2008-2013	4	1984-2012	33
Total	21	1983-2014	15	1980-2012	58

to the present payam administration for 2014 this figure is much higher due to a vast number of returnees and IDPs; the figure of 61,000 people has been mentioned.

The inventory in Imurok payam found 36 boreholes with hand pumps of which 21 were functioning, giving a functionality of 58% (range 33-65%). The year of hand pump installation ranged from 1980 to 2014.

Depending which population figure is used, the average number of users per borehole/hand pump ranges between 290 and 2,900 assuming all people use the hand pumps that function. People living closer to a stream will probably use that as water source.



Five private hand pump mechanics (HPM) reside in Imurok payam. However, only one or two do minor hand pump repairs on a regular basis and are thus keeping up their repair skills. A technical

assessment carried out showed the competent skills of one of them on the India Mark II. Various partner organisation conducted HPM training that varied in duration between 3 and 10 days. All of them lack a

complete toolbox to dismantle an India Mark II hand pump.

Technology Check -Evaluation

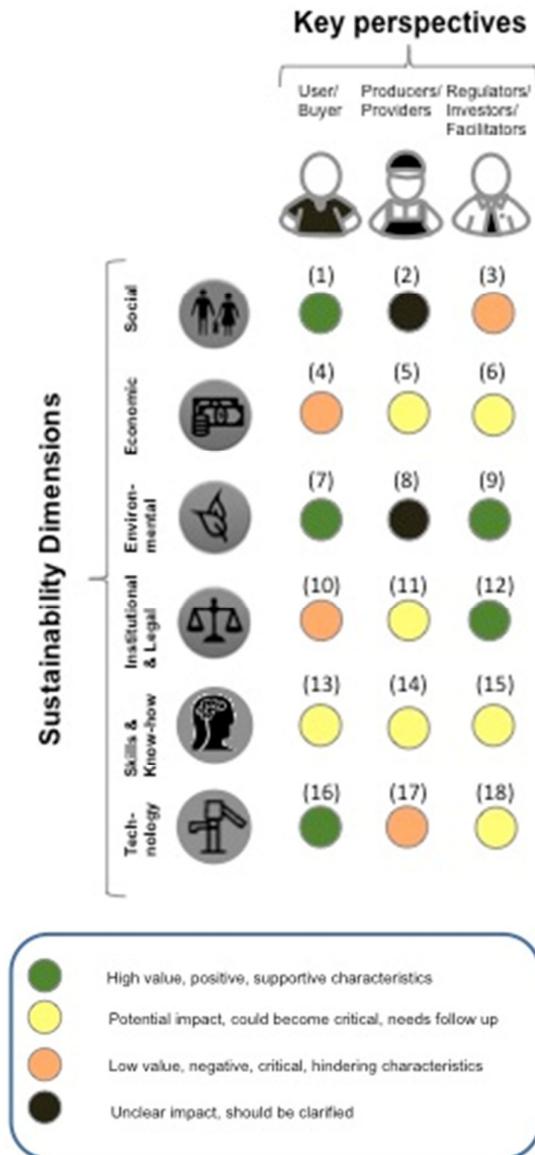
A 5-person team composed of members of the Torit County Rural Water Service Board, a community-based resource person and VNG-IRC staff did the community data collection part of the TAF. IRC staff collected the 'supplier' and government/regulator data from the County Rural Water Service Board and the Directorate of Water and Sanitation in the State Ministry of Physical Infrastructure.

Results of Technology Check on the borehole & hand pump India Mark II in Torit County

The TAF was used to identify obstacles to the sustainability and scalability of this technology in rural areas of Torit. The TAF was not used to make a judgment on whether the India Mark II is a good technology or not. The graphical profile below presents the result of the participatory review/scoring exercise with members of the County Rural Water Service Board, Imurok Payam Acting Chief and Administrator, Ifoho boma hand pump mechanic, Okulu village resource person, Drop-in-the Bucket staff and VNG staff; IRC facilitated the review. The scoring was done using six sustainability dimensions and three stakeholder perspectives.



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Social

The community expressed a high demand for improved water service as many hand pumps are broken down and many households are using streams. There is no scoring for the 'supplier' as they are not available in Torit. The need to change perceptions, attitudes and behaviours among communities-of-users is high where the government does not have sufficient capacities and resources to effectively address these needs.

Economic-financial

Users are not paying for the present water service, which may be a key cause for the non-functionality of three out of four hand pumps in the study village. This present payment attitude is a serious risk for the water service to last. Economic perspectives for the supplier and the subsidy/financing arrangements by the county government seem fair.

Environmental

The technology does not create a risk for the environment at community level and for the ground water resources. Pollution during production in India or East Africa is not known.

Institutional- organisational

At community level where service needs to be managed, as per Water Policy, WMCs do not exist. This creates a high risk for the sustainability. The quality of hand pump and parts supply by local firms is not controlled by the government. South Sudan has a National Bureau of Standards for testing the quality of imported goods.

Knowledge and Skills

At community level there are some managerial and financial skills available, while the hand pump mechanics need extra training. The supplier of parts has also some business skills. The capacities for post-construction support and training at county level need also strengthening.

Technological

All users will appreciate the water services by BH/HP. However, a serious risk is the absence of a viable and effective spare parts supply chain. UNICEF used to provide HP spares free-of-charge to the States but this arrangement will stop. No new system or chain has been developed and put in place. The South Sudanese sector has no responsible body to support the private manufacturer in the product development as the India Mark II has been developed a long time ago.