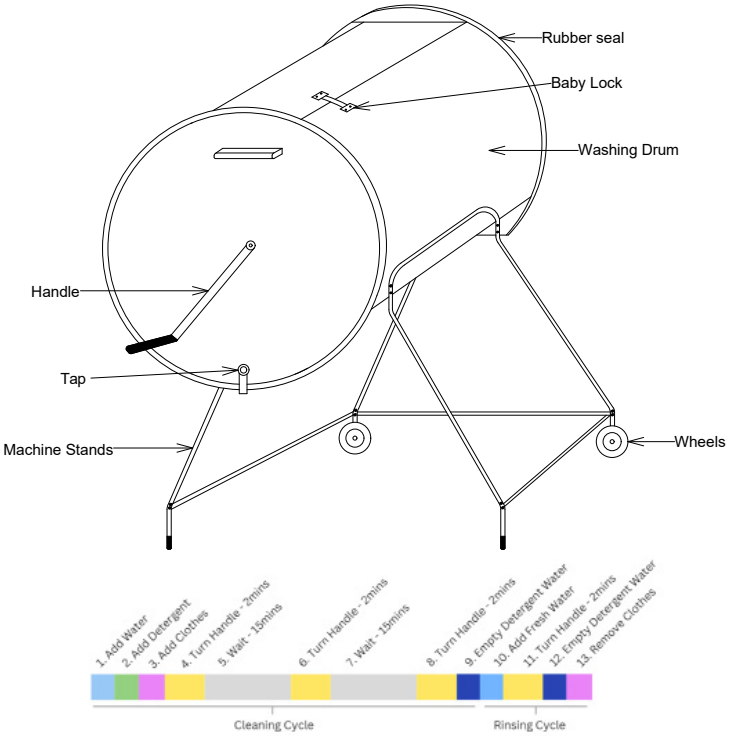
Applicability of the Divya Washing Machine Technology in Kampala, Wakiso and Mayuge district, Uganda

Technology Applicability Framework (TAF) developed in WaSHTec project by a consortium; is a decision tool on applicability, scalability and sustainability of a particular WaSH technology. It is used to assess the potential of a given technology in a specific setting. It helps us to understand if a given technology can provide the envisaged service sustainably, meeting the needs of the users and also helps to capture the valuable learning with insights for technology scale up.

The Divya washing machine was assessed using TAF and this briefing note captures the findings of the evaluation conducted.

Divya Washing Machine

The Divya Washing Machine (DWM) is off-grid and a portable-clothes washing technology. It is a hand-cranked device that uses mechanical energy to agitate and clean clothes. The machine has outer size of; 73x69x68 cm and weight of 30kg per box. It has a stainless steel 5kg drum capacity and was designed to use 30l of water per washing cycle, save detergent use, saving up to 75% of time and 50% of water compared to hand washing of clothes. Other features of the machine include; a flat-pack, all stainless-steel construction, 430 steel for long-life, 30-minute wash time and 10-minute contact time.



Washing procedures include:

Preparation for washing;

Adding 20L of water, I cup of detergent and adding clothes.

Washing;

Turn the handle for 2 minutes with one turn per second and waiting 15 minutes for clothes to soak. After, turn the handle again with one turn per second for 2 minutes. Then pause the machine for other 15 minutes after which you turn the handle again for 2 minutes (one turn per second) and pour out the water (empty the drum).

Rinsing:

Add 10L of water and turn the handle with one turn per second for 2 minutes after which you drain out the water and remove clean clothes.

For the period 2023-2024 the UK based Washing Machine Project (TWMP) distributed a total of 16 Divya washing machines to households, schools and community groups in Mayuge, Wakiso and Kampala.

The organization's rationale for distribution of these machines was to alleviate the burden of traditional washing and empower women in vulnerable and low-income communities.

12 out of the 16 machines distributed in Uganda were assessed and these were being used in schools (05), orphanage (01), community healthcare Centre for children with disabilities (03), women groups (02) and households (01). At the time of assessment, one out of the twelve (1/12) machines assessed was not functional.

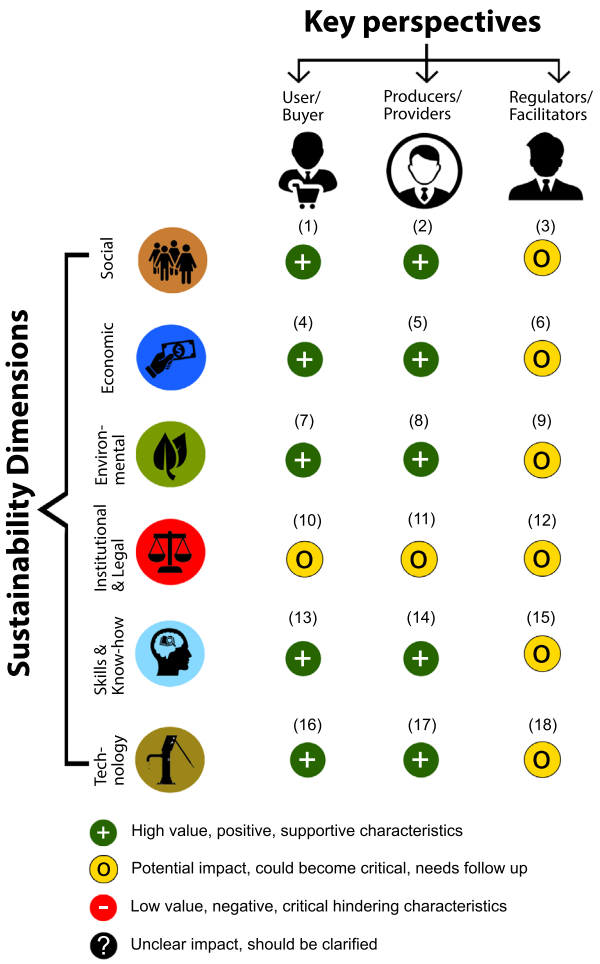
The TAF process

The assessment was based on perspectives of three stakeholders' groups; user/buyer, provider/producer and regulator/facilitator. The exercise was guided by six (06) sustainability dimensions; i.e., social, economic, skills and know-how, technological, environmental, and legal & institutional. Each dimension had three (03) indicators, bringing the total to 18 accessed indicators. The indicators were scored through a transparent process using information collected and validated by the stakeholders.
Scoring informs the graphical TAF profile of the technology under study.

Sustainability dimensions	Key perspectives: User Group Communities	Producer/promoter The Washing Machine Project	Facilitator/regulator Local Government	18 indicators for Divya washing Machine
Social	(1) Demand for Divya washing machine	(2) Need for DWM promotion	(3) Need for DWM	
Economic	(4) Affordability	(5) Profitability	(6) Support financial mechanism	
Environmental	(7) Potential negative impacts on the environment and end user	(8) Potential negative impacts in the production of the DWM	(9) Potential negative impact of scaling-up	
Institutional/ Legal	(10) Structures for management and accountability	(11) Legal regulation and requirements for registration of promoter	(12) Alignment with national strategies and compliance to national standards	
Skill & Know How	(13) Skills set of users for DWM management	(14) Levels of technical skills and business skills	(15) Sector capacity for introduction of DWM	
Technology	(16) Reliability of DWM and user satisfaction	(17) Viable supply chains for DWM spares and services	(18) Support mechanisms for DWM development	

The graphical profile provides guidance for developing a roadmap for scaling up the technology as it offers a comprehensive interpretation and provides for identification of strength, bottlenecks, risks and uncertainties with regard to the technology.

Results of TAF assessment of the Divya Washing Machine



Social

In places where the technology has been promoted, users hold a positive reception with arguments that the DWM has helped them to lessen the burden of washing as well as shorten the washing period. All the respondents demonstrated that they use the technology for washing. They indicated that they wash with any source of water including spring and unprotected sources. For schools washing is mainly done on weekends, for other institutions and at household level washing is done 3-4 times a week and the groups offering laundry services indicated that they wash every day. In homes, the DWM is used by women and children above 10 years and in schools the DWM is operated under the guidance of senior personnel. According to the producer/ promoter, the technology has a clear objective based on research i.e., to ease washing for the vulnerable women, reduce the risk of back straining experience due to bending for long hours and inflammation caused by use of detergent during the process of washing clothes. The promoter ascertained demand for the technology through needs assessment prior to piloting it. It was established that Uganda's low-income levels, limited access to electricity and high costs of household appliances create significant barriers to owning/using electric powered washing machines, access gaps being wider among the vulnerable communities who in addition lack access to piped water supply inside their houses. Apparently, the technology has been promoted in Mayuge, Wakiso and Kampala with a plan to supply 71 machines in Kyangwali refugee settlement in Kikuube district.

Economic

Technology users did not contribute towards purchase, as the machines were received in the form of donations through contacts. They are mainly used in groups, with some deployed for income-generating purposes such as laundry services. Regardless of the purpose, none of the users contribute to the operation and maintenance of the Divya Washing Machine (DWM). Those offering laundry services reported earning at least UGX 10,000–20,000 daily from the services, but without remitting any contribution for the machine's upkeep.

According to the producer/promoter, the production cost of a single unit ranges between USD 300–400, which they consider relatively affordable when the machine serves a group of people as opposed to individual households, and their interest is largely humanitarian. The market potential for the technology is high, considering that a large proportion of Ugandans still wash clothes manually using their hands, and the machine is adaptable even in remote areas since it does not require electricity and only involves manual water supply. Stakeholders, however, noted that this cost is still out of reach for most individual households and advised exploring local production options to make the machine more affordable.

Enviromental

There were no observed pollution threats associated with the technical components of the technology. Despite the fact that steel production is associated with carbon emission, technology producers use pro-active measures during the production of DWM. They for example adopted an eco-conscious design that optimizes use of materials, allows for easy repair of replicable parts, waste minimization and allows for end-of-life cycle recycling. The technology is associated with reduction of carbon footprint given that it eliminates use of electricity and reduces water usage by 50%. However, the projected life-cycle of 5years is such a short period and may present a risk of increased waste generation yet there are not clear in-country arrangements for recycling of such waste.

Institutional /Legal

Apparently, the legal structures for managing the technology are not yet well aligned. The users think that they will continue getting the units as donation and even look forward to the technology promoter to provide the necessary repairs in case of major breakdowns. The DWM is produced in the UK and the current pilot in Uganda is done through local partners i.e., Innovation Program for Community Transformation (INPACT Uganda) – a registered local Non-Government Organization (NGO)offering Water and Health services in Kigezi South-Western Uganda. The Washing Machine Project group also got approval from the Office of the Prime Minister to operate in the refugee settlements and made earlier contacts with UNHCR and OXFAM. They however have gaps on legal authorization to operate in the three districts where the machines have been piloted.

Skill and Know how

All users know how to use the machine. They were equipped with tools and skills to carry out routine operation and maintenance as well as undertake minor repairs like tightening the bolts and nuts. As part of the technology handover process, the users were trained on assembling the DWM and were provided with tool kits. They however have limited access to spare parts in case there is need for replacement. On the other hand, the technology producer has the necessary skills to produce the technology and his in-country partners plus the end-users were equipped with necessary skills to assemble the technology and also do minor trouble shooting to ensure optimal operation. The in-country partners offer after sales services through periodic monitoring.

Technological

The users appreciated the machine for lessening the burden of washing and also minimizing water usage and amount of soap used. Besides, the machine does not require electricity and it is flexible to fit anywhere. It also allows the user to attend to other chores and wash clothes at the same time without over straining. From the producer's perspective, the technology was carefully designed to meet the needs of the end-users. It is easy to use, easy to assemble, reduces the amount of detergent and water used during washing, it is a compact portable machine that can even fit in a very small space but can also be shared between users since it is easy to transport.

The users observed that there are two models of machine and their effectiveness vary i.e., the 2023 model is mainly good at washing blankets clean and the 2024 model is better at washing ordinary clothes. For both models, prior soaking is a must without which the machine cannot wash the clothes effectively. Both models of machine cannot handle extremely delicate fabrics like silk.

Observations and Recommendations

Issue	Observation	Recommendation
Handle durability	Handles were reported to wear out quickly with regular use	Improve the handle mounting mechanism to better withstand operational force
Rubber seals	Rubber seals were reported to wear out or fail after repeated use	Use stronger, more durable rubber materials and ensure availability of replacements in-country
Washing Drum material & capacity	The drum casing deforms under heavy loads of clothes	Use thicker stainless steel (2–2.5mm, grade 304) to minimize deformation and improve corrosion resistance
	The current size is too small to handle bulky laundry loads	Revise the drum design to include larger capacity models, particularly for schools and institutions
Greywater disposal	Greywater is discharged directly into the environment after rinsing	Provide user training on eco-friendly greywater disposal and encourage reuse where possible
Ownership & Institutional involvement	Weak user management and limited district/regulator involvement	Develop user committees, involve district stakeholders early in rollout
Inclusivity	The manual-only model is difficult for the elderly and persons with disabilities, and the fixed stand height does not suit all users	Explore solar-assisted models for easier use and provide adjustable stand options to cater for different user needs
Branding	The technology branding is unclear and sometimes confused with conventional electric washing machines	Develop a distinct brand identity to differentiate the Divya Washing Machine
Affordability	Unit cost of USD 300–400 is considered reasonable for groups, but remains unaffordable for most individual households	Explore local production or partnerships with Ugandan fabricators to reduce cost and improve accessibility
Spare parts	Access to spare parts in-country is limited	Establish a local spare parts supply chain or partner with Ugandan distributors to ensure quick availability

About Water, Sanitation and Hygiene Technologies (WASHTech)

WASHTech was an action research initiative in Burkina Faso, Ghana and Uganda that aimed to facilitate cost-effective investments in technologies for sustainable water, sanitation and hygiene services. http://washtechafrica.wordpress.com or www.washtechnologies.net

Technology Applicability Framework (TAF)

The TAF is a participatory evaluation tool that identifies blockages, scalibility and performance of a technology. With blockages identified, a clear picture is formed of areas where collective action towards improving the success of a WASH service in a given context may be taken.

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