Card image:

Detailed Description and Requirements:


Unimproved toilet and latrine

BACKGROUND

Openly defecating or using an unimproved toilet is a widespread problem globally, with 2.3 billion people doing one of these two activities on a regular basis. This leads to significant public health issues with up to 280,000 people dying annually of diarrhea-related causes attributable to poor sanitation. In addition, poor sanitation is a major factor in several neglected tropical diseases, including intestinal worms, schistosomiasis, and trachoma as well as contributing to malnutrition. The cost of a proper toilet is one of the primary reasons this situation exists amongst the rural poor throughout the world.


Containment


Interface


Superstructure

Toilets consist of three primary components: (1) containment – the mechanism by which waste is stored for treatment or removal, (2) interface – the point of contact between the user and containment, and (3) superstructure – the structure above the ground that serves to separate the user from the environment and provide privacy and safety. The pictures above are examples of what is currently being used in areas of interest and although low-cost they are still often too expensive for the majority of low-income homeowners to afford. Market research in Mozambique identified a cost of US$45 as attainable for most of the lowest income households, though products somewhat above or below this threshold may also help to fill crucial gaps. An ideal toilet should be able to effectively separate human excreta from human contact (the lack of this ability is the definition of an "unimproved toilet") and facilitate treatment on-site or removal of the waste from the containment system for treatment off-site.

Toilets are often constructed with locally available materials, often causing containment systems and superstructures to collapse or allow the leaching of contaminants into ground water or failing to adequately protect humans from contact with fecal material. Interfaces are often difficult to clean or unusable by those with physical disabilities or the very young. Superstructures are often built of local materials and do not provide adequate safety (due to doors that do not close or lock well, or that have holes in the walls or roof). Some piecemeal solutions have been developed using mass manufactured materials/products, especially targeting the interface, but cost-effective options for containment and/or superstructure (and the need to produce a fully integrated whole) are a significant gap. While sanitation promotion interventions often consist of demand creation approaches, toilets are not affordable by the vast majority of the rural poor. Higher-quality toilets are often made entirely with cement and porcelain interfaces, and while plastic interface products are being produced, integrated solutions or even piecemeal containment or superstructure products are not available.

CURRENT TECHNOLOGY

The current technologies in use for sanitation globally vary substantially, and costs for labor and materials and the required type of technology vary greatly by setting (for example, the level of the water table varies across settings). The **Compendium of Sanitation Systems and Technologies** by EAWAG provides examples of system designs and components using a standardized language. This comprehensive reference describes far more than just toilets, but Sanitation System 1 (starting on page 20) and 2 (starting on page 23) describe what is envisioned in this challenge (limited to "U" (User Interface) and "S" (Collection and Storage/Treatment). Components of these systems are described under the headings U.1 (Dry toilet), U.2 (Urine-Diverting Flush Toilet) and U.4 (Pour Flush Toilet) as well as S.2 (Single Pit), S.3 (Single Ventilated Improved Pit (VIP)), S.4 (Double Ventilated Improved Pit), and S.8 (Composting Chamber).

However, **we strongly note that innovative solutions may not fall easily under any of these existing categories, which should therefore not restrict solutions proposed, as the key is that the functions below be fulfilled, not that an iteration of an existing system/component be the only thing considered for design**.

The requirements in this Challenge correspond roughly to "Safely Managed Sanitation" according to the World Health Organization/UNICEF Joint Monitoring Program's sanitation ladder, and existing solutions range in costs perhaps from US$90-360 (Please see the COST BENCHMARKS link under REFERENCES for more information.)

Given the context-specific nature of costing toilet solutions, and the generally higher costs and lower coverage rates in Sub-Saharan Africa, cost discussions should provide detailed breakdowns of quantity of material/labor requirements, ideally also costed in a Sub-Saharan African country where World Vision has a large footprint (e.g., Ghana, Rwanda, Kenya, Ethiopia, Zambia) to allow for comparisons across proposals.

REFERENCES

Providing a basic level of water and sanitation services that last: COST BENCHMARKS provides results from four costing studies in Burkina Faso, Ghana, Andhra Pradesh (India), and Mozambique, with additional working papers in the series describing maintenance costs and other considerations. (See additional resources related to WASHCosts project such as this **costing summary** from Nepal, Uganda, and Mauritania)

The **Toilet Board Coalition** have produced a number of useful resources, including estimating the business opportunity in countries like India and South Africa and "**Mapping Sanitation Solutions**."

THE CHALLENGE

World Vision is seeking novel ideas, concepts, and technologies to **significantly lower the cost of safe, sanitary, and effective toilets for use by a single household**. While solutions presenting integrated designs that address all three primary components (containment, interface, superstructure) are ideal, Solvers may also receive awards for solutions that only address one or two components. World Vision may indeed find the best solution to be a combination of several submissions. Solutions to this Challenge will have a major positive impact on the lives of countless children and adults worldwide and potentially significantly reduce the number of deaths due to poor sanitation conditions around the globe.

Proposed solutions should meet as many of the following **Solution Requirements as possible**:

General Requirements

1. Significantly reduce the cost of safe, sanitary, and effective toilets. **Target cost for a system with all three primary components is US$45 for the total installed cost** in the Sub-Saharan Africa market. Solutions somewhat higher than this price range will be considered based on price versus quality. While options may currently exist that meet this price target they are of inadequate quality, durability, and effectiveness and do not meet the minimum requirements of this Challenge.

2. Solutions addressing individual components should show proportional cost reduction for the component. Containment typically represents 40-50%, the interface 20-25%, and the superstructure 30-35% of the total cost of a system.

3. Must be for use by a single family or living group (not meant for communal use/use by the general public).

Component Requirements – any component present in proposed solution should meet corresponding requirements

4. **Containment**
    a. Must be able to hygienically store or otherwise safely manage waste (so that no humans come in contact with pathogenic waste from the toilet) for the average family for at least one year – approximately 2 cubic meters in volume.
    b. Must be:
        1) emptiable by a mechanical vacuum tanker; or

2) removable from the ground such that the waste can be left in the ground to decompose while an alternative place for containment is used and the toilet moved; or
3) otherwise facilitate safe management of fecal material.

c. Able to support the weight of anything above it such as people or structures.

5. **Interface** – must be usable or adaptable to be usable by people ranging from young children (as young as 3 years old) to adults, including those with physical disabilities. Must be moveable to allow for relocation of containment component.

6. **Superstructure** – should allow the user to use the toilet safely (no ability for others to access the toilet while in use), privately (no ability for others to see or hear the user when using the toilet.), and comfortably (no nuisances such as flies or challenges using in a typical range of weather conditions). Must be moveable to allow for relocation of containment component.

The solutions would preferably satisfy the additional following criteria (but not essential):

7. Superstructure
    a. Provides sufficient space to perform menstrual hygiene management behaviors and a place for solid waste disposal inside the structure/facility.
    b. Includes a place for washing hands with soap and water attached/attachable to the outside of the superstructure (integrating a handwashing station where possible—see, for some of many possible examples, SATO Tap or HappyTap)

8. Ventilated or includes a barrier between the interface and containment to reduce smell.

9. Materials for interface and superstructure are easily cleanable.

10. Self-installable and self-manageable by the user (or else these are possible at low cost through a service provider)

Project Criteria:

Submitted proposals along with all relevant supporting documentation should include the information described in the Detailed Description of the Challenge.

The submitted proposal should include the following:

1. A **detailed description** of the solution and how it addresses one or more of the **Solution Requirements** listed above. Description should also include estimated cost of the solution, and/or equipment and materials required so that such a cost can be estimated.

2. **Rationale** as to how the solution meets one or more of the **Solution Requirements.**

3. Any **supporting documents, images, illustrations** that help clarify and support the solution.

The Seeker may wish to partner with the Solver at the conclusion of the Challenge. Solver should describe their expertise and include a statement indicating their interest in this opportunity.

The proposal should not include any personal identifying information (name, username, company, address, phone, email, personal website, resume, *etc*.) or any information the Solvers may consider as their Intellectual Property they do not want to share.

This is an Ideation Challenge, which has the following unique features:

- **There is a guaranteed award**. The awards will be paid to the best submission(s) **as solely determined by the Seeker**. The total payout will be $15,000, with at least one award being no smaller than $5,000 and no award being smaller than $1,000.

- The Solvers are not required to transfer exclusive intellectual property rights to the Seeker. **Rather, by submitting a proposal, the Solver grants to the Seeker a royalty-free, perpetual, and non-exclusive license to use any information included in this proposal, including for promotional purposes.**

PLEASE NOTE: In addition to monetary awards, winning Solvers, with their consent, will **receive recognition in a public announcement made by World Vision** and will have the **opportunity for engagement and collaboration with World Vision** and other stakeholders to discuss application of their solutions.

Submissions to this Challenge must be received by 11:59 PM (US Eastern Time) on 12-Jan-2021. **Late submissions will not be considered**.

After the Challenge deadline, the Seeker will complete the review process and make a decision with regards to the Winning Solution(s). All Solvers that submit a proposal will be notified on the status of their submissions; however, **no detailed evaluation of individual submissions will be provided**.

ELIGIBILITY

Employees of World Vision and their immediate families, as well as any individuals involved in the judging of this Challenge and their immediate families, are ineligible to receive an award for this Challenge.

ABOUT THE SEEKER

World Vision is a Christian humanitarian organization conducting relief, development, and advocacy activities in its work with children, families, and their communities in nearly 100 countries to help them reach their full potential by tackling the causes of poverty and injustice. World Vision serves all people regardless of religion, race, ethnicity, or gender. For more than 35 years, World Vision has been bringing water, sanitation, and hygiene services to the most vulnerable children around the world. Our 2021-25 Business Plan aims to leverage $1 billion of investments into 41 priority countries, bringing sanitation to more than 13 million people. Our strategy includes market-based approaches, developing viable business models with tiered product offerings to leave no one behind, as well as increasing consumer demand.

Committed to making a positive and lasting difference in the world, and driven by our desire to serve God, World Vision has become a global leader in improving and transforming the lives of children, their families, and their communities.

World Vision is supported in this project by SeaFreight Labs (www.seafreightlabs.com), an open-innovation consultancy using global challenges to cost-effectively deliver breakthrough innovation. Participation in this project is a direct result of the recent SeaFreight Labs decision to join the Pledge 1% movement.