

INNOVATIVE MENSTRUAL PAD PROJECT

A Sustainable Solution for Rwanda

MENSTRUAL PADS



INTRODUCTION

Menstrual hygiene remains a significant challenge for many women and girls in Rwanda and globally due to their costs, limited access, and the environmental impact of disposable pads. These barriers force many women to use unsafe alternatives, compromising their health, dignity, and opportunities.

Menstrual hygiene



REFERENCES

- Chintan Madhu & Bharat Patel (2024) Preparation of microencapsulated phase change materials for use in feminine hygiene napkins based on pH response, EssentialChem, 1:1, 1-9, DOI: 10.1080/28378083.2024.2357332 To link to this article: <https://doi.org/10.1080/28378083.2024.2357332>

- Disposable sanitary pads and sustainable environment

Authors: Maitreyi College University of Delhi January 2017

- Establishing a Sustainable, Low-cost, Biodegradable Sanitary Napkin Production Facility in Sri Lanka Towards zero period poverty Mihitha Basnayake.

GRÓ GEST, University of Iceland May 2024

Rwanda:

- **School Absenteeism:** In Rwanda, particularly in rural areas, 20% of schoolgirls miss up to 50 days of school annually due to menstruation-related issues. [UNFPA Rwanda](#)
- **Economic Impact:** These absences may result in a potential loss of GDP, estimated at US\$215 per woman each year, totaling US\$115 million annually in Rwanda.
- **Access to Sanitary Products:** As of 2021, 18% of women and girls in Rwanda miss school or work because they cannot afford menstrual pads.
- **Knowledge and Practices:** A study among visually impaired adolescent girls in Rwanda found that 67.4% had poor knowledge of menstruation and menstrual hygiene, and 47.8% had poor menstrual hygiene practices.

AIM

Aim:

To design and develop an innovative, recyclable, and reusable sanitary pad that integrates sustainable materials and advanced health-monitoring technology to detect infections or diseases. This project seeks to promote menstrual hygiene, environmental sustainability, and proactive health management, addressing the challenges of waste, limited access to healthcare, and menstrual health stigma, especially in underserved communities.

GOAL

- **Improve Menstrual Hygiene:**
- **Promote Sustainability**
- **Empower Communities**
- **Leverage Technology:**

OBJECTIVES

- **Incorporate Smart Textiles:**

Employ **thermochromic fabrics** that change color to indicate when the pad needs to be changed.(titanium dioxide, zinc sulfide and zinc oxide)

- **Utilize Biodegradable and Eco-friendly Plastics:**

Integrate **bio-based polyesters (PLA or PHA)** as a waterproof layer.

Replace traditional plastic layers with **biodegradable films** made from plant-based sources.

What

The project is a **recyclable and reusable sanitary pad**, made with sustainable, washable materials, and enhanced with **technology to detect infections or diseases**. These pads address menstrual hygiene while providing a **non-invasive method to monitor health** for early detection of issues like bacterial or fungal infections, pH imbalances, or other menstrual health conditions.

Who

- **Primary Users:** Menstruating individuals, particularly those in low-resource areas or regions where medical testing is inaccessible.
- **Healthcare Organizations:** NGOs, clinics, or health initiatives working to improve menstrual and reproductive health worldwide.
- **Environmentally Conscious Individuals:** Those seeking sustainable menstrual products with added health benefits.
- **Young People and Adolescents:** Educational initiatives can pair this product with health literacy programs.

Why

- **Environmental Impact:** Traditional disposable pads contribute to significant environmental waste. Recyclable pads provide a sustainable alternative.
- **Health Risks:** Many infections go undetected due to lack of awareness or medical access. By combining hygiene with health monitoring, these pads ensure timely detection and early intervention.
- **Accessibility:** For individuals in underserved areas, this dual-purpose pad helps bridge the gap between menstrual health and preventive healthcare.

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When

- During every **menstrual cycle**, to maintain hygiene and monitor for any signs of infections or irregularities.
- It can also be used **postpartum** or for general reproductive health monitoring in women experiencing irregular bleeding.

Fabricademy can help develop reusable menstrual pads that are affordable, comfortable, and safe for girls to use. The process would involve:

1. **Design:** Using digital design tools (such as CAD software), Fabricademy students can create patterns and prototypes for reusable pads that suit various body types and preferences.
2. **Material Selection:** Sustainable, absorbent, and breathable materials such as organic cotton, bamboo fiber, or recycled textiles are chosen, ensuring that the pads are not only effective but also environmentally friendly.

3. **Digital Fabrication:** Using technologies like laser cutting and 3D printing, the pad components, including layers of absorbent fabric and waterproof backing, can be precisely cut and assembled. These techniques minimize waste and improve the efficiency of production.
4. **Testing and Prototyping:** The pads are tested for comfort, absorbency, and durability to ensure they meet the needs of the girls and withstand regular use.
5. **Distribution and Education:** Once production is streamlined, the pads can be distributed through local organizations, schools, and health programs, while educational materials are provided to teach girls how to use, wash, and care for the pads.

MATERIALS USED

❖ **Smart Textiles**

- **Conductive Fabrics:** Sensors to monitor moisture levels and absorbency.
- **Thermochromic Fabrics:** Fabrics that change color to indicate when the pad needs to be changed.

❖ **Biodegradable Plastics**

- **Bio-based Polyesters (PLA, PHA):** Used for the waterproof layer.
- **Plant-based Films:** Replace traditional plastic layers with biodegradable options.

MATERIALS USED

❖ **Hydrogel Materials**

- **Super Absorbent Polymers (SAP):** Increased moisture absorption and retention, ensuring comfort.

❖ **Recycled and Upcycled Fabrics**

- **Recycled Polyester/Nylon:** Water-resistant outer layers made from recycled materials.
- **Upcycled Textiles:** Reused fabrics for layers or packaging.

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MATERIALS USED

❖ **Bio-fabrics**

- **Mushroom Leather (Mycelium):** Sustainable and durable outer covers.
- **Algae-based Fabrics:** Lightweight, biodegradable outer layers.

❖ **3D-Printed Components**

- **3D-Printed Mesh Layers:** Improved air circulation and moisture absorption.
- **3D-Printed Inserts:** Enhance absorbency or add antibacterial properties.