



Green is the new colour for menstruation. Environmentally sustainable, Uger fabric pads, shows the way.

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Abstract: Early woman managed menstruation in ways society around her sanctioned menstruation management. These included isolating herself when bleeding, using leaves or cloth and other techniques. These used to be environmentally friendly systems, the methods and products causing no harm to the community they lived in. As societies evolved, newer ways of managing emerged, giving rise to menstrual products that are no longer sustainable. Waste now includes menstrual debris, which is a concern everywhere. In this paper we examine menstrual products used by women in South Rajasthan through a sustainable perspective. For assessing sustainability, we developed a diagrammatic representation for sustainable menstrual management, the PASS diagram. We assessed products through PASS using qualitative data from studies. Additionally, we developed a new product, *Uger* fabric sanitary napkins. *Uger* was tested by users and assessed through PASS. We found *Uger* to be sustainable from four aspects environment, economic, society and health.

Keywords: *Menstruation, Sustainability, Reusable, Napkin*

1 Introduction

Humans, as others in the animal kingdom, hunted, gathered, reproduced and passed on. The next generation carried on in much the same way. When communities began to settle, it changed the way life was managed, it was no longer the simple hunting – gathering sequence, it was replaced by complexities. In the 21st century, it is no longer easy to be simple. “Complexity is failed simplicity”. (Bono,1998). In this study we examine the issue of menstruation, a body expulsion specific to women. We look at design systems or products that exist for this biological phenomenon. Earlier periods were managed in simple ways which aligned with nature causing no imbalance to the environment. The systems were sustainable. Period management today has been commoditized, dominated by disposable products. An impact caused by this is huge volumes of visible menstrual waste. This can no longer be ignored, clearly, menstruation management has become unsustainable. Is using a reusable product an answer for turning menstruation management from an unsustainable to sustainable scenario? The study tries to find some clues looking at menstruation management from sustainable perspectives.

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2 Background

2.1 *Menstruation and management*

The human body expels saliva, sweat, gas and many other products. Menstruation or periods is one such physiological phenomenon. "A period is the part of the menstrual cycle when a woman bleeds from her vagina for a few days. In most women, this happens every 28 days or so." (Periods, n.d). Early woman managed menstruation using leaves, moss, mud or sand. (Finley, n.d). When clothing evolved, periods were managed differently. When garments became old or torn, the stronger parts of the fabric were recovered from it, converting this into absorbent material. This was a sustainable system. The early nineties saw inventions, the sanitary napkin, the tampon and the menstrual cup. (Finley, n.d). The disposable sanitary napkin as we now know it, revolutionized the way menstruation was managed, one time use and throw became popular. Today there are many varieties of branded napkins to choose from and more and more women show preference for disposable. (Juyal, Kandpal, Semwal, Negi, 2012).

2.2 *Menstruation products and impact on environment*

Used cotton menstrual rags were buried by users, it degraded within six months. Rags were also burned, the ash like residue going back into earth. When modern sanitary products became available in the early part of the century, they were made from materials that were bio degradable. This caused no known harm to the surroundings. Impact on the environment was noticed when used disposable products started to become visible. Environmentalists began realizing that debris washed up on coast lines were ear buds, diapers, tampons, applicators and sanitary napkins, made up of non degradable raw materials. (Pots, Hastings, 2011) Effects from choked landfills were also being felt. "Landfills are also known to produce large volumes of methane, a principle greenhouse gas contributing to global warming."(Chapman, 2007). In India, menstrual waste has started to become a problem, as reported in a newspaper article. (Sabnis, 2013).

Designers and innovators have clearly ignored sustainability issues, often designing for planned obsolescence. (Landes, 2012). The modern non woven sanitary napkin was an innovation that ignored impact on environment. The highly absorbent disposable napkin is composed of non degradable material such as polymers, polyacrylate gel and other plastic derivatives'. (Sanitary Napkin Properties, n.d)

2.4 *Objective of the study*

Ways to reduce environmental impact on products has been a vastly analysed and explored area. Within this we found that there were possibilities for more work in the area of sustainability in menstruation management, specific to a community. The overarching objective of the study was to understand menstruation management from a sustainability framework relevant to Rajsamand District in Southern Rajasthan, India.¹ The study in two parts looked at:

- the sustainability of current menstrual management products, that are accessible, affordable and used by the community
- the sustainability of a new menstrual product that was tried by some users within that same community

3 Method

3.1 Developing a visual representation, the model “PASS”

A sustainability diagram was developed, the “PASS” model to visually and easily assess menstruation management sustainability. This visual would assist a user to make informed choices during menstrual product selection. This is discussed in Section 4.

3.2 Assessing sustainability of current products using “PASS”

We first studied menstruation products are in use and the practices that govern the use. ² These products were assessed using “PASS”. We discuss findings in Section 5

3.3 Introducing a new product and assessing it for sustainability

A new menstrual product was introduced to users in the study area. Feedback was gathered and the product was assessed using “PASS”. We discuss findings in Section 6

4 Developing a diagram for assessing sustainable menstruation

“Sustainable” is defined in dictionaries as “capable of being continued with minimal long-term effect on the environment”.(Sustainable, n.d). Sustainable communities mean - well being of the community from the perspectives of surroundings, wealth, health and social-cultural contexts. (Green Communities, 2012). Researchers have represented sustainability through visuals to understand concepts easily, for example the Venn diagram model, (Lozano,R., 2008) (Mann,S.,2009) which has three aspects social, economic and environmental. The four pillar model (Sustainable Development, 2013) which includes culture. Culture takes into account community values and community expressions. (Hawkes, J., 2001) (Four Pillars of Sustainability, n.d)

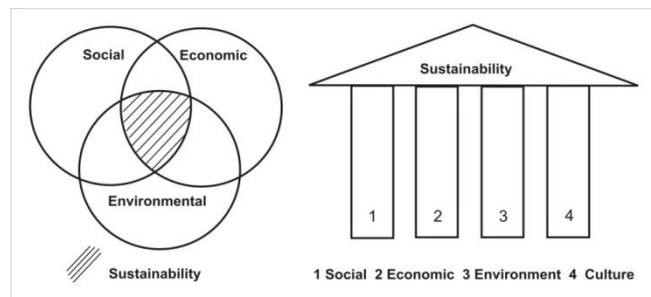


Figure 1 Sustainability, Venn Diagram Model, 4 Pillar model. Source Author generated

We defined “Sustainable Menstruation Management” or SMM as - “a human body expulsion managed by a product or system that maintains a balance between environmental, economic, health and social aspects within a community, causing no harm to anyone”. We selected four pillars, and assigned each pillar to an aspect of

sustainability in Hindi language to make it applicable and relevant to the study area. “Pass” and “fail” are common terms used in the area to sanction or reject anything, hence PASS acronym was appropriate for the area.

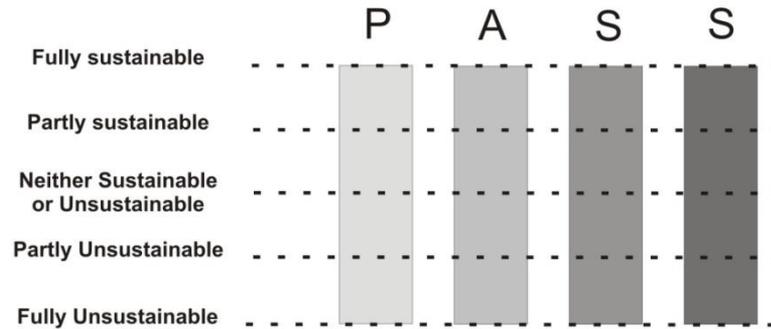


Figure 2 Represents 4 pillars, each pillar assigned levels. Source Author generated

Further each pillar was demarcated, into a scale of 5 each denoting a level of sustainable or unsustainable, described as fully, partly or neither. A product could thus be measured using this scale. The measure was guided by a simple qualitative analysis based on the studies conducted. The height of the pillar was thus determined.

Pillar P - *Paryavaran* or Environment - to consider LCA³, WF⁴ and MD⁵

Pillar A – *Arthic* or Economic to consider cost of production, how much the user paid and maintenance costs

Pillar S – *Samaj* or Society to consider infrastructure, social acceptance, attitude toward a practice or product that has a direct bearing both on individual user and community

Pillar S - *Swasth* or Health to consider negative or positive health impact caused by the use of the product both on the user and on the community

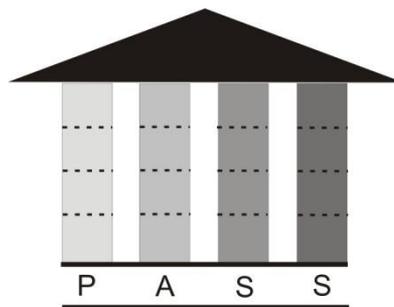


Figure 3 The roof resting on 4 pillars completes the PASS model. This represents an ideal SMM model with all four pillars reaching full heights for sustainability. Source: Author Generated

5 Menstrual products and practices and assessing for sustainability

5.1 Menstrual products and practices in the study area

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Three types of menstrual products are currently used by girls and women in the study area. The first is cloth recovered from old garments⁶, the second the *Time Piece*⁷ - TP and the third the Commercial Sanitary Napkin⁸ - CSN

Circumstances govern and influence the way all menstruation products are managed. One situation is privacy as most homes do not have latrines. Jungles and fields are used for changing of the menstrual product. As a result, changing is not done as often as recommended.⁹ There are superstitions, one strong notion is that men turn blind if they see menstrual blood. Dark coloured products are preferred over light colours so that residual blood stains do not show. After washing out a product, it is hung in a dark corner with no sun reaching it. These practices compromise health. Increasingly reusable products are losing value, as users see reusable as an old fashioned method. There is aspiration for a better product. The first step is purchase of TP Rs 15-20 and the next step is CSN when it can be afforded, each pad costing Rs 2 - 7 depending on the brand.

5.2 Mapping products using the PASS diagram

Pillar heights were decided based on a qualitative analysis.

5.2.1 PASS for Cloth

Pillar P – Was found to be fully sustainable. LCA and WF - Cloth is harvested from old used cotton garments, and takes on a new life, no cost for production and processing. MD - there is no menstrual debris. The fabric, bio-degrades or turns to ash if burned.

Pillar A - Was found to be fully sustainable. There is no manufacturing cost, no purchase cost. Maintenance cost, a cake of detergent soap and 6 to 8 buckets of water per cycle have been considered insignificant, as this has been considered a reproductive right (Human Rights, n.d) to maintain menstrual hygiene.

Pillar S - Was found to be partly sustainable. Society's attitudes to privacy compromises sustainability. Men need lesser privacy, no attention is paid toward creating private spaces for women. Society sanctions negative practices such as the use of dark menstrual products, endorsing poor hygiene and maintenance.

Pillar S - Was found to be partly sustainable. Use of a poorly maintained dark cloth leads to reproductive infections. Itching, burning, fungal infections are routinely reported and treatment seeking is delayed - as colour of discharge is never identified in time due to dark background of the cloth .

5.2.2 PASS for TP

Pillar P - Found neither sustainable nor unsustainable. LCA – Fabric is a non woven polymer based product, it is not biodegradable. WF – Water used for production was not calculated but assumed to be much lower than cotton production¹⁰ (cotton and water, n.d). MD - At the end of the product's life it is either buried or burned. There will be menstrual debris, a woman will dispose 8 TPs per year. This disposed material will pelletize¹¹ and enter waterways. If it is burned, pungent fumes are given off understood to be toxic.

Pillar A – Found to be fully sustainable. Cost to individual user is low, hence affordable. Maintenance cost is less half cake of detergent soap, 4 buckets of water per menstrual cycle, half the amounts of water and soap as compared to cotton cloth.

Pillar S - Found neither sustainable nor unsustainable. TP has social sanction, dark coloured background, perceived to be very convenient as it dries very quickly.

Pillar S - Fully unsustainable. Nature of material in TP is reported to increase vaginal temperature, leading to discomfort and health problems such as itching, burning, fungal infection and ulcers.

5.2.3 *PASS for CSN*

Pillar P - Partly unsustainable. LCA – We found most raw materials in the product to be made up cellulose, polymers, non woven material and polyacrylate gel. Most materials are non biodegradable. Cellulose while biodegradable remains trapped in between polymer layers in the napkin, causing it to be preserved, remaining intact in a landfill. WP – Water used in production was not calculated but cellulose production and bleaching requires water. Overall water consumption understood to be lower than than cotton and TP production. MD - High amount of menstrual debris, as one woman using disposable alone, will throw away 120 napkins at the end of one year. No biodegradation similar disposal issues as in TP

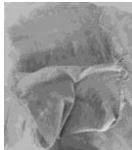
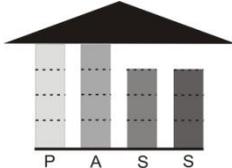
Pillar A - Fully unsustainable. Cost to individual user is high. No maintenance cost.

Pillar S - Partly unsustainable. Increasing accepted for convenience. Due to high cost, the napkins are thus worn for very long periods. This is a machine made product (Youtube, 2013) and not labour dependent¹². It generates no local employment and hence fails in an SLCA Frame work Social Life Cycle Assessment framework. (UNEP Guidelines, 2009)

Pillar S - Partly unsustainable. Individual users present with itching, ulcers due to allergy to materials in the product. Often users wear the same napkin the whole day to save money, causing health problems.

5.2.4 *Conclusion*

All three products are not completely sustainable as can be seen below from Figure 4. However within the three products, recovering cloth from old garments puts the least environmental negative load when compared to CSN which has the highest load. TP on the other hand puts some environmental load but significantly less when compared to CSN. Analysis through a PASS diagram, visually indicates SMM of a product.

Product	Image	PASS diagram
Cloth		

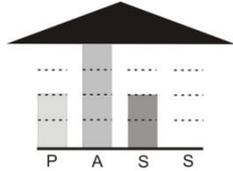
Time Piece		
Commercial Sanitary Napkin		

Figure 4 Table showing product and visual representation of sustainability through PASS

6 Introducing a new product and assessing through PASS

Earlier, we concluded that all three products are not entirely sustainable. There was scope for a new product that could ideally reach all 4 pillar heights. Reusable cloth pads appeared to be a solution¹³. We consulted with *Ecofemme* at *Auroville, Tamil Nadu*, the pioneers of cloth pad making in India. (*ecofemme,n.d*) We took inspiration from their product, both the design and the philosophy of reuse.

6.1 Product design

Our understanding from Section 5 guided the brief for the design.

- cotton fabric¹⁴ selected, cool to skin, non irritating raw material, no menstrual debris
- be suited for different volumes of discharges, colour of fabric be suited to identify abnormal discharges
- styled, be fixed to underwear, have a comfortable contour and be the correct size

The pads designed were named *Uger*¹⁵ Pads. There were two styles of pads, for light flow and heavy flow. Fabric close to skin was always kept white while the fabric away from skin is a bright print. A Self Help Group of the NGO produced these cloth pads.



Figure 5 Light pad designed for light flow, colour. Source Author Generated

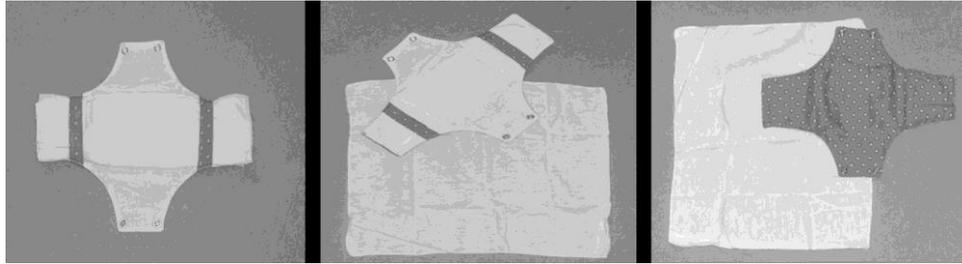


Figure 6 Pads for heavy flow have were designed with towel inserts

6.2 Feedback from users and assessing through the PASS diagram

Users tried *Uger* pads in the study area, pads were given to those willing to try the new product. 45 users in the age group of 16 to 45 years, used *Uger* pads over 12 to 13 menstrual cycles. The product worked in terms of function that is absorbing the flow, it was also reported as comfortable to wear. The most significant finding here was that 18 users of TP reported no discomfort such as itching or burning with the new product. Of the 9 respondents using cloth, all felt that the design was far superior than just placing old cloth into an underwear. CSN users who had earlier presented with health problem reported no itching or burning after using *Uger* cloth pads. One user washed *Uger* 60 times and said it is fit to be thrown after 5 washes.

Next we assessed the product through the PASS diagram.

Pillar P – Was found to be partly sustainable For LCA and WF – Cotton cloth is water intensive, with huge cultivation and processing cost. Maintenance cost is similar to cloth. MD - there is significantly less menstrual debris. User threw away 6 *Uger* pads after 12 menstrual cycles. The product had biodegraded within 6 months.¹⁶

Pillar A - Was found to be partly sustainable. The cost of each pad is Rs 80 very high as compared to the cost of a TP or CSN.

Pillar S - was found to be partly sustainable as light colored pads are not easily accepted. However many users saw *Uger* as an upward social move from TP to Cloth.

Pillar S - was found to fully sustainable. No health problems were reported by using *Uger*. The pad design has white coloured fabric is next to skin, allowing user to easily identify abnormal discharges and seek medical advise early. There is no menstrual debris from this product, community health is also maintained.

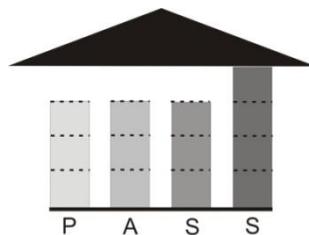


Figure 7 PASS diagram for *Uger* pads Source Author Generated

7 Conclusion

We have understood from the analysis that products like TP and CSN do not fit well into PASS. Old cloth is certainly more sustainable but will be rejected by more users as it is perceived as old fashioned, taking twice the maintenance time as compared to TP. As economics in a family improve the move toward disposable pads is a reality, the other ugly reality is cost to environmental health. *Uger* pads is an option that is taking the middle path, it is trendy and has taken into account health and environment factors. *Uger* pads has also taken care of the social side, livelihood, pads are handmade generating employment within the community. Some factors go against *Uger*, cost, resistance to using white and inconvenience of maintaining, current social sanctions and availability of infrastructure like bathrooms to support reusable options. Creating awareness and advocacy around sustainability can catalyse behaviour change and influence product selection. Users can be made aware that investments are required, that purchasing an expensive *Uger* Pad means is long lasting, that washing effort needs to be made for health reasons, and that *Uger* is healthier options containing no artificial polymers.

An ideal menstrual management product is one that is sustainable from all four aspects, environmental, economic, social and health. Design has a huge role to play in keeping environment safe and in the current scenario sustainability has to be kept central to creating and manufacturing.

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¹ The researcher collaborated with an NGO in Rajsamand district of South Rajasthan, India.

² Studies were done through 5 home visits, visiting spaces used by women for toilet needs, conducting 3 group discussions with 68 young women and girls. All girls and women are from schedule caste families, age group 16 to 50 years. Additionally we interviewed 3 doctors.

³ LCA Life Cycle Assessment assess a product at all stages production, consumption, till disposal

⁴ WF Water Footprint assesses total amount of fresh water, direct, indirect water use by producer and consumer.

⁵ MD Menstrual Debris means residue, remains of menstrual product after use and disposal.

⁶ Cloth is recycled from old garments petticoats, turbans, veils, towels, bed sheets, saris, loin cloth

⁷ *Time Piece*, is a rectangular piece of fleece or poly acrylic fibre. The non woven material, is available in dark shades, the fabric was tested using standards for identification of fiber - ASTM D276 and identification of dyes as per AATCC 161-2012

⁸ Branded sanitary napkins Whisper, Stayfree, Sofy

⁹ Recommended by gynecologists, menstrual products need to be changed 3 to 4 times in a day

¹⁰ It takes 2,720 litres of water to produce one cotton T-shirt

¹¹ Materials in *Time Piece* photodegrade, they physically break down into small pellets and enter waterways causing pollution

¹² It takes a machine 40 seconds to make one sanitary napkin

¹³ More than 20 small and large units sell reusable cloth pads through shops and on the internet. These companies are *Gladrags*, *Party in my Pants*, *Luna* pads and *Pink Robin* and others.

¹⁴ Interviews with gynecologists - cotton cloth will not potentially cause a health problem. Problems occur due to poor personal hygiene and improper care of menstrual cloth.

¹⁵ *Uger* means "New Beginning" in *Mewadi*, the language of Sothern Rajasthan

¹⁶ Used *Uger* pads were buried for 8 months and we found that the waste had reduced significantly