

Technical Appendix: Life Cycle Assessment of

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Authors: Ashima Rajput, Dr Cara Tobin Greene, Sonja Schmid

I. Description

The objective of this study is to establish GHG Emission Factors for hygiene kits adapted to the humanitarian context, and analyse the environmental impact of the product's life cycle to identify key levers for impact reduction through a comparison with a previous variation.

The ICRC updated the makeup of their hygiene kits to fulfil the same functions for their beneficiaries with reduced volume – so that more kits can be shipped with the existing infrastructure.

These updates include changing of the product in some cases, and reducing the number of pieces in other cases. This study standardizes the function of each product in the hygiene kit – and then assesses the change in environmental impact from the older version of the kit to the newer version, as well as what can be done to further improve the kit's overall impact.

The functional unit of this study is complete use of 1 kit for 1 person.

II. Methodology

Life Cycle Assessment is a standard methodology used to estimate the potential environmental impacts linked to the entire life cycle of a product or system (ISO 14040, 14044, 14067). The scope in this study is a cradle-to-grave system boundary for the assessment of impact across the complete life cycle named as follows:

- Raw Material
- Production
- Supply & Distribution
- Use

- Waste Management

To perform these studies, data from the Ecoinvent 3.11 cut-off system model is used, which allocates the entire impact of the material to its primary user without any 'rewards' for its potential for being recycled. The results are calculated following the Environmental Footprint 3.1 indicator system in the below categories:

- Climate Change: Global Warming Potential (GWP100)
- Impact on Human Health:
 - Human Toxicity: Carcinogenic and Non-carcinogenic
 - Ionising Radiation
 - Particulate Matter Formation
 - Photochemical Oxidant Formation

The impact on human health results are weighted using the approach detailed in the EF methodology – with a percentage assigned to each sub indicator, as well as normalized for one citizen so as to aggregate and represent as a single score.

III. Key Parameters & Assumptions

Below are the parameters for the hygiene kit

LIFE-CYCLE STAGE	PARAMETER	DESCRIPTION OF MODEL
Raw Material	Bill of Materials	Varied
	Packaging	Plastic or laminated paper film
Production	Manufacturing Location	Spain
	Manufacturing Processes	Varied

Supply & Distribution	Transport Chain	TRUCK to European port SHIP to distribution port TRUCK to warehouse and/or distribution site
Use	Lifespan	Depending on usage (assumed)
	Usage Processes	Varied
Waste Management	Product Disposal Method	Varied
	Packaging Disposal Method	Open dumping

The kits are made up of the below products:

PRODUCT (USE)	OLD KIT	NEW KIT	DESCRIPTION OF CHANGES
Washing Powder (10 loads)	1 x 450g in a plastic bag	1 x 225g concentrate detergent	Volume reduced; Packed in laminated cardboard box
Sanitary Pad	1 x 10pcs in a plastic bag	No Change	
Hair Shampoo (4 washes)	1 x 275ml in a plastic bottle	1 x 70g solid shampoo	Volume reduced; Packed in laminated paper bag
Body Soap (50 baths/pc)	2 x 100g in plastic bags		Packed in laminated paper bag
Razor (2 shaves)	1 x 5 in one plastic bag	1 x 2 in one plastic bag	New razors are higher quality and therefore 2 new razors provide the same usage as the 5 older variants
Tooth Paste (60 uses)	1 x 75g plastic tube	No Change	
Tooth Brush (90 uses)	1 pce 100% PP in a plastic bag	1 pce 50% PP + 50% wheat straw	Material changed; New version packed in laminated cardboard
Toilet Paper	2 rolls virgin tissue paper in plastic bag	2 rolls recycled, unbleached	Packed in paper wrap

IV. Results & Discussion

Detergent is the biggest contributor of GHG emissions in the new kit, consisting of 27% of the total GHG Emissions with soap being second at 20%.

Soap Bars, mainly due to their water consumption, are the biggest contributors for impact on human health, making up 28% of the total

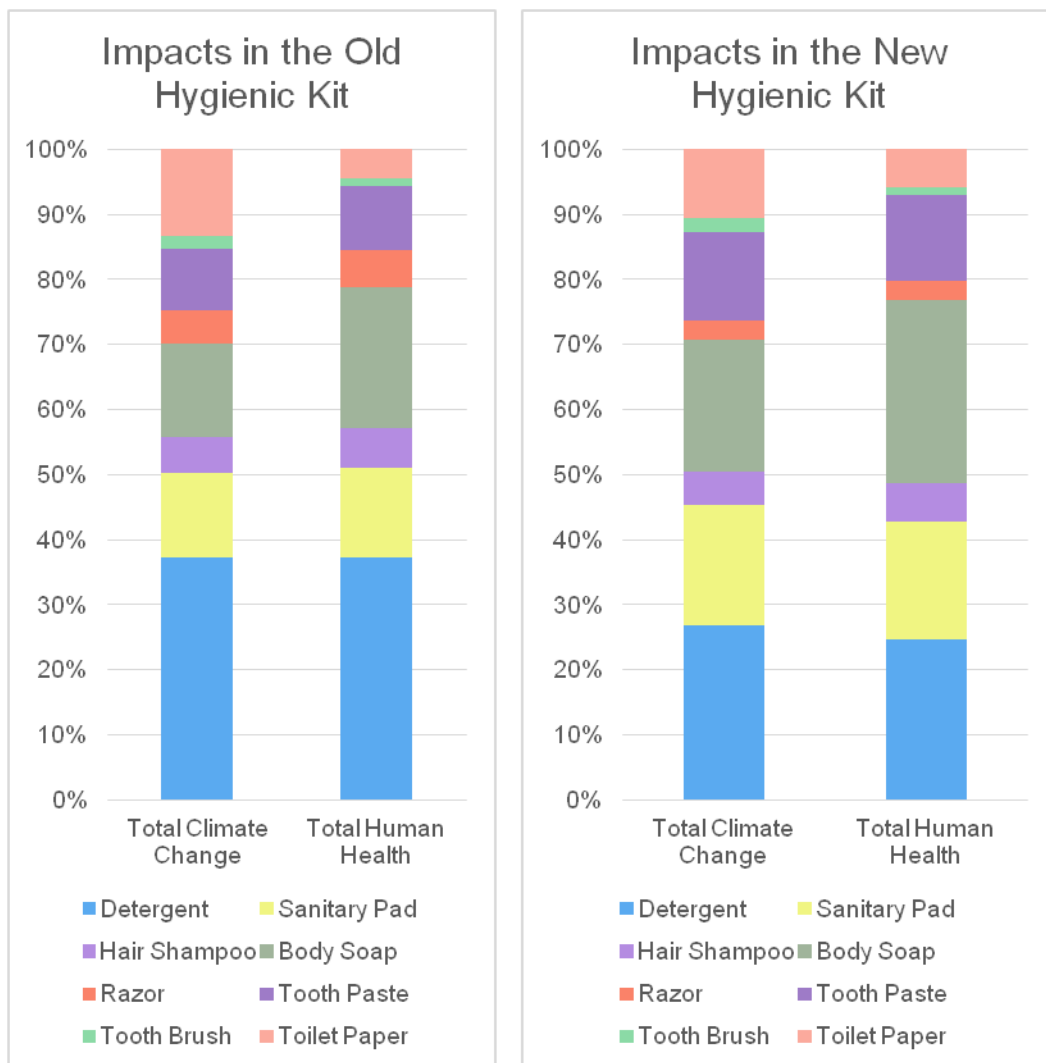
impact on human health, with detergent being the second highest at 25%. Other notably high impact items are sanitary pads, accounting for about 18% of the impact in both the old and new.

Greenhouse Gas (GHG) Emission Factors: New Hygiene Kit

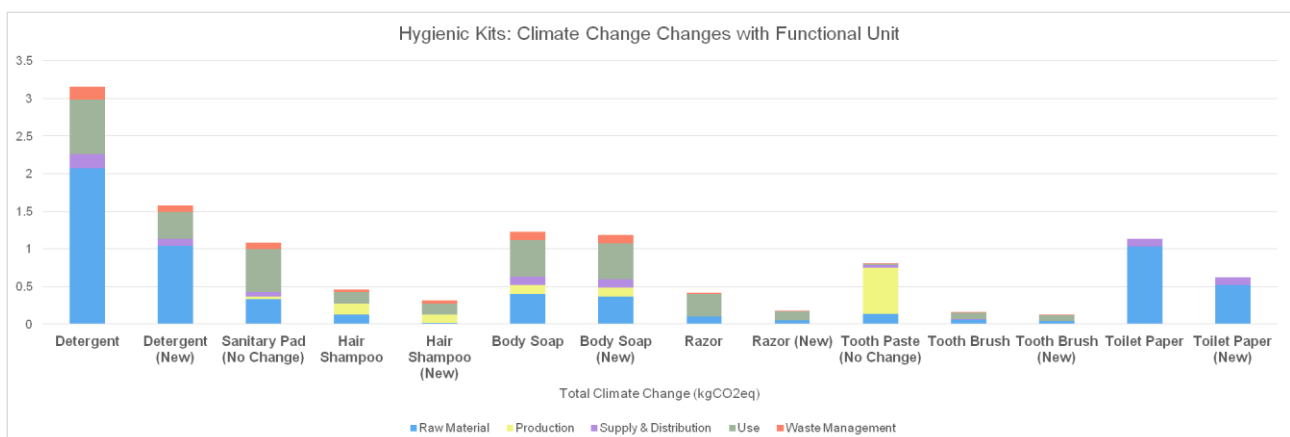
Name	GHG Protocol Category	kgCO ₂ eq/unit
Cradle-to-grave	N/A	5.9
Cradle-to-gate	3.1 Purchased Goods	3.4

Greenhouse Gas (GHG) Emission Factors: Old Hygiene Kit

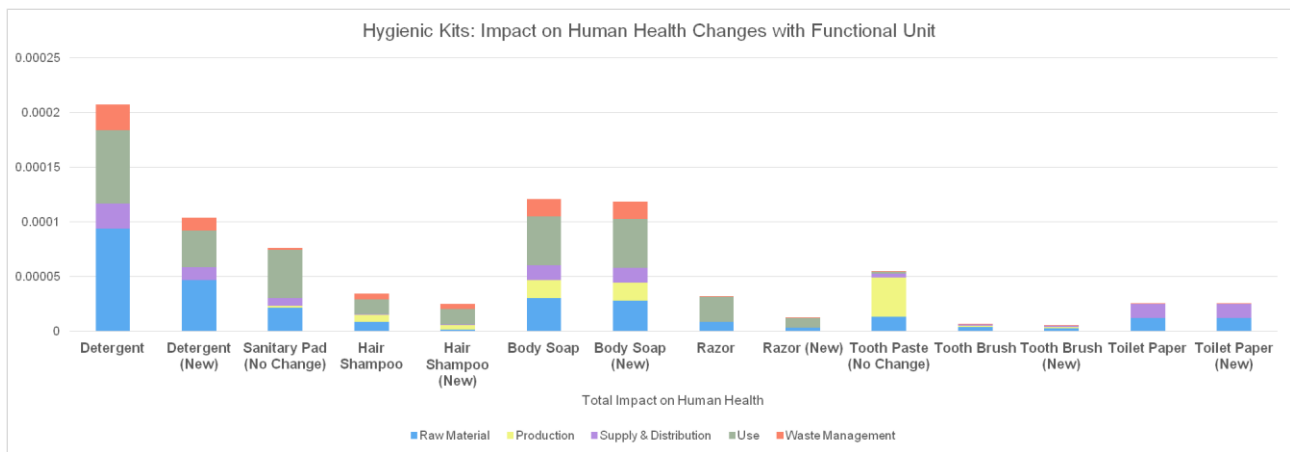
Cradle-to-grave	N/A	8.4
Cradle-to-gate	3.1 Purchased Goods	5.2



With the changes made to products inside the kit, the new hygiene kit has an overall 30% reduction in GHG Emissions & 24% reduction in impact on human health as compared to the previous kit.



The greatest reduction in emissions on a product level was seen in razors (59%), detergent/washing powder (50%) and toilet paper (45%).



The greatest reduction in impact on human health on a product level was seen in razors (61%), detergent/washing powder (50%) and hair shampoo (27%)

NOTE: These improvements assume that the extent of usage of the old and new hygiene kits is the same.

V. Conclusion

The changes made to the hygiene kit had the below effect on its environmental impact according to the updated specifications

- ▼ 30% climate change
- ▼ 24% impact on human health

While the study focuses on a singular hygienic kit, the reduction in volume causes a reduction of impacts related to transport at the level of a shipment which is out of scope of the analysis

For further impact reduction for future revisions of the kit, additional impact reductions of the most impactful products within the hygiene kit would need to be addressed, such as

- Washing powder or detergent
- Soap bars
- Sanitary pads

VI. Bibliography

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