Upcycling as an alternative to depletion of natural resources: the Curitiba scenery.

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Abstract. Earth's resources are limited, and environmental indicators such as Overshoot Day and Ecological Footprint show that humankind is exhausting them before they are able to renew themselves naturally. Hence the need to seek consumption alternatives in order to not exhaust planet Earth. One of these alternatives, upcycling, fits this demand, as it seeks to use waste as raw material, instead of natural resources and all the burden that their extraction causes to the planet. With that in mind, this paper presents the practice of upcycling and its relevance to society; connects the practice with the science of Geography; and reviews the scenery of upcycling in the city of Curitiba, by reviewing the online presence of brands and analysing the connection of the practice with Curitiba's history as a "clean city". It was found that there is a promising scene of the practice in Curitiba, however, it requires a purchasing power that is not accessible to a lower-middle class population and, therefore, the potential of this practice as a factor for large-scale environmental change is questioned. To become more advantageous and, consequently, more widespread, practices such as upcycling should mind two factors: high prices and, for the fashion industry, small availability of clothing sizes. Geography relates to all of this and is able to give the support to make this kind of analysis due to its holistic nature.

Keywords. Upcycling, natural resources, Curitiba

1. Introduction

Planet Earth is an "island" in the universe. That is in the sense that human beings, at least for the foreseeable future, have no other place where they can go (or escape to) and settle. Therefore, the natural resources necessary for the survival and prosperity of all species are limited to what exists here; and the waste from what will no longer be used also remains here. However, this does not seem to stop the current consumerist culture, as Lucietti et al.'s[1] exposition of the concepts of Baumann et al.[2] demonstrates:

"Contemporary society marks the end of rigid standards, stability, security and certainties, emerging indefiniteness, insecurities and fear (BAUMANN ET AL, 2002). It is an unstable society, vulnerable to objects and the instantaneous sensation they can provide. Consumers cling to consumer goods as if they were the solution to many of their problems. [...]

According to Baumann et al., (2002), all products cause environmental impacts during their life cycle in some way, from raw material extraction, production and use to management and disposal. These environmental effects are the results of interrelated decisions made at various stages of the product life cycle."

Confirming the above, some indicators (such as the Ecological Footprint, biocapacity and the Overshoot Day, for example) show that an environmental collapse from over-consumption beyond the planet's capacity of support is approaching ever faster. The Ecological Footprint, for example, was created in 1993 by researchers at Global Footprint Network and measures human demand for natural resources in the form of global hectares (gha), which are "the world average for productive land and water required in a year"[3]. The calculation of the Ecological Footprint is essentially done by measuring levels of CO_2 being released and absorbed by a given area. For this calculation, it takes into account the carbon itself, cultivated areas, pastures, forests, built areas and fish stocks[3]. Biocapacity, on the other hand, "represents the capacity of ecosystems to produce useful resources and absorb the waste generated by humans."[4]. Earth Overshoot Day "marks the date when

humanity's demand for resources and ecological services exceeds what Earth can regenerate that year"[5].

According to this method, the math is not adding up. The Overshoot Day in 2020 was August 22, which means that it would take 1.6 planet Earth to supply human consumption[5]. Still it was an atypical case, it had been 15 years that it was not so late (a fact attributed to COVID-19 and its unfoldings)[6]. WWF Brazil states that "currently, the world average Ecological Footprint is 2.7 global hectares per person, while the biocapacity available to each human being is only 1.8 global hectares"[4]. In Brazil, the Ecological Footprint varied, from 1961 to 2017, between 2.3 and 3.0 global hectares, being at 2.8 gha in 2017[7].

Taking these data into account, one realizes the importance of consuming fewer natural resources and generating less waste. Upcycling is a practice that combines both: "The term characterizes the practice of transforming something that is at the end of its useful life, or that would be discarded as waste, into something of greater utility and value, aiming to reduce the waste of virgin raw materials" [8][9].

Geography is a science that studies the environment, human societies, and the connections between the two, so it is a valid assessment tool to analyze this practice.

2. Research Methods

The objectives of the present work are:

-To present the practice of upcycling and its relevance to society;

-To understand the connection between the practice and Geography;

-To review the scenery of upcycling in Curitiba by:

a)reviewing the online presence of brands (products and prices) and their location;

b)analysing the connection of the practice with Curitiba's history as a "clean city".

The procedure to reach the objectives was to search the internet for articles that talked about upcycling and about the role of Geography in relation to the environment, and to search for brands from Curitiba, searching their websites and social networks for prices and locations, as well as later critical analysis of the material to evaluate the possible conclusions to be drawn from the work.

3. Results

First, the term "upcycling curitiba" was searched on the internet. The results on the first page were:

- Farrapo Couture - a clothing brand created in 2012 by designer Kamila Olstan and located in the São Francisco neighbourhood. The clothes are made from textile waste. Prices of the products in-stock listed on the website range from a "Mullet Gasp" shoe for R$ 120 to a jacket for R$ 364. This brand was present in five different search results, with some interviews with the brand's creator, for example, indicating that it is a prominent brand. Kamila Olstan also hosts the Curitiba unit of the Fabric Bank, an initiative created by Lu Bueno, costume and set designer, which aims to exchange and sell textile waste instead of throwing it away[10]. The Fabric Bank also has an online store[11].

- Transmuta, by Lucas Bettin and Yasmin Lapolli. The physical location was not found, the brand's presence seems to be entirely online. They offer a lot of upcycling courses for fashion designers. Their working style is to transform customers' old clothes into new pieces, styled from previous prepared models of the brand, with advice from the designers. In their order catalog prices vary from a "samba canção" underwear for R$119 to a denim jacket model for R$1139[12][13][14].

Delacrux, located in the Barreirinha neighbourhood in Curitiba, transforms fire hoses into various products such as cases, wallets, backpacks, etc. The products listed on the site range from a small purse for R$15 to a backpack for R$157. The online presence is not very elaborate[15].

Upcycle Curitiba has only a Facebook page with little information, and the last post is from 2017. Apparently, the person responsible for the page focused mainly on decorative wooden objects from other old wooden products (e.g. wooden cooler tank). No values or location described[16].

Later, in a search with the term "city hall" (the choice of this word will be explained below) another brand was found, called Pablita, which the owner, Ligia Massabki, designer and architect, uses construction waste to make accessories. The lowest price of the Elas collection, featured on the designer's site, is R$55 for a ring and the highest is R$135 for a necklace. Of the items for sale, the cheapest one is a ring for R$25. The store location is not listed on the site[17].

In addition to these companies, it was returned as a result an upcycling workshop offered in 2018 by the CAMOD fashion institute, located in Jardim das Américas. For the event, the registrant had to bring a piece of clothing that would otherwise be discarded to transform into another piece of clothing. The entrance fee was R$60[18].

A result also appears for a second hand furniture store called Suma and located in the São Francisco neighbourhood, but upon further research, the store does not appear to have an online presence, except for an Instagram account with only one post from 2019, telling the story of the brand, but not displaying any products or pricing.

Moreover, the city of Curitiba has some titles,

attributed mainly to Jaime Lerner's mandates as the city's mayor[19]:

"[...] "The Ecological Capital", "The Model City", "The Planned City", "Brazilian Capital of life quality" are just a few, among so many that we see being daily conveyed by the most diverse types of media, and whether national or international, they all coincide on one point: that the city of Curitiba is a reference for the whole world in most of the structural sectors of a government".

To find out if the city administration would follow the logic cited above, a search for "upcycling city hall Curitiba" was conducted, and two news articles were found on the city hall's website. One comments on the Curitiba collective Casa 102, which "uses supplier networks close to production and consumption to work with recycled raw materials to offer more sustainable fashion."[20]. The other news article is about the Green Workshop that was offered in 2019, and one of the courses was about upcycling with bicycle parts - the only mention in the article to upcycling[21]. These findings indicate that upcycling is a term that has travelled through this sphere but is not a practice very specifically spread by the city government.

4. Discussion

It is important to know why the effective management of natural resources is necessary. Natural resources are, according to Pena[22], "all elements made available by nature that can be used by human activities", and can be divided into renewable - those that, either naturally or by anthropic action, are renewed frequently, such as animals, vegetation, water - and non-renewable - those that are never renewed or take thousands of years to do so, such as iron, gold or oil. Some sources still list inexhaustible resources, such as wind or sunlight[23][24]. However, the "renewable" element in this classification has a limit. Logically, if the consumption of any resource is faster than its renewal, it can run out. This is a more imminent situation with non-renewables, as the name already indicates, but the same is true for renewables.

It is also highlighted a concept that has been emerging that is interesting for the discussion of this paper: consumerism, which is a:

"[...] consumer movement that began to question the production, mass communication, marketing techniques, the dangerousness of the products placed on the market, the quality of the goods and the information provided by manufacturers, among other items of consumer relations"[1][25].

There are different terms for the process of utilizing waste and consequently saving natural resources. In addition to upcycling, there is recycling and downcycling:

"The separation of materials from household waste for the purpose of bringing them back to industry for beneficiation is the definition of recycling (MONTEIRO, 2001). More specifically, recycling is a process by which waste that is destined for final disposal is collected, processed, and reused (O'LEARY et al. 1999).

In many situations the recycling of waste is not a totally ecological action, since it reduces the quality of the product. Often, recycling can also be considered downcycling, as it decreases the quality of the raw material over time in this process (MCDONOUGH BRAUNGART, 2002). In summary, recycling is generally described as downcycling because the quality of the material degrades in each new life cycle."[8][26][27][28].

Fig. 1 - Image representation of the processes of cycling waste[1].

To relate it to the geographic science, it was used the historical analysis that Raquel Souto[29] makes about ecological thought in Geography. She identified three lines of thought over time, and the one that best fits the vision proposed by this paper is the third and most recent: "[...] the environment is composed by the means including men, but this one is seen as a social man that fits into a society; it is proper of Political Ecology and similar to the approaches adopted in the environmentalist period of geography."[29].

5. Conclusion

From what was exposed in this paper, it is understood that the problem of natural resources is something extremely in vogue today, hence the need to seek consumption alternatives in order to not exhaust planet Earth. One of these alternatives, upcycling, fits this demand, as it seeks to use waste as raw material, instead of natural resources and all the burden that their extraction causes to the planet. In Curitiba, there is a promising scene of the practice, however, it requires a purchasing power that is not accessible to a lower-middle class population and, therefore, the potential of this practice as a factor for large-scale environmental change is questioned. The fast fashion industry is extremely harmful to the environment, but its advantages are reduced prices and greater availability of clothing sizes (accommodating more bodies), so it is evaluated that these two points should be the things to overcome for practices such as upcycling, so that it can be more advantageous and, consequently, more widespread. Geography is a science that gives the support to make this analysis,

due to its holistic nature.

6. References

[1] LUCIETTI, T. J.; TRIERWEILLER, A. C.; RAMOS, M.S.; SORATTO, R. B.; MACIEL, C.E.; VEFAGO. Upcycling as an Alternative for a Sustainable Fashion. In: *7th workshop Advances in Cleaner Production.* Barranquilla, 2018. Available from: http://www.advancesincleanerproduction.net/7th/files/sessoes/6A/3/lucietti_tj_et_al_academic.pdf.

[2] BAUMANN, H.; BOONS, F.; BRAGD, A. Mapping the green product development field: engineering, policy and business perspectives. *Journal of Cleaner Production*, Amsterdam. 2002.

[3] WWF BRAZIL. *Ecological Footprint*: our lifestyle leaves its mark on the planet. 2013.

[4] WWF BRAZIL. *Ecological Footprint? What is it?* [201-?]. Available from: https://www.wwf.org.br/natureza_brasileira/especiais/pegada_ecologica/o_que_e_pegada_ecologica/.

[5] WWF BRAZIL. *Earth overshoot day | Overshoot Day.* 2020. Available from: https://www.wwf.org.br/overshootday/.

[6] BRUMATTI, G; Milestone: this Saturday (08/22) the planet exhausts the natural resources it had for 2020. Terra da Gente. *G1*. 2020. Available from: https://g1.globo.com/sp/campinas-regiao/terra-da-gente/noticia/2020/08/22/marco-historico-planeta-esgota-neste-sabado-2208-os-recursos-naturais-que-tinha-para-2020.ghtml..

[7] GLOBAL FOOTPRINT NETWORK. *Open Data Platform*. 2020. Available from: https://data.footprintnetwork.org/#/?.

[8] BIZARRIA, F. P. A. MOREIRA R; MARINHO, L; BARBOSA, F. The Upcycling Sustainable Production Model: the Case of the TerraCycle Company. In: *Ambiência*, v.14 n.1 p. 72 - 84. Guarapuava, 2018. Available from: https://core.ac.uk/download/pdf/230458418.pdf.

[9] SHOUP, K. *Rubbish! Reuse your Refuse*. New Jersey: Wiley Publishing, 2008.

[10] FARRAPO COUTURE. *About*. Available from: https://www.farrapocouture.com.br/sobre.

[11] FABRIC BANK. *Who are we?* [20--?]. Available from: https://bancodetecido.com.br/quem-somos/.

[12] TRANSMUTA. Transmuta 2021 *Final Catalog*. Curitiba, 2021. Available from: https://drive.google.com/file/d/1nUMVqwTIo_gamJJHclOKQYcTg7x8MhRS/view.

[13] INSTAGRAM. *Transmuta*. Available from: https://www.instagram.com/transmutaoficial/?hl=pt-br.

[14] YOUTUBE. *The TRANSMUTA process of Upcycling*. 2020. Available from: https://www.youtube.com/watch?v=_U48X05QUKY.

[15] DELACRUX. *Delacrux*. Available from: https://www.delacrux.com.br/.

[16] FACEBOOK. *Upcycle Curitiba*. 2017. Available from: https://www.facebook.com/upcyclecuritiba/.

[17] PABLITA. *The Pablita*. Available from: https://www.pablita.com.br/a-pablita/.

[18] CAMOD FASHION INSTITUTE. *Upcycling Workshop*. Available from: https://www.sympla.com.br/workshop-de-upcycling__366382.

[19] SOUZA. T. F. de. *Curitiba and the myth of the "Model City"*. Curitiba, 2012. Available from: https://acervodigital.ufpr.br/bitstream/handle/1884/48812/R%20-%20E%20-%20THAIS%20FIGUEIREDO%20DE%20SOUSA.pdf?sequence=1&isAllowed=y.

[20] CURITIBA. *Collective integrates studios and makes Curitiba a reference in sustainable fashion*. 2018. Available from: https://www.curitiba.pr.gov.br/noticias/coletivo-integra-atelies-e-faz-de-curitiba-referencia-na-moda-sustentavel/46782.

[21] CURITIBA. *Green Workshop follows through Sunday with ten courses on sustainability*. 2019. Available from: https://www.curitiba.pr.gov.br/noticias/oficina-verde-segue-ate-domingo-com-dez-cursos-sobre-sustentabilidade/49038.

[22] PENA, R. F. A. Natural resources. In: *Education World*. [20--]. Available from: https://mundoeducacao.uol.com.br/geografia/recursos-naturais.htm.

[23] DINÂMICA AMBIENTAL. *Understand what inexhaustible resources are and the importance in their management*. 2017. Available from: https://www.dinamicambiental.com.br/blog/curiosidades/entenda-sao-recursos-inesgotaveis-importancia-gerenciamento/.

[24] WIKIPEDIA. *Natural Resources*. 2020. Available from:

https://pt.wikipedia.org/wiki/Recurso_natural.

[25] DIAS, R. *Environmental Management: social responsibility and sustainability*. São Paulo: Atlas, 2009.

[26] MONTEIRO, J. H. P. *Manual for Integrated Solid Waste Management*. Rio de Janeiro: Brazilian Institute of Municipal Administration, 2001.

[27] O'LEARY, P. R. et al. *Decision Maker's Guide to Solid Waste Management*. v. 2. Washington DC: U.S. Environmental Protection Agency, 1999.

[28] MCDONOUGH, W.; BRAUNGART, M. Cradle to cradle: remaking the way we make. BIZARRIA, F. P. A. et al. *83 things*. New York: North Point Press, 2002.

[29] SOUTO, R. D. The role of geography in the face of the environmental crisis. In: *Advanced Studies* 30 (87). 2016. São Paulo. Available from: <https://www.scielo.br/j/ea/a/7TZFwV9vt4KLtV36NwyXf3L/?lang=pt&format=pdf.