Pouring rights contracts & the environment: Crisis, impact, potential solutions

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1. The Anthropocene existential crisis

Anthropocene = human activities dominate Earth systems, e.g. climate

Anthropocene crisis = activities have large negative, unsustainable impacts
  • Climate, biodiversity, ecosystems
  • Society, human health, equity

Large negative impacts result from growth of superfluous, unsustainable production & consumption

Research shows we need to
  • Reduce superfluous consumption
  • Transition to steady state (no growth) economy
  • Center improving health and equity

[Graph showing change in global surface temperature, with observed and reconstructed data from 1850-2020, highlighting super-exponential growth in temperature and unprecedented warming.]
2. What are the direct environmental impacts of PRCs? and, How can we reduce them through Healthy Beverage Initiatives? These are the questions we answered in our life cycle assessment (LCA) research.
"The University is seeking to maximize the return to the institution…"

"[Pepsi] will work the University…to promote sales of the soft drinks…." (pp. 11,57)

Yet Combined total cash payment per year over 10 years, $228,500 = 0.02% of UCSB 2022 budget

Environmental (or health and social) impacts not considered, assumed these will be externalized
The UC, UCSB Healthy Beverage Initiative (HBI)

Evidenced based goals of HBI
- Reduce sugar sweetened beverage (SSB) consumption
- Increase availability and consumption of tap water in reusable bottles

Benefits of HBIs
- Improved Health
- Reduced Environmental Impacts
Methods for our LCA study at UCSB

UCSB Dining beverage purchase data
- 2247 beverage purchases of 993,901 individual beverages over 12 mos (2019-20) = 940,773 liters

Categorizing beverages and containers
- Each beverage classified by
  - SSB (sugar sweetened beverage) or non-SSB status
  - 10 beverage type
  - 5 container types
- Plus filtered tap water from water filling stations

Environmental life cycle assessment (E-LCA)
- Impacts, cradle to grave, from literature
  - Greenhouse gas emissions, as CO$_2$e
  - Blue water (fresh surface & ground water, not rain) use
  - Plastic pollution
- Separately for beverage liquid and container
Results

Overall

- Lots of variation in impacts
- Most volume purchased
  - SSBs: soda, tea, juice & almond milk
  - Non-SSBs: bottled water, soda, animal milk & juice

Impacts of containers per liter of containers

Climate impact
- Greatest for glass, aluminum, plastic
- Least for reusable stainless steel water bottle

Blue water impact
- Greatest for plastic, carton, aluminum
- Least for reusable stainless steel water bottle

Plastic pollution
- Greatest for PET plastic
- Significant for bag-in-box & carton
Impacts per liter of liquid beverage

Impacts of SSB & non-SSBs versions very similar; sugar has low impact

Climate impact for both non-SSBs and SSBs
- Highest for animal milk, juice, coffee+milk, and soy milk
- Soda very low
- Tap water the lowest

Blue water impact for both non-SSBs and SSBs
- Highest for animal milk, coffee+milk, juice, and almond milk
- Soda very low
- Tap water the lowest

Note: ‘juice’ SSBs = ‘juice drinks’
HBI counterfactual scenarios

Large differences between scenarios

Baseline = UCSB with Pepsi PRC

Scen 1 = only tap water = lowest for all impacts

Scen 2.1 = replace SSBs with bottled water and non-SSBs: climate, plastic, & blue water impacts greater than baseline

Scen. 5.1 = replace all plastic with aluminum containers: climate and blue water impact not changed, plastic pollution decreased
“Pepsi shall have the right to place no less than 80 vending machines. And UCSB helps to identify optimal locations for such equipment” (PRC, p. 6)

<table>
<thead>
<tr>
<th>Unit</th>
<th>Number</th>
<th>Volume sold (L yr⁻¹)</th>
<th>Electricity cost ($)</th>
<th>Climate impact (kg CO₂e)</th>
<th>Blue water impact (liters)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vending machines</td>
<td>90</td>
<td>104,397</td>
<td>$36,894</td>
<td>$0.35</td>
<td>1.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$0.35</td>
<td></td>
<td>788,400</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.6</td>
</tr>
<tr>
<td>Fountain machines</td>
<td>13</td>
<td>313,500</td>
<td>$5,329</td>
<td>$0.08</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$0.08</td>
<td></td>
<td>113,880</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.4</td>
</tr>
<tr>
<td>Retail refrigerators</td>
<td>NA</td>
<td>522,876</td>
<td>$8,189</td>
<td>$0.02</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$0.02</td>
<td></td>
<td>174,989</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.3</td>
</tr>
<tr>
<td>Total</td>
<td>940,773</td>
<td>$50,412</td>
<td>223,309</td>
<td>1,077,269</td>
<td></td>
</tr>
</tbody>
</table>

Table SI.13. Environmental impact of cooling beverages on campus.
Direct environmental impacts of beverages relatively *very* small

First year students, 64% total beverage impact

Their **per capita** beverage environmental impact for first year students

- Blue water: 13% of North American diets
- Plastic pollution: 16.6% of plastic pollution in California
- Climate (42.2 kg CO2e/yr):
  - = 2.4% of the US diet mean, 2005–2010
  - = 0.24% of total US per capita emissions, 2019

Our results useful for choosing between HBI scenarios

**Indirect impacts much greater**
3. Indirect impacts of PRCs

Health care climate impact

Added sugar intake in SSBs, risk of NCDs, and environmental impact of related health care

Estimated per year over 20 yrs

- Based only a few NCDs
- Emissions from health care = 85.8 MT CO2e/yr, = 17% of the baseline CO2e/year from all beverages on campus
- Health care costs from added-sugar associated NCDs = $393k/yr = 1.7 x PRC revenue!
- Costs externalized to students & society, private prioritized over public good

<table>
<thead>
<tr>
<th>Beverage type</th>
<th>g/L</th>
<th>Amount kg</th>
<th>%</th>
<th>g L⁻¹</th>
<th>Amount kg</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSBs, added sugar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>coffee</td>
<td>31</td>
<td>22</td>
<td>0%</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>coffee + milk</td>
<td>46</td>
<td>1,001</td>
<td>2%</td>
<td>22</td>
<td>12</td>
<td>0.2%</td>
</tr>
<tr>
<td>juice</td>
<td>101</td>
<td>9,027</td>
<td>21%</td>
<td>77</td>
<td>3,087</td>
<td>53.0%</td>
</tr>
<tr>
<td>almond milk</td>
<td>13</td>
<td>869</td>
<td>2%</td>
<td>0</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>animal milk</td>
<td>29</td>
<td>675</td>
<td>2%</td>
<td>47</td>
<td>2,665</td>
<td>45.8%</td>
</tr>
<tr>
<td>plant milk, other</td>
<td>63</td>
<td>474</td>
<td>1%</td>
<td>0</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>soy milk</td>
<td>47</td>
<td>1,480</td>
<td>3%</td>
<td>4</td>
<td>44</td>
<td>0.8%</td>
</tr>
<tr>
<td>probiotic</td>
<td>28</td>
<td>155</td>
<td>0%</td>
<td>31</td>
<td>13</td>
<td>0.2%</td>
</tr>
<tr>
<td>soda</td>
<td>100</td>
<td>26,984</td>
<td>63%</td>
<td>0</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>tea</td>
<td>18</td>
<td>1,964</td>
<td>5%</td>
<td>0</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>68</td>
<td>42,649</td>
<td>100%</td>
<td>28</td>
<td>5,821</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

- Emissions from health care = 85.8 MT CO2e/yr, = 17% of the baseline CO2e/year from all beverages on campus
- Health care costs from added-sugar associated NCDs = $393k/yr = 1.7 x PRC revenue!
- Costs externalized to students & society, private prioritized over public good
Biggest environmental impact: PRCs re-enforce consumerism

- Neoliberalism dominates economics & society
- Re-enforces the human potential to prioritize individual and private good values, humans over the environment, consumerism, market based solutions
- Behaviors generated by these values shown to increase human misery
- Key, scientifically unsupported assumption of neoliberalism is absolute decoupling of economic growth from environmental impact by increasing efficiency, so that economies and consumption can grow indefinitely (‘green growth’)

(Cleveland 2023)
4. The Anthropocene crisis demands science-based solutions, not market-based solutions

• ‘Comforting lies’ will get pretty uncomfortable, because they won’t avert crisis

• Accepting ‘unpleasant truths’ and taking action will lead to happier, healthier future
‘Sufficiency’ increasingly discussed and researched as a necessary response to the Anthropocene crisis

It means rejecting neoliberal assumptions about ‘green growth’

So we can prosper within sustainable boundaries, and instead

• Emphasizing human potential to prioritize community and public good values

• For HBIs, replacing commercial beverages with tap water as much as possible

• Replacing some commercial beverages with healthier, more environmentally sustainable beverages, while reducing consumption

• Reducing superfluous consumption, which can increase health & happiness

Sufficiency can transform human impact
The correlation between well-being (happiness) and consumption

- There are diminishing returns to well-being from increasing consumption
- Superfluous consumption of over-consuming populations does not contribute to well-being, but has large environmental impact
- Superfluous consumption deprives under consuming populations of resources needed for well-being
- Sufficient consumption optimizes well-being & environmental impact

Happiness (explained by income, healthy life expectancy, social support, freedom, trust, generosity)

- Costa Rica: US$=9,733 kcal=2848 meat=15 GHGE=1.6 LE=81 H=7.1 (16)
- Haiti: US$=767 kcal=2091 meat=5 GHGE=0.3 LE=63 H=3.4 (140)
- USA: US$=51,433 kcal=3682 meat=37 GHGE=14.2 LE=77 H=7.0 (19)

KEY
US$=GDP (gross domestic product) per cap per year, 2013
kcal=kcal per capita per day in food supply, 2013
meat=ruminant meat supply, kg per capita per year, 2013
GHGE=MT CO₂e per cap per year, 2012
LE=life expectancy, years, 2022
H=Self-reported happiness (global rank), 2021

GDP, kcal food, meat, and GHGE per cap per year

More sufficient consumption

Superfluous consumption

There are diminishing returns to well-being from increasing consumption. Superfluous consumption of over-consuming populations does not contribute to well-being, but has large environmental impact. Superfluous consumption deprives under consuming populations of resources needed for well-being. Sufficient consumption optimizes well-being & environmental impact.
Sufficient consumption is key to avoiding Anthropocene catastrophe

Reducing superfluous consumption by over-consuming populations can make resources available to under-consuming populations

...and everyone can be happier and healthier

<table>
<thead>
<tr>
<th>Country</th>
<th>US$</th>
<th>kcal/day</th>
<th>Meat (kg)</th>
<th>GHGE (MT CO₂e)</th>
<th>LE (years)</th>
<th>Happiness (rank)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haiti</td>
<td>767</td>
<td>2091</td>
<td>5</td>
<td>0.3</td>
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<td>81</td>
<td>7.1 (16)</td>
</tr>
</tbody>
</table>
Colleges and universities should lead response to the Anthropocene crisis

- Have public good mission
- Are centers of the research that has established our sustainable environmental and social limits
- Are centers of learning for young people in US: in 2020
  - 74.5% of 18–19-year-olds
  - 40.6% of 20–24-year-olds
- Where students establish life time consumption habits

Beverages on campus are a small part, but a good place to start!
To make our campuses, and the world, more environmentally sustainable (and healthier & more equitable)

We need to accept scientific findings & prioritize public good

...difficult, but are there are no alternative ways to avoid catastrophe


