



# Global Plastics Tool

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A Samuel Pottinger | PH 101 | April 14



**Hello!** I'm a data scientist, software engineer, and information designer. Plastics, high potency greenhouse gasses, agriculture, fire recovery.

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**Sam Pottinger**

A more human-centered AI/ML

<https://gleap.org>

<b>UC Berkeley</b>	Data + Environment
EVERY	Data + Synthetic Biology
IDEO	Data + Design
Plenty	Data + Indoor Agriculture
Apple	Data + Engineering
Google	Data + Visualization
LabJack	Data + Hardware

Processing	Data + Love in Java
Sketchingpy	Data + Love in Python



**A sustainable healthy world requires  
system-level intervention.**

We need tools which allow us to engage in  
collaborative systems design.

We need media for thought.

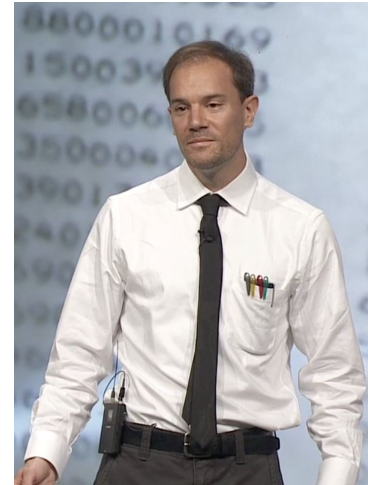
We will explore these ideas through plastics  
pollution.

*What is the square which when taken with ten of its roots will give a sum total of thirty nine? Now the roots in the problem before us are ten. Therefore take five, which multiplied by itself gives twenty five, an amount you add to thirty nine to give sixty four. Having taken the square root of this which is eight, subtract from this half the roots, five leaving three. The number three represents one root of this square, which itself, of course is nine. Nine therefore gives the square.*

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$$x^2 + 10x = 39$$

# Media for thought



# The most popular games in 1999

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GameSpot may receive revenue from affiliate and advertising partnerships for sharing this content and from purchases through links.

## 1999's Best-Selling Games

The numbers are in. PC Data has compiled a list of the 20 best-selling games of last year.



# Today

> **The outlook for plastics.**

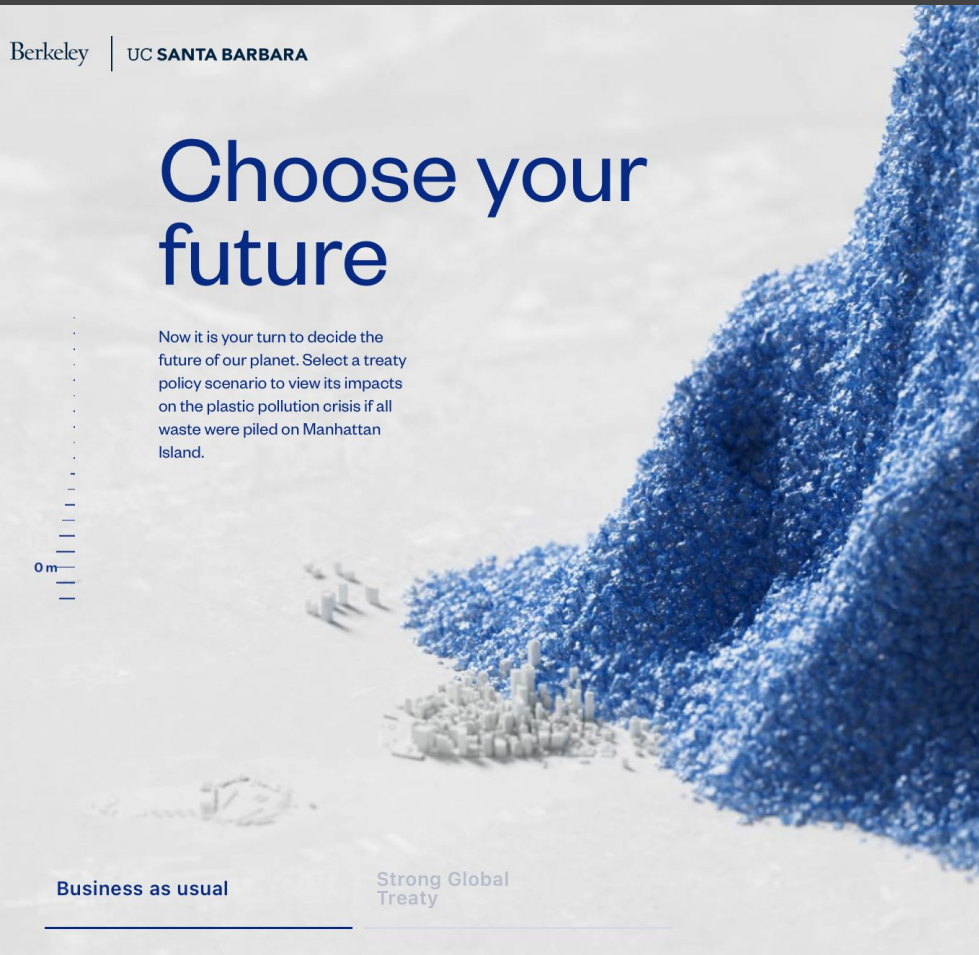
A systems perspective on plastics.

Brief group exercise.

Learnings for systems and public policy design.



# A massive mess of plastic.



<https://>

[plasticstreaty.](https://plasticstreaty.berkeley.edu)

[berkeley.](https://plasticstreaty.berkeley.edu)

[edu](https://plasticstreaty.berkeley.edu)

# Harms on the environment and us.

 SPECIAL ISSUE REVIEW

## The global threat from plastic pollution

MATTHEW MACLEOD , HANS PETER H. ARP , MINE B. TEKMAN , AND ANNIKA JAHNKE  [Authors Info & Affiliations](#)

SCIENCE • 2 Jul 2021 • Vol 373, Issue 6550 • pp. 61-65 • DOI: 10.1126/science.abc5433


 98,581  1,550  

### Abstract

Plastic pollution accumulating in an area of the environment is considered “poorly reversible” if natural mineralization processes occurring there are slow and engineered remediation solutions are improbable. Should negative outcomes in these areas arise as a consequence of plastic pollution, they will be practically irreversible. Potential impacts from poorly reversible plastic pollution include changes to carbon and nutrient cycles; habitat changes within soils, sediments, and aquatic ecosystems; co-occurring biological impacts on endangered or keystone species; ecotoxicity; and related societal impacts. The rational response to the global threat posed by accumulating and poorly reversible plastic pollution is to rapidly reduce plastic emissions through reductions in consumption of virgin plastic materials, along with internationally coordinated strategies for waste management.

Review article

## The potential impact of nano- and microplastics on human health: Understanding human health risks.

Ewa Winiarska <sup>a</sup>, Marek Jutel <sup>a b</sup>, Magdalena Zemelka-Wiacek <sup>a</sup>  

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### Highlights

- Exposure to nano- and microplastics in humans potentially leads to serious health issues, including various cancers, respiratory disorders, and inflammatory bowel disease.
- Understanding molecular mechanisms underlying the interaction of plastics with human cells may help

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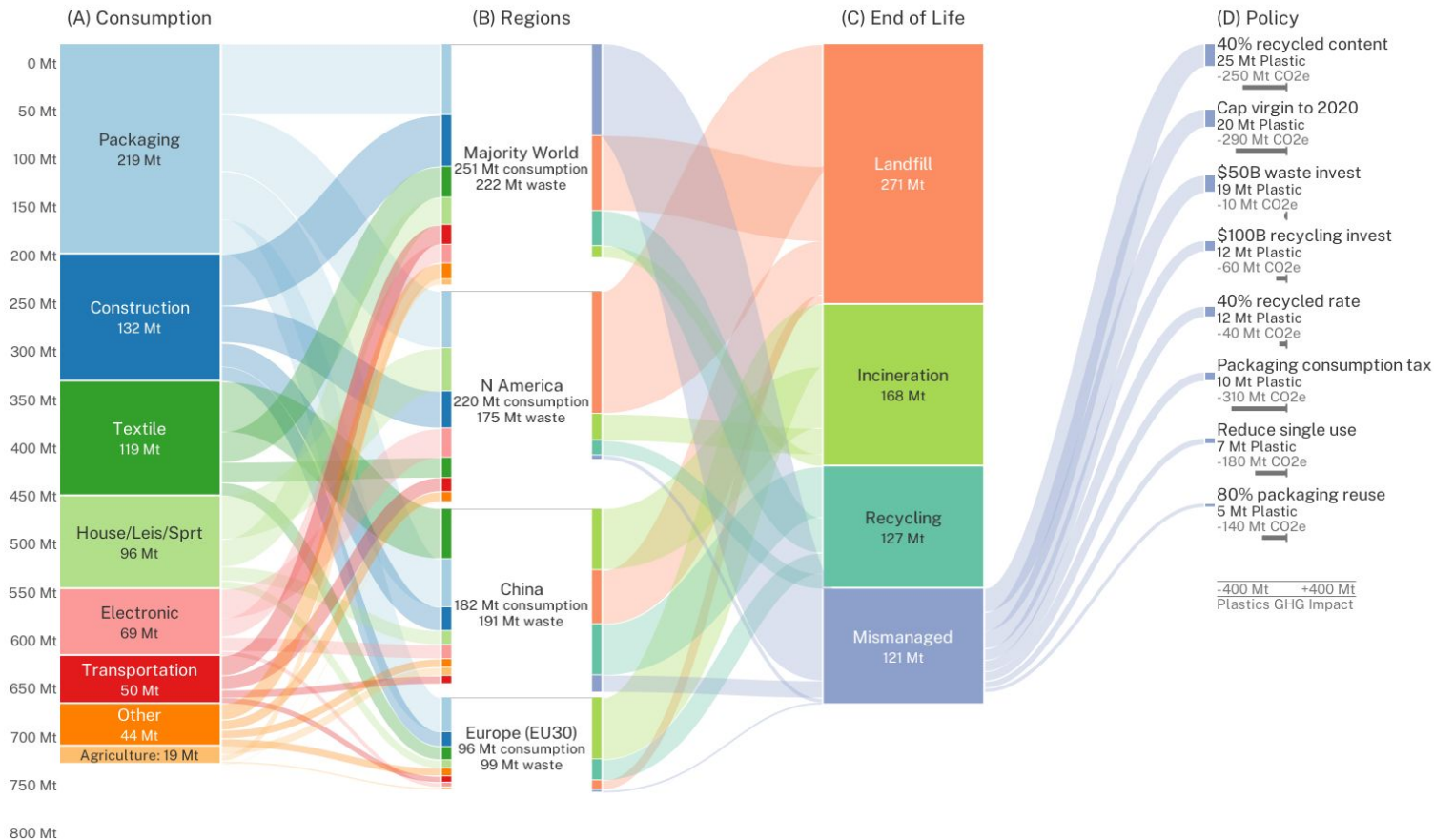
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# Plastic isn't in just one thing.



# We've solved something like this before.



## HEALING THE OZONE LAYER COOLING THE PLANET

### MONTREAL PROTOCOL CONTRIBUTES TO THE



Given all of these factors and more, the Montreal Protocol is considered to be one of the most successful environmental agreements of all time. What the parties to the Protocol have managed to accomplish since 1987 is unprecedented, and it continues to provide an inspiring example of what international cooperation at its best can achieve.

We are trying to do it again.

An underwater photograph showing marine life, including a striped fish, swimming near a large, tangled mass of plastic debris and other pollutants in the water.

# Intergovernmental Negotiating Committee on Plastic Pollution

NOTIFICATIONS

In March 2022, at the [resumed fifth session of the UN Environment Assembly \(UNEA-5.2\)](#), a historic resolution was adopted to develop an international legally binding instrument on plastic pollution, including in the marine environment.

# Today

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# We are going to step into the policy makers' shoes.

## Global 2050 Plastics Projections

Mismanaged Waste ⓘ  
**71.7**  
Million Metric Tons

Incinerated Waste ⓘ  
**129.3**  
Million Metric Tons

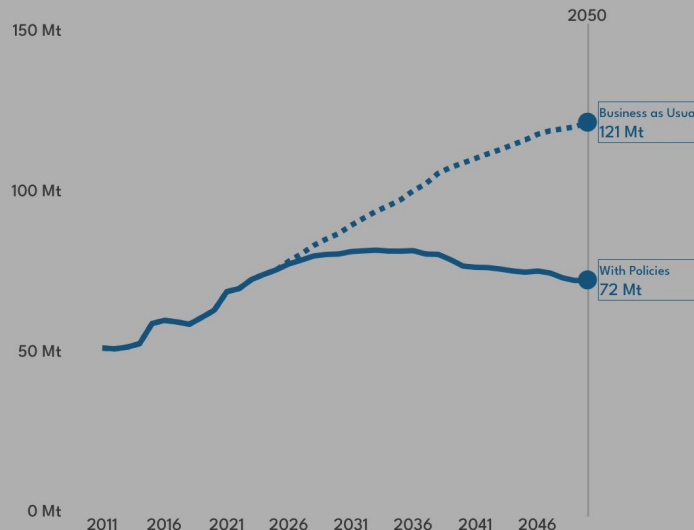
Landfill Waste ⓘ  
**118.4**  
Million Metric Tons

Gross GHG ⓘ  
**2755.7**  
Million Metric Tons

## Policies

- ☐ High > Reduction in Single Use Packaging ⓘ
- ☐ 90 > % Reduced Additives ⓘ
- ☐ Ban Polystyrene Packaging ⓘ
- ☐ Ban Waste Trade ⓘ
- ☒ Cap to 2020 Virgin Production ⓘ
- ☐ 40 > % Min Recycle Collection Rate ⓘ
- ☐ 80 > % Packaging Reuse / Life Extension ⓘ
- ☐ 40 > % Min Recycled Content ⓘ
- ☐ High > Packaging Consumption Tax ⓘ
- ☐ 100 > Billion USD for Plastic Recycling ⓘ
- ☐ 50 > Billion USD for Waste Infrastructure ⓘ
- ☒ Custom ⓘ

## Global Annual Rate of Mismanaged Waste as Million Metric Tons ⓘ



<https://>

[global-](#)

[plastics-](#)

[tool](#)

[.org](#)

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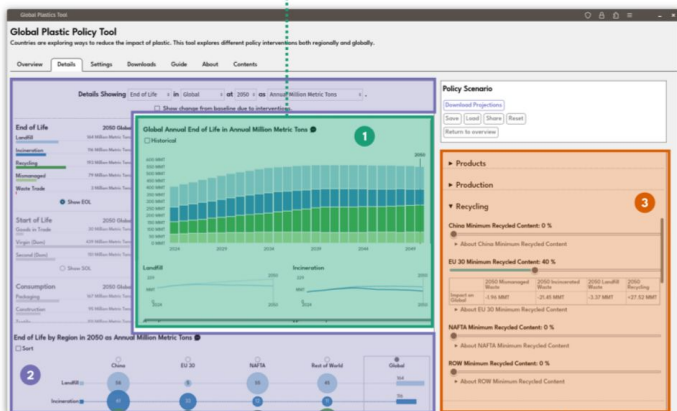
Brief group exercise.

**> Learnings for systems and public policy design.**



# Users as co-creators (using game design).

## 1. Valley: Current region shows deep detail / local landmarks



## 3. Mechanics impact whole world

## 2. Over the hill: Landmarks support quick insights and navigation

Figure 2: The details tab use “valleys” to structure primary and secondary loops.



Game Maker's Toolkit

## How Nintendo Solved Zelda's Open World Problem

2 years ago

2.9M views

Be there.



# Speak their language.

## Global 2050 Plastics Projections

Mismanaged Waste ⓘ

120.9

Million Metric Tons



Incinerated Waste ⓘ

167.9

Million Metric Tons

Landfill Waste ⓘ

270.9

Million Metric Tons

Gross GHG ⓘ

1.1 Gt CO<sub>2</sub>e

Million Metric Tons

### China Packaging Consumption Tax: 0.0 USD PPP cents

#### ▼ About China Packaging Consumption Tax

Slider for chinaPackagingTax: The amount of tax per article imposed as a consumption tax in China. Assumes this is a more immediate policy with short phase in.

[Write up for China Packaging Consumption Tax](#)

```
1 # Determine formula
2 var power = in.chinaTaxPower;
3 var multiplier = in.chinaTaxMultiplier;
4 var offset = in.chinaTaxOffset / 100; # U
5
6 # Determine change immediate
7 var percentDecreaseEnd = (in.chinaPackag
8 limit percentDecreaseEnd to [0, 1];
9 var percentDecrease = 0;
10 change percentDecrease by percentDecrease
11
12 # Determine change delayed
13 var delayYears = lifecycle of [out.china.c
14 var percentDecreaseDelay = 0;
15 var startYearDelay = in.startYear + delay
```

## Policies

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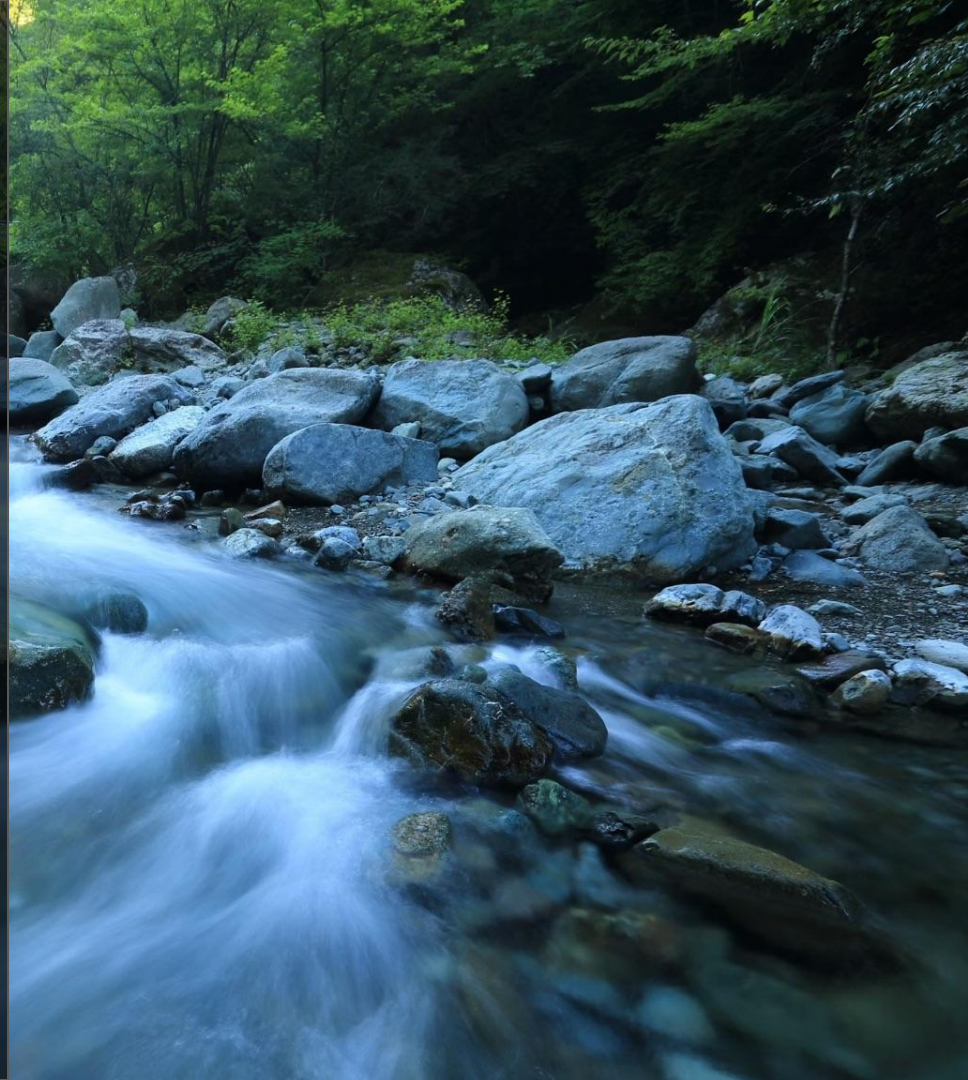
Add Save Load Share Reset

Customize Details Export CSV



**Thank you.**

Works cited attached.



## Bonus Activity

<https://foodsimsf.com>

**I teach! Learn more...**

<https://interactivedatascience.courses>

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