Discussion #1: Easter Island

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Class Web Site: http://www.atmos.umd.edu/~rjs/class/honr229L

ELMS Page: https://myelms.umd.edu/courses/1249026

https://goo.gl/images/mH3D1v

4 September 2018
AT 00: Initial Survey

1) Where do you stand on the climate change debate? (2 pts)

In other words, are you a Believer, a Denier, or Unsure? In addition to stating where you stand on the debate, please expound upon your standing in two to three sentences.

Based on scientific evidence, the Earth's climate is changing and it's pretty clear that humans are the main cause. I don't like to use the term "believer," because it suggests that whether or not climate change is "real" is a matter of personal opinion rather than the reality of the world we live in. Though I haven't analyzed every research paper about climate change to make sure their data really is statistically significant, I understand enough about science to know that climate change is a real threat.

… [nonetheless, I] wouldn't feel comfortable with trying to debate a climate change denier.
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Earth’s Climate History

http://www.planetaryvisions.com/display.php?id=4101_1&t=1&w=1

Climate History, 500 Million ybp to Present

Figure 1.1, updated

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Today’s polar caps formed about 33.6 millions years ago
https://www.natureworldnews.com/articles/2155/20130529/antarctic-ice-caps-formed-33-6-million-years-back-researchers.htm
2) On a scale of 1 to 10, 1 being least important and 10 being most important, what priority should the United States government give towards curbing our nation’s emissions of fossil fuels over the course of your lifetime, such that by year 2060, half of all energy in the U.S. would be achieved by renewable sources? (4 pts)

Please note:

- such a large scale transition to renewable energy will undoubtedly cause some economic disruption; the amount is hotly debated
- by renewable source, we mean technologies such as solar, wind, hydro, biofuels, even carbon capture and sequestration
- In addition to stating the priority level, support your reply with two to three additional sentences.

Though it may seem immediately more efficient on a immediate level to ignore the possibly negative environmental impacts of our actions, renewability and conservationist policies preserve resources and efficiency for the future, and also help to alleviate other problems such as the spread of disease. This should be a high priority because pushing a solution further down the line will only worsen the problem and make it harder to solve in the future.

... although there may be serious economic implications for the US, which may need to seriously reform the shape of its workforce, the failure to control climate change will have economic ramifications that are far more wide-reaching and devastating.
AT 00: Initial Survey

In terms of curbing dire effects of climate change at an international level, which of the following four factors do you think is most important:

1. designing living spaces in a sustainable manner (i.e., so that cars are not essential, locally sourced food can be consumed, etc): 5
2. generating electricity in a manner that releases little to no greenhouse gases to the atmosphere: 14
3. changing our dietary preferences to minimize the consumption of meat, especially red meat: 0
4. limiting population growth and ultimately reducing global population levels: 3

All of these items are important! Will touch upon each at some point during this presentation, and each will be discussed throughout this semester.

Please note the authority responsible for each action differs:

1. Mayors & urban planners ⇒ smart growth
2. National and state governments, utilities, public service commissions ⇒ carbon tax
3. Individuals ⇒ health, religion, culture
4. Individuals BUT often attempted by governments ⇒ very controversial
   If diet is the so-called “elephant in the room” when discussing climate change, then planned population growth control is the proverbial “herd of elephants”
AT 00: Initial Survey

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... According to the EPA, 28.5% of 2016 greenhouse gas emissions was from the transportation sector. If we as a society design our living spaces in a sustainable manner then hopefully we would be able to greatly reduce the largest source of greenhouse emissions.

... This is the most important factor because it allows individuals to feel empowered in helping the environment.
In terms of curbing dire effects of climate change at an international level, which of the following four factors do you think is most important:

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Connection to Easter Island

Jared Diamond describes “Easter Island as a “cold dry desert” (pg 116) and states it has “among the lowest rainfalls” (pg 118) of surveyed islands.

Also, “Easter’s windy, dry, cool climate” is mentioned when the use of rocks in fields is described (pg 92).

Anyone remember the latitude of Easter Island?
Easter Island

Emma Walz
4 September 2018
Easter Island is the most extreme example of:

- “deforestation” (pg. 115)
- "a society that destroyed itself by overexploiting its own resources.” (pg. 118)
ahu sites

Puna Pau

TEREVAKA

Anakena

Paro

POIKE

Rano Raraku

Motu Iti

Orongo

Vinapu area

RANO KAU

• ahu sites

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Main Points

• How does the geography of Easter Island differ from other Polynesian islands? How did this predispose the island to its fate?
  – Isolated, subtropical, limited freshwater, less tropical crops, windy, no coral reefs/fish, without makatea, no aerial ash fallout, lowland, small size

• Why do estimates of Easter’s population rise as far as 30,000 inhabitants, when Captain Cook in 1774 recorded only 2,000?
  – Manpower necessary for moai industry, house ruins, post-epidemic/Peruvian slave ships/population crash

• What elements allow us to identify the island as “collapsed”?
  – Deforestation, low population, poor technology/tools, low biodiversity, cannibalism

• What three arguments can be made that prove human exploitation was the biggest cause of collapse?
  – While there is a possibility of European presence prior to 1774, evidence of environmental deterioration goes as far back as the 1300s
  – Climate change had little effect on the island as seen by evidence that trees had survived droughts and El Niño’s for tens of thousands of years
  – You would think that the islanders would be able to see that they were destroying their resources, but we have hindsight bias and there may have been other political factors at play.
What were some things that surprised you in this chapter?

- What 9 aspects affect deforestation on Polynesian islands?
- What factors contributed to Easter’s collapse, besides deforestation?
Critical Thought

• Are the assumptions that Diamond makes based on historical accounts and paleontological data valid?
• With what confidence can we weigh the impact of certain factors over other on the collapse of Easter Island?
• Is the impact of Europeans on native peoples understated?
• In what ways is the demise of Easter Island a possible prediction for the future of our planet?
  – Humans are exploiting natural resources at unsustainable rates
  – Countries must work together like Easter’s 12 clans, as they affect each other
  – Earth is isolated in space as Easter is in the Pacific Ocean
• In what ways does our planet differ from Easter Island, that would allow us to avoid this fate?
  – Improved technology & innovation
  – More biodiversity
  – Continents provide some isolation in ecosystems
  – Variety in governance allows societies to choose different paths
  – Historical knowledge
• Should we consider this a cautionary tale?
The Metaphor

• On Easter Island, little evidence is available to present climate change as a factor in society’s collapse. What are some ways climate change might play into the potential collapse of humanity?
  – Rising sea levels threaten freshwater sources through flooding and storm surges.
  – Melted icecaps decrease salinity of oceans, affecting currents (gyres) that bring warm water to coasts and freezing over densely populated areas.
  – High levels of CO₂ can acidify oceans and damage marine life and phytoplankton’s contribution of oxygen into the atmosphere.
  – Increased occurrences of extreme weather events
  – Extreme weather includes droughts that impact agriculture and farmland
  – Animal migrations due to habitat loss can increase the spread of disease

• How do you meet the needs of a growing population without depleting all available resources?
  – Sustainable forest management, crop rotation, domesticating livestock
Final Thoughts?
HONR 229L Peer Evaluation

Presenter’s name:
Date:

1) Was the discussion leader prepared?
   1  2  3  4  5
   very well

2) Did the discussion leader speak clearly?
   1  2  3  4  5
   very clearly

3) Overall rate the delivery, based on factors such as clarity, conciseness, and ability to engage others in the discussion
   1  2  3  4  5
   excellent

Additional comments:
Rapa Nui: The Last Word

Ross Salawitch
Describe something stated in this chapter you might challenge, should you for instance be on a debate about Rapa Nui and the chapter you have just read is the opening argument from the other side.

⇒ One characteristic shared by most successful professionals is the ability to think critically about what is stated by others!
Describe something stated in this chapter you might challenge, should you for instance be on a debate about Rapa Nui and the chapter you have just read is the opening argument from the other side.

⇒ One characteristic shared by most successful professionals is the ability to think critically about what is stated by others!

I have often asked myself, “What did the Easter Islander who cut down the last palm tree say while he was doing it?” Like modern loggers, did he shout “Jobs, not trees!”? Or: “Technology will solve our problems, never fear, we’ll find a substitute for wood”? Or: “We don’t have proof that there aren’t palms somewhere else on Easter, we need more research, your proposed ban on logging is premature and driven by fear-mongering”? Similar questions arise for every society that has inadvertently damaged its environment.
Describe something stated in this chapter you might challenge, should you for instance be on a debate about Rapa Nui and the chapter you have just read is the opening argument from the other side.

⇒ One characteristic shared by most successful professionals is the ability to think critically about what is stated by others!

Easter’s sole domestic animal, the chicken, was also typically Polynesian and ultimately Asian, as were even the rats that arrived as stowaways in the canoes of the first settlers (pg 86)

Easter is the sole known Polynesian island at whose archaeological sites rat bones outnumber fish bones (pg 105)

Land birds disappeared completely from the diet … from some combination of … and predation by rats (pg 106)

… every Easter palm nut that has been recovered shows tooth marks from rats gnawing on it and would have been incapable of germinating (pg 106)

The only wild food source whose availability remained unchanged was rats (pg 108)

Lack of radiocarbon-dated palm nuts after 1500 (pg 113)
The *Rapa Nui Journal* has been described as the “premier source for Easter Island events and scientific studies”. The journal covers the subjects of archaeology, anthropology, botany, cultural resource management, cultural and ethnic studies, ecology, geology, field reports, history, linguistics, musicology, and many other topics specifically related to Easter Island, but also including other Pacific islands. In addition, the journal provides book reviews and Pacific island news. The journal was published in 30 volumes from 1986 through 2016.

http://islandheritage.org/wordpress
Palm trees vanished from some areas of Hawaii after humans had settled, but well before charcoal appears in the sedimentary record … the Polynesian rat has been implicated
Prehistoric rat-gnawed *Jubaea* nuts from Rapa Nui
Hunt & Lipo, 2007

Hundreds of palm nuts preserved in caves around Rapa Nui show telltale signs of rat gnawing and seed destruction ⇒ few new seedlings would sprout and survive.

Eventually the oldest trees died and deforestation followed as younger trees could not replace them.

The Rapa Nui palms are thought to be a distinct species; it is unclear how long they lived but ~400 years is a reasonable estimate.

Certainly trees were also felled by fire for agriculture and most likely also for transport of the famous Moai.
In 3 years, a single breeding pair of rats could lead to a population of about _______
In 3 years, a single breeding pair of rats could lead to a population of about 17 million!
In 3 years, a single breeding pair of rats could lead to a population of about 17 million!

Rats had no predators on Rapa Nui except for humans ... most likely the population stabilized at 75 per acre, or 3 million total.

Nearly all the plants lost to extinction on Rapa Nui were favorite foods of rats.

Most interestingly *Sophora toromiro*, a native woody shrub, was one of the few surviving plants. Field studies of related plants in New Zealand show that when rats damage these seed casings, the damage appears to encourage seed germination.
The fact that rats alone can devastate forests raises the issue of their relative impacts for Rapa Nui, as well as for other island ecosystems. The role of rats has often been underestimated, yet this does not deny that direct human actions such as the use of fire likely played decisive roles in deforestation. Additional research should disentangle the relative impacts of contributing factors. In short, the environmental catastrophe of Rapa Nui likely has a complex history, one that has been obfuscated by simple speculations on the intentions of the person cutting down the last tree. As the story of rats as invasive species suggests, perhaps the “last tree” simply died, and rats ate the last seeds (Hunt 2007:499).
Rapa Nui

Unfortunately there is no written record prior to European contact, and much of the oral tradition was obliterated by Peruvian slave traders.

Rapa Nui appears to have never had a centralized government; thus there may not have been a political ability to deal with deforestation as it was occurring, regardless of the cause.

Have posted on the class website a link to an NPR clip (~3.5 mins) of an archeologist who questions whether Rapa Nui actually ever underwent a population collapse prior to European contact.

as well as:

IMDB page of a 1994 movie directed by Kevin Costner entitled Rapa Nui

Rapa Nui Today

Province of Chile
Languages: Rapa Nui, Spanish, & English
Currency: Peso, Dollar, and Euro
Population: 7,750 (2017 census)
Economy: Tourism (including numerous eco lodges)
About 7 flights per day, generally from Chile and Tahiti
Runway was lengthened by NASA to accommodate Space Shuttle

https://www.qantas.com/hotels/properties/158598-easter-island-ecolodge

Jan 2013: Modern hospital opened
Aug 2018: Chilean presidential visit results in:
1) name change to Rapa Nui from 'Isla de Pascua' (Easter Island in Spanish)
2) new residency law limits the length of time that visitors and non-residents can stay on the island to 30 days (had been 90 days)
3) establishment of 6 member ocean committee to control Marine Protected Area (MPA), which covers 740,000 sq. km around Rapa Nui (one of the largest MPAs in the world)

http://easterislandnews.blogspot.com/

(CNN) — It's a five-hour flight to Chile's Easter Island (Rapa Nui) from the nation's capital of Santiago.

Mysterious, hard-to-get-to and isolated, the volcanic island in Polynesia automatically makes it a dream destination for intrepid travelers who long to get off the beaten path.

The island is famous around the world for its iconic moai -- enormous paleolithic structures in the shape of human heads. Rapa Nui National Park was added to the UNESCO World Heritage Site list in 1995.

But now, the island is one of many destinations around the world trying to balance popularity with preservation.

A new initiative both limiting the number of people who can visit the island as well as length of stay for said visitors has changed the accessibility factor further.

Lonely Planet's Alex Butler reports that tourists can only stay on the far-flung Easter Island for a period of 30 days; previously, a 90-day stay was permissible.

This new rule applies both to international travelers and to Chileans who are not a part of the indigenous Rapa Nui people.

While the 30-day rule went into effect August 1, Chile has not yet established how many visitors will be allowed on the island.

Rapa Nui islanders Pota Encina and his wife Francisca Haoa Hey. They state “our heritage comes to us from the past and we will pass it along to our children in Rapa Nui language and culture. First we are Rapanui; second, we are Chilean.”

https://books.google.com/books?isbn=1107717329
Thursday, September 6, 2018
AOSC Seminar

**Speaker:** Dr. Travis Rieder

**Speaker's Institution:** Johns Hopkins University, Berman Institute of Bioethics

**Title:** The Ethics of Making Babies in the Face of Climate Change

*(See abstract on the seminar website: [https://www.atmos.umd.edu/seminar/](https://www.atmos.umd.edu/seminar/))*

**Local Contact:** Safa Motezharrei (Please email ssm@umd.edu to arrange an individual meeting with Dr. Rieder.)

Pre-seminar refreshment: 3:00pm - 3:30pm, ATL 2400 Atrium
Seminar: 3:30 - 4:30pm, ATL 2400 Auditorium
Meet-the-Speaker: 4:45 - 5:15pm, ATL 3400 AOSC Conference Room [For AOSC Students only]
Announcement

AOSC Seminar
September 6, 2018

The Ethics of Making Babies in the Face of Climate Change

Travis Rieder
Berman Institute of Bioethics, JHU

Abstract:

Climate change is no longer coming; it’s here. And the path we’re on is not good. After decades of claiming that we absolutely must not allow the earth to warm more than two degrees Celsius, we now face the very real prospect of a future of three or even four degrees global average temperature rise. And every increase in temperature will bring yet more disruptions and more harm to millions of people.

The ethical stakes, in other words, simply couldn’t be higher. And yet we continue to discuss how to decrease emissions among a global population that hasn’t shown any serious motivation to make the changes needed. There is, however, another potential solution: rather than trying to decrease emitting activity, we could also try to decrease the number of emitters. We could, that is, discuss trying to decrease the number of new people coming into the world. Doing so, it turns out, would be powerfully effective, is relatively easy to do, and could be started right now.

The case for mitigating climate change through procreative changes—logically sound though it is—upsets and offends people. There seems to be something wrong with saying that we should have fewer children rather than more. In this talk, I will suggest that it only seems that way; in fact, careful ethical reasoning counts in favor of promoting smaller families as a means of combating climate change.