OVERVIEW OF INQUIRY UNIT PLAN	
Title of Inquiry: Global Geography 12: The Climate Crisis	
Compelling Question:	Will individual actions effectively contribute to solving the climate crisis?
Rationale: Why Does This Question Work?	Despite their belief in the science and support for fighting climate change, many believe that individual action is not necessary for solving the climate crisis. This is based on a number of studies confirming the following: • The top contributors to climate change are powerful multi-national corporations and foreign nations. • The top 1% of wealthy people have a disproportionately large carbon-footprint compared to the working class However, many also associate individual responsibility and action with actively taking steps to lessening one's own carbon footprint. However, individual responsibility and action can mean more than simply eating less meat or installing solar panels on the roof of the house. Individual action can include a number of things. It can mean remaining engaged in the democratic process, supporting a political party with better solutions to the climate crisis, or joining the one in power and advocating for change from within. It can mean advocating for greener initiatives in the company that employs you, or taking those initiatives on your own when you reach a position of power. **The most important takeaway is that individual and community contributions to solving the climate crisis will make an impact.** This issue is of less of a historical concern, and more of a contemporary issue. While climate change as theory gained mainstream attention in the 1970's and 80's, the issues caused by climate change were not noticeable until recently, their full potential yet to be experienced. Individual action and responsibility only became concepts in the last 20 years or so. There is a great deal of literature that disagree on the topic. While all sources agree that climate change is an issue that needs to be solved as soon as possible, experts disagree on whether individual's personal actions will solve the issue, in the wake of the pollution caused by powerful entities such as Foreign autocratic regimes or multi-national corporations. This issue promotes student development because it allows students to be more conscious of their impact on the world, as well as more mindful of what forces are contributing to the climate crisis, and how they can help solve it. It teaches them to think critically on the advice their given regarding the climate crisis.

	This issue is of personal interest to both myself as well the students as, due to our age, we will be the ones bearing the burden of the full extent of the damage caused by climate change, and many of us are anxious to mitigate as much of the damage as possible. This topic is related to an ethical decision: Do we have any right to abstain from individually helping to solve the climate crisis, just because larger more powerful entities are more culpable? Fortunately, as this is a more contemporary issue, finding primary and secondary sources from any medium should pose no problem. There are some resources in the curriculum guide regarding climate change, but none specific enough to suit our purposes.
Outcomes:	**GCO's:** **Citizenship, Power, and Governance** A. demonstrate an understanding of the rights and responsibilities of citizenship and the origins, functions, and sources of power, authority, and governance. **Individuals, Societies, and Economic Decisions** B. demonstrate the ability to make responsible economic decisions as individuals and as members of society. **People, Place, and Environment** C. demonstrate an understanding of the interactions among people, places, and the environment. **Culture and Diversity** D. demonstrate and understanding of culture, diversity, and world view, recognizing the similarities and differences reflected in various personal, cultural, racial, and ethnic perspectives. **Interdependence** E. demonstrate an understanding of the interdependent relationship among individuals, societies, and the environment—locally, nationally, and globally—and the implications for a sustainable future. **Time, Continuity, and Change** F. demonstrate an understanding of the past and how it affects the present and the future. **SCO's:**

	Unit 1: **1.1.2 - Earth as a Closed System** Primary Themes: human/environment interaction (implied) a) Closed and open systems b) Incoming/outgoing energy c) **Carbon**, nitrogen, oxygen, and water cycles **1.1.3 - The Gaia Hypothesis** Primary Themes: human/environment interaction, culture (implied) a) The hypothesis b) The peril of humankind's action Unit 2 **2.2.2 - Human Settlement and Natural Perils: The Relationships** Primary Themes: human/environment interaction, location, region, pattern, culture a) Natural perils and high density population regions b) Natural perils and developing countries c) Human responses: prediction and preparation **2.3.1 When are Peril and Threat Global?** Primary Themes: human/environment interaction, pattern **a) Impacting on a life-sustaining system** ~~b) Affecting Earth's Radiation Balance~~ **2.3.2 Examining Global Peril and Threat** Primary Themes: potentially all, with human/environment interaction, and culture predominant **a) The greenhouse effect** ~~b) Depletion of the ozone layer~~ ~~c) Genetic erosion~~ ~~d) Space debris/junk~~ ~~e) Acid rain~~

	~~f) The nuclear hazard~~
Skills & Attitudes Outcomes:	**Skills:** • Listen, read, write, and speak with comprehension and clarity. • Define and apply discipline-based conceptual vocabulary. • Arrange events in chronological sequence. • Differentiate fact from opinion. • Analyze cause and effect relationships. • Differentiate between and among various options. • Explore and/or observe, identify, and analyze how individuals and/or institutions relate to one another. • Locate, analyze, critique, and use appropriate resources and data. • Articulate and construct reasoned arguments from diverse perspectives and frames of reference. • Present solutions to problems by analyzing conflicts and evaluating persistent issues. • Use library, online, or other search tools to locate sources. • Use maps, globes, graphic, representation and tools, and geographic information systems. • Prepare other products that organize information. • Utilize tools and resources to manage and communicate information including correspondence, finances, data, charts, and graphics. • Recognize and interpret different points of view. • Compare and contrast the credibility of differing ideas, elements, or accounts. • Present information extracted from one format in a different format, e.g., print to visual. • Communicate concisely both orally and in writing. • Determine whether or not sources are valid and credible. **Attitudes:** <u>Personal</u> • Exhibit honesty and integrity. • Convey creativity and ingenuity. • Communicate personal beliefs, feelings, and convictions. • Demonstrate self-direction when working towards and accomplishing personal goals. • Demonstrate flexibility as goals and situations change. • Adjust personal behavior to fit the dynamics of various groups and situations. • Respect and be tolerant of others' beliefs, feelings and convictions <u>Collaborative</u> • Contribute to the development of a supportive climate in a group. • Participate in making rules and guidelines for group activities.

	• Assist in setting, working towards, and accomplishing common goals for a group. • Participate in delegating duties, organizing, planning, making decisions, and taking action in group settings. • Participate in persuading, compromising, debating, and negotiating in the resolution of conflicts and differences. • Utilize diverse perspectives and skills to accomplish common goals. <u>Civic Engagement</u> • Understand the fundamental process of democracy. • Identify and understand public and community issues. • Dialogue with others who have different perspectives. • Participate in communities through organizations working to address and array of cultural, social, political, and religious interests and beliefs. • Act to accomplish public purposes through group problem solving, public speaking, petitioning and protesting, and voting. • Exhibit moral and civic virtues such as concern for the rights and welfare of others, social responsibility, tolerance and respect, and belief in the capacity to make a difference. Develop skills in sustainability. Learn how to reduce carbon footprint. Attitudes: Foster a respect for the Environment, the Democratic process, and our individual impact on both.
Description of Inquiry:	Students will delve into the question of whether individual action is necessary for climate change. The ultimate goal is for the students to learn that individual action is necessary to solve the crisis, as this inquiry is designed to broaden their ideas of what constitutes individual action. Students will view sources that they will have to analyze using the 6 important aspects of historical analysis outlined by Critical Thinking Consortium. These sources will explore the greatest contributors to climate change, the responsibility of government, the nature of multinational corporations, and the power of the individual. I think that this inquiry will have you ask students to not just do historical thinking but use geographic thinking (and we'll talk in class on Thursday). This unit is perfect for teaching students **geographic thinking**.
Staging the Question: See the section below called Staging the Question	How does the carbon cycle function, and how does humanity impact it? Discuss in relation to the Gaia Hypothesis. In groups, design an informative poster that depicts the Carbon Cycle. During the end of class synthesis discussion, I will be stating the compelling question as the overall conclusion to the lesson, while also iterating that this conclusion is the theme of the unit going forward. I will pose the question for open class discussion: Is Individual responsibility/action essential to solving the Climate Crisis? I will tell the students to keep this in mind, as this is the theme of the mini-unit. Following this, we will watch the following video on Climate Change:

	Is It Too Late To Stop Climate Change? Well, it's Complicated. - YouTube The Graphic Organizer in Figure. 1 attached with this document will be handed out for the students to fill in their thoughts during the videos. Students will be instructed to ask their parents for the amount of power their household uses in kilowatts per hour (KWH), for next class.

Inquiry: Will individual actions effectively contribute to solving the climate crisis?		
Supporting Question 1:	**Supporting Question 2:**	**Supporting Question 3:**
How do individuals both positively and negatively impact the climate crisis?	Which economic sectors are the largest emitters of GHG's? How pivotal are these industries to society?	Who are the chief contributors to the climate crisis? Individuals? Nations? Multinational Corporations? How has this evolved since pre-Industrial times?
Formative Performance Task 1:	**Formative Performance Task 2:**	**Formative Performance Task 3:**
Students will ready the KWH their household uses that they were asked to bring from last class. Using the carbonfootprint.com - Carbon Footprint Calculator , students will calculate their carbon footprint, which will give them the total metric tons of CO2 emitted by their own lives and activities. The teacher will graph these footprints on a chart. Formative task: Students will also be given data sheets of hypothetical people with information to plug into the calculator. Examples include an impoverished young Peruvian Girl, a United States Senator, a wealthy Chinese CEO, a working class Japanese fisherman, a 19th	In groups, create an infographic regarding GHG emissions by Economic sector. Include a pie chart depicting emissions by economic sector. Include two ways each sector can reduce their emissions.	In groups, craft a series of line charts depicting atmospheric carbon PPM from pre-industrial times to the present day.

century African Canadian etc. Students will have to graph these carbon footprints as the teacher did.		
Featured Sources:	**Featured Sources:**	**Featured Sources:**
Tragedy of the Commons - Econlib carbonfootprint.com - Carbon Footprint Calculator	Transportation climate change - YouTube How rapidly can we move to 100% clean energy? | Phillip Dale | TEDxUniversityofLuxembourg - YouTube Why Meat is the Best Worst Thing in the World 🍔 - YouTube Secondary: Global Emissions | Center for Climate and Energy Solutions (c2es.org) Sources of Greenhouse Gas Emissions | Greenhouse Gas (GHG) Emissions | US EPA	Who Is Responsible For Climate Change? – Who Needs To Fix It? - YouTube Who is really to blame for climate change? - BBC Future. This source provides an in-depth look at the actors contributing to climate change, similar to the introductory video. Which nations are most responsible for climate change? | Environment | theguardian.com. This article discusses who is to blame for climate change by focusing on nations. Just 100 companies responsible for 71% of global emissions, study says | Guardian Sustainable Business | The Guardian. This article discusses who is to blame for climate change by focusing on corporations. The role of indigenous peoples in combating climate change | Humanities and Social Sciences Communications (nature.com). This website discusses the ways in which Indigenous people are fighting to solve the climate crisis. Indigenous communities are at the forefront of climate resilience

		(climatechangenews.com). This article discusses the ways in which Indigenous people are fighting to solve the climate crisis. Non-Profit Organizations Working on Climate Change | ClimateStore. This website has a comprehensive list of organizations working to resolve the climate crisis.

Summative Performance Task:	**Argument:** Construct an argument by writing a news-media Op-Ed article that addresses whether individual actions will effectively contribute to the climate crisis. All claims must be made using relevant evidence from historical and/or contemporary sources while acknowledging and refuting competing views.
	Extension: Submit the Op-Ed article to various news media outlets, ranging from smaller University student newspapers, to larger national and international publishers.
Taking Informed Action:	• In my community, knowing what I know from my Op-Ed article, I will **act** by developing a small sustainability plan for a business in my community, based on the strategies I have learned throughout this unit.

DETAILED EXPLANTION OF STAGING THE QUESTION (Lesson #1 before the 3 supporting question lessons)	
Staging the Question Lesson:	At the first class, teacher will plant two bean plants (which grow remarkably quickly). One will have a plastic dome, the other will not. As the unit progresses, the covered bean plant will grow much larger and quicker, before dying due to the Greenhouse Effect caused by the plastic covering. To stage the question, the teacher will show excerpts from David Attenborough's Our Planet. This will inform the students about the carbon cycle, and how humanity is impacting it. Teacher will expand on the carbon cycle in a brief discussion of the carbon cycle after the viewing, discussing in relation to the Gaia Hypothesis. In groups, design an artistic poster that depicts the Carbon Cycle.

	During the end of class synthesis discussion, I will be stating the compelling question as the overall conclusion to the lesson, while also iterating that this conclusion is the theme of the unit going forward. I will pose the question for open class discussion: Is Individual responsibility/action essential to solving the Climate Crisis? I will tell the students to keep this in mind, as this is the theme of the mini-unit. As a closing, we will watch the following video on Climate Change: Is It Too Late To Stop Climate Change? Well, it's Complicated. - YouTube The Graphic Organizer in Figure. 1 attached with this document will be handed out for the students to fill in their thoughts during the videos.

DETAILED EXPLANATION FOR TEACHING EACH SUPPORTING QUESTION	

Supporting Question 1 Lesson:	How do individuals both positively and negatively impact the climate crisis?
	• Opening Activity: Students will take the amount of power in KWH that their household uses and use that and other information to calculate their carbon footprint.
	• **Cooperative Learning:** A brief discussion will take place, as the teacher graphs the carbon footprints of each student, before discussing the concept of the "Tragedy of the Commons." Following this, students will get in groups, and using profiles of hypothetical individuals provided by the teacher, will run them though the carbon footprint calculator and graph them as the teacher did with the class's individual results.
	• Closing: A discussion regarding the carbon footprint of the individual profiles.
	• *Opportunities for students to use historical and/or geographical thinking:
	  ○ The students will use historical thinking while analyzing profiles of hypothetical humans from different historic periods. For example: Continuity and Change: How does the carbon footprint of an 18th century Canadian differ from a 20th century Canadian?
	  ○ Students will use geographical thinking while analyzing profiles of humans from different geographic demographics, like rural or urban, or wealthy nation or poor nation.
	• **Inclusion of diverse perspectives (Indigenous, African Canadian, Acadian, Gaelic)
	  ○ The profiles given to the students will be diverse. For example, a modern-day Indigenous lobster fisherperson, and their practices for sustainability.

	Formative performance task for supporting question 1 • Students will also be given data sheets of hypothetical people with information to plug into the calculator. Examples include an impoverished young Peruvian Girl, a United States Senator, a wealthy Chinese CEO, a working class Japanese fisherman, a 19th century African Canadian etc. • This task allows students to see first-hand how different individuals affect the emissions of Greenhouse Gasses. The graphing of the results demonstrates to the students how wealth correlates to larger GHG emissions. • Graphic organizer/s for completing the task/s Featured sources (minimum 2 per supporting question) • carbonfootprint.com - Carbon Footprint Calculator ○ This is a comprehensive calculator which takes a large amount of information to determine an individuals carbon footprint. • Tragedy of the Commons - Econlib ○ This publication discusses the Tragedy of the Commons, which is the idea that if each individual takes too much from the common resource, eventually that common resource will no longer exist. • Profile sheets ○ Premade profile sheets of hypothetical people of various eras, ethnicities, social classes, etc. These sheets will be made by teacher in advance, using research gathered from the web. *Have you included opportunities for students to use current events and Indigenous content/strategies? • By including Indigenous profiles in the formative assessment piece, students will be able to see first-hand how Indigenous people of various time periods affected the carbon cycle, as well as their strategies for mitigating environmental impact.
Supporting Question 2 Lesson:	Which economic sectors are the largest emitters of GHG's? How pivotal are these industries to society? • Opening Activity: Discussion on Greenhouse Gasses by Economic Sector • **Learning centers**: Each student will join a group which will then attend different learning centers, each focused on a particular economic sector or prominent industry's contribution to the climate crisis. ○ Why Meat is the Best Worst Thing in the World - YouTube. This resource contains a great deal of information regarding the environmental impact and greenhouse gas emissions caused by the meat industry, to get them thinking about just how much different industries contribute to the climate crisis. ○ Transportation climate change - YouTube. This resource focuses on the transportation industry, and how to lower its Greenhouse Gas Emissions.

- How rapidly can we move to 100% clean energy? | Phillip Dale | TEDxUniversityofLuxembourg - YouTube. This resource discusses how to transition to clean energy for our power production. It includes discussions how an individual could power their home with wind and solar, while feeding that power into the greater electrical grid.
- How buildings contribute to climate change - Curbed.
  - Additional secondary sources listed at the bottom of the document.

- Students will then create a small infographic regarding emissions by industry, and how to improve them as individuals.
- Discussions will revolve around the differences between industries of different historical time periods and geographical locations and their relation to emitting Greenhouse Gasses. Discussions will also include how pivotal these industries/sectors are to society. How pivotal is meat? Could society go without?
- These discussions will include how Indigenous practices for sustainability can be implemented in these various economic industries/sectors, specifically related to food and agriculture (three sister's farming method, for example).

Formative performance task for supporting question 2

- After their learning centers, each group will fabricate an infographic regarding industries and their greenhouse gas emissions, how they could be improved, and how individuals can impact this.
- This task allows students to see just how much each of the various privileges we as individuals take for granted contribute to the climate crisis.
- Graphic organizer/s for completing the task/s

Featured sources (minimum 2 per supporting question)

- Why Meat is the Best Worst Thing in the World 🍔 - YouTube. This resource contains a great deal of information regarding the environmental impact and greenhouse gas emissions caused by the meat industry, to get them thinking about just how much different industries contribute to the climate crisis.
- Transportation climate change - YouTube. This resource focuses on the transportation industry, and how to lower its Greenhouse Gas Emissions. This teaches students about the impact society has. Everything, from the clothes on our backs, to the food we eat, to the pencils we write with, all of it needs to be transported, which produces emissions.
- How rapidly can we move to 100% clean energy? | Phillip Dale | TEDxUniversityofLuxembourg - YouTube. This resource discusses how to transition to clean energy for our power production.
- Sources of Greenhouse Gas Emissions | Greenhouse Gas (GHG) Emissions | US EPA. Raw statistics on GHG emissions by economic sector in the USA.

	○ Global Emissions | Center for Climate and Energy Solutions (c2es.org). Raw statistics on GHG emissions by economic sector globally. • Description of sources (how they help students learn content/skills) • References for the sources (title and web address) *Have you included opportunities for students to use current events and Indigenous content/strategies?
Supporting Question 3 Lesson:	Who are the chief contributors to the climate crisis? Individuals? Nations? Multinational Corporations? How has this evolved since pre-Industrial times? What actors are trying to fix things? • Opening Activity: Watch the video Who Is Responsible For Climate Change? – Who Needs To Fix It? - YouTube • **Cooperative learning –** In groups, view the sources provided and film a one minute Rick Mercer style "rant" in which both the contributors to the climate crisis and those working to resolve it are discussed. • Who is really to blame for climate change? - BBC Future • Closing: Open discussion regarding actors in the climate crisis. • Students will apply historical thinking by analyzing the degree of change in GHG emissions overtime. What causes an individual country to produce more or less? For example, Cause and Consequence: What caused the increase in GHG emissions by a given actor, and what were the consequences overtime? • Students will apply geographical thinking by considering where the large climate change contributors are located geographically. For example, are the chief contributors to the crisis located in areas that will be less affected by the crisis overall? • By viewing sources depicting successful Indigenous Environmental Justice, students learn that the Indigenous peoples of the world aren't simply helpless victims of climate change, but are in fact catalysts for positive change in the movement to address the climate crisis. Formative performance task for supporting question 3 • In groups, view the sources provided and film a one-minute Rick Mercer style "rant" in which both the contributors to the climate crisis and those working to resolve it are discussed. • This formative task requires students to do their own research on the topic, enhancing their learning of the subject. The content of the rant itself demonstrates their level of understanding of the matters at hand. • Graphic organizer/s for completing the task/s

	Featured sources (minimum 2 per supporting question) • Who is really to blame for climate change? - BBC Future. This source provides an in-depth look at the actors contributing to climate change, similar to the introductory video. • Which nations are most responsible for climate change? | Environment | theguardian.com. This article discusses who is to blame for climate change by focusing on nations. • Just 100 companies responsible for 71% of global emissions, study says | Guardian Sustainable Business | The Guardian. This article discusses who is to blame for climate change by focusing on corporations. • The role of indigenous peoples in combating climate change | Humanities and Social Sciences Communications (nature.com). This website discusses the ways in which Indigenous people are fighting to solve the climate crisis. • Indigenous communities are at the forefront of climate resilience (climatechangenews.com). This article discusses the ways in which Indigenous people are fighting to solve the climate crisis. • Non-Profit Organizations Working on Climate Change | ClimateStore. This website has a comprehensive list of organizations working to resolve the climate crisis. *Have you included opportunities for students to use current events and Indigenous content/strategies? • While climate change itself is a current event, the articles regarding Indigenous strategies to solving climate change are opportunities for students to learn Indigenous content.

DETAILED EXPLANTION OF THE SUMMATIVE PERFORMANCE TASK & EXTENSION ACTIVITY	
	• Construct an argument by writing a news-media Op-Ed article that addresses whether individual actions will effectively contribute to the climate crisis. You must anticipate counter-arguments to your position, and refute them in your article. All claims must be made using relevant evidence from historical and/or contemporary sources while acknowledging and refuting competing views. • Argument Stems: Individuals can meaningfully impact the climate crisis/Individuals can not meaningfully impact the climate crisis. • Include graphic organizer students will complete • Submit this Op-ed to a media outlet, ranging from small-scale University student newspapers to larger national and international publishers.

TAKING INFORMED ACTION - DETAILS	
	• I will **act** by developing a small sustainability plan for a business/organization in my community, based on the strategies I have learned throughout this unit. • This plan will include actions such as installing energy efficient lights, sourcing more sustainable packaging, etc. **See page 161 in text book for a good example of these stages

RESOURCES	

	**All sources (which means all the text that students will read) need to be included at the end of the unit plan (here).
	• First, write down the title and weblink
	• Class 1:
	  ○ carbonfootprint.com - Carbon Footprint Calculator. This is a comprehensive calculator which takes a large amount of information to determine an individual's carbon footprint.
	  ○ Tragedy of the Commons - Econlib. This publication discusses the Tragedy of the Commons, which is the idea that if each individual takes too much from the common resource, eventually that common resource will no longer exist.
	• Class 2:
	  ○ Why Meat is the Best Worst Thing in the World 🍔 - YouTube. This resource contains a great deal of information regarding the environmental impact and greenhouse gas emissions caused by the meat industry, to get them thinking about just how much different industries contribute to the climate crisis.
	  ○ Transportation climate change - YouTube. This resource focuses on the transportation industry, and how to lower its Greenhouse Gas Emissions.
	  ○ How rapidly can we move to 100% clean energy? | Phillip Dale | TEDxUniversityofLuxembourg - YouTube. This resource discusses how to transition to clean energy for our power production.
	  ○ Sources of Greenhouse Gas Emissions | Greenhouse Gas (GHG) Emissions | US EPA. Raw statistics on GHG emissions by economic sector in the USA.
	  ○ Global Emissions | Center for Climate and Energy Solutions (c2es.org). Raw statistics on GHG emissions by economic sector globally.
	• Class 3:

	○ Who is really to blame for climate change? - BBC Future. This source provides an in-depth look at the actors contributing to climate change, similar to the introductory video. ○ Which nations are most responsible for climate change? | Environment | theguardian.com. This article discusses who is to blame for climate change by focusing on nations. ○ Just 100 companies responsible for 71% of global emissions, study says | Guardian Sustainable Business | The Guardian. This article discusses who is to blame for climate change by focusing on corporations. ○ The role of indigenous peoples in combating climate change | Humanities and Social Sciences Communications (nature.com). This website discusses the ways in which Indigenous people are fighting to solve the climate crisis. ○ Indigenous communities are at the forefront of climate resilience (climatechangenews.com). This article discusses the ways in which Indigenous people are fighting to solve the climate crisis. ○ Non-Profit Organizations Working on Climate Change | ClimateStore. This website has a comprehensive list of organizations working to resolve the climate crisis. • Then, include the complete source text

Newspaper Op-Ed Article - DUE XXXX XXST, 20XX

Using what you have learned in this inquiry unit on the individual's impact on the climate crisis, write a News Media Op-Ed (opinion) article on how the individual can effectively contribute to the climate crisis, from the point of view of an objective journalist in **2021**. You must write about the chief causes of the crisis, the barriers that prevent a solution, and how the individual can make an impact.

What is an "Op-Ed" Article?

- "Op-Ed" stands for "Opposite Editorials," Op-Ed articles are OPINION pieces, written by individuals who have NO affiliation to the newspaper.
- They are printed next to (opposite) the "Editorial" articles (which are opinions written by the Newspapers' editors), hence the name "Opposite Editorials, or "Op-Ed."

Your Assignment - Remember, this is your Opinion, based on Facts

- 500 word minimum
- Contains relevant background information
- Discusses main contributors to the crisis
- Discusses the barriers to implementing a solution
- Discusses how the individual can make a difference despite the challenges
- Backed by reputable sources. Include a minimum of 4 sources discussed in class **using proper MLA citation style in a bibliography.** External research is not required, but will be rewarded.

<u>Your assignment must also contain the following elements:</u>

1. Headline
2. Date
3. At least 5 key terms from the Unit.
4. 2 Graphs of data related to the climate crisis (this could be data from, with figure captions explaining their significance
5. Bibliography of sources in MLA format

Newspaper Article	Developing 1	Accomplished 2	Proficient 3	Exemplary 4
Critical Analysis /4	Student needs to continue developing their ability at critical analysis.	Student is sometimes able to think critically about the content, but needs to continue working at identifying fact/opinion.	Student frequently thinks critically about the content, frequently differentiates fact from opinion, and can spot bias.	Student is constantly thinking critically, almost always differentiates fact from opinion, and almost always spots bias.
Vocabulary /4	Student needs to continue developing their vocabulary on related to the climate crisis, as their knowledge of important definitions is limited.	Student has a fair vocabulary, but needs to develop further. Of the words they do know, they sometimes use them incorrectly.	Student has a great vocabulary, and usually uses the words they know correctly	Student has a fantastic vocabulary, and always uses their words correctly.
Content /4	Student needs to continue researching the underlying factors of the climate crisis, as well as ideas regarding the impact of the individual.	Student has a fair grasp of the underlying factors of the climate crisis, as well as ideas regarding the impact of the individual.	Student has an emerging understanding of the underlying factors of the climate crisis, as well as	Student has a well-developed understanding of the underlying factors of the climate crisis, as well as ideas regarding the impact of the individual.

	Student has not included the required elements listed in the assignment.	Student has included some of the required elements.	ideas regarding the impact of the individual. Student has included most of the required elements.	Student has included all of the required elements of the assignment.
Written Comprehension /4	No clear Introduction, Body, or Conclusion. Many spelling and grammar mistakes.	Student has an Introduction, Body, and Conclusion, but needs to ensure that they are clearly visible. Several spelling and grammar errors.	Student has a clear Introduction, Body, and Conclusion. Only a few spelling and grammar mistakes are present.	Student has a clear Introduction, Body, and Conclusion. No spelling/grammar mistakes. Student is adept at emulating a journalist.
Sources /4	Student only has a one of the required sources. Student has not attempted to adhere to MLA format.	Student has some of the required sources. Student has attempted to adhere to MLA format, must continue developing their citation skills.	Student has provided most of the required sources. Student has done fairly well at utilizing MLA format, with some mistakes.	Student has provided all of the required sources. Student has done well at adhering to MLA format, with few mistakes.

Tragedy of the Commons

By Garrett Hardin

In 1974 the general public got a graphic illustration of the "tragedy of the commons" in satellite photos of the earth. Pictures of northern Africa showed an irregular dark patch 390 square miles in area. Ground-level investigation revealed a fenced area inside of which there was plenty of grass. Outside, the ground cover had been devastated.

The explanation was simple. The fenced area was private property, subdivided into five portions. Each year the owners moved their animals to a new section. Fallow periods of four years gave the pastures time to recover from the grazing. The owners did this because they had an incentive to take care of their land. But no one owned the land outside the ranch. It was open to nomads and their herds. Though knowing nothing of **KARL MARX**, the

herdsmen followed his famous advice of 1875: "To each according to his needs." Their needs were uncontrolled and grew with the increase in the number of animals. But **SUPPLY** was governed by nature and decreased drastically during the drought of the early 1970s. The herds exceeded the natural "carrying capacity" of their environment, soil was compacted and eroded, and "weedy" plants, unfit for cattle consumption, replaced good plants. Many cattle died, and so did humans.

The rational explanation for such ruin was given more than 170 years ago. In 1832 William Forster Lloyd, a political economist at Oxford University, looking at the recurring devastation of common (i.e., not privately owned) pastures in England, asked: "Why are the cattle on a common so puny and stunted? Why is the common itself so bare-worn, and cropped so differently from the adjoining inclosures?"

Lloyd's answer assumed that each human exploiter of the common was guided by self-interest. At the point when the carrying capacity of the commons was fully reached, a herdsman might ask himself, "Should I add another animal to my herd?" Because the herdsman owned his animals, the gain of so doing would come solely to him. But the loss incurred by overloading the pasture would be "commonized" among all the herdsmen. Because the privatized gain would exceed his share of the commonized loss, a self-seeking herdsman would add another animal to his herd. And another. And reasoning in the same way, so would all the other herdsmen. Ultimately, the common property would be ruined.

Even when herdsmen understand the long-run consequences of their actions, they generally are powerless to prevent such damage without some coercive means of controlling the actions of each individual. Idealists may appeal to individuals caught in such a system, asking them to let the long-term effects govern their actions. But each individual must first survive in the short run. If all decision makers were unselfish and idealistic calculators, a distribution governed by the rule "to each according to his needs" might work. But such is not our world. As James Madison said in 1788, "If men were angels, no Government would be necessary" (*Federalist,* no. 51). That is, if *all* men were angels. But in a world in which all resources are limited, a single nonangel in the commons spoils the environment for all.

The spoilage process comes in two stages. First, the non-angel gains from his "competitive advantage" (pursuing his own interest at the expense of others) over the angels. Then, as the once noble angels realize that they are losing out, some of them renounce their angelic behavior. They try to get their share out of the commons before

competitors do. In other words, every workable distribution system must meet the challenge of human self-interest. An unmanaged commons in a world of limited material wealth and unlimited desires inevitably ends in ruin. Inevitability justifies the epithet "tragedy," which I introduced in 1968.

Whenever a distribution system malfunctions, we should be on the lookout for some sort of commons. Fish populations in the oceans have been decimated because people have interpreted the "freedom of the seas" to include an unlimited right to fish them. The fish were, in effect, a commons. In the 1970s, nations began to assert their sole right to fish out to two hundred miles from shore (instead of the traditional three miles). But these exclusive rights did not eliminate the problem of the commons. They merely restricted the commons to individual nations. Each nation still has the problem of allocating fishing rights among its own people on a noncommonized basis. If each government allowed ownership of fish within a given area, so that an owner could sue those who encroach on his fish, owners would have an incentive to refrain from overfishing. But governments do not do that. Instead, they often estimate the maximum sustainable yield and then restrict fishing either to a fixed number of days or to a fixed aggregate catch. Both systems result in a vast overinvestment in fishing boats and equipment as individual fishermen compete to catch fish quickly.

Some of the common pastures of old England were protected from ruin by the tradition of stinting—limiting each herdsman to a fixed number of animals (not necessarily the same for all). Such cases are spoken of as "managed commons," which is the logical equivalent of **SOCIALISM**. Viewed this way, socialism may be good or bad, depending on the quality of the management. As with all things human, there is no guarantee of permanent excellence. The old Roman warning must be kept constantly in mind: *Quis custodiet ipsos custodes?* (Who shall watch the watchers themselves?)

Under special circumstances even an unmanaged commons may work well. The principal requirement is that there be no scarcity of goods. Early frontiersmen in the American colonies killed as much game as they wanted without endangering the supply, the multiplication of which kept pace with their needs. But as the human **POPULATION** grew larger, hunting and trapping had to be managed. Thus, the ratio of supply to **DEMAND** is critical.

The scale of the commons (the number of people using it) also is important, as an examination of Hutterite communities reveals. These devoutly religious people in the northwestern United States live by Marx's formula:

"From each according to his ability, to each according to his needs." (They give no credit to Marx, however; similar language can be found several places in the Bible.) At first glance Hutterite colonies appear to be truly unmanaged commons. But appearances are deceiving. The number of people included in the decision unit is crucial. As the size of a colony approaches 150, individual Hutterites begin to undercontribute from their abilities and overdemand for their needs. The experience of Hutterite communities indicates that below 150 people, the distribution system can be managed by shame; above that approximate number, shame loses its effectiveness.

If any group could make a commonistic system work, an earnest religious community like the Hutterites should be able to. But numbers are the nemesis. In Madison's terms, nonangelic members then corrupt the angelic. Whenever size alters the properties of a system, engineers speak of a "scale effect." A scale effect, based on human psychology, limits the workability of commonistic systems.

Even when the shortcomings of the commons are understood, areas remain in which reform is difficult. No one owns the Earth's atmosphere. Therefore, it is treated as a common dump into which everyone may discharge wastes. Among the unwanted consequences of this behavior are acid rain, the greenhouse effect, and the erosion of the Earth's protective ozone layer. Industries and even nations are apt to regard the cleansing of industrial discharges as prohibitively expensive. The oceans are also treated as a common dump. Yet continuing to defend the freedom to pollute will ultimately lead to ruin for all. Nations are just beginning to evolve controls to limit this damage.

The tragedy of the commons also arose in the savings and loan (S&L) crisis. The federal government created this tragedy by forming the Federal Savings and Loan Insurance Corporation (FSLIC). The FSLIC relieved S&L depositors of worry about their money by guaranteeing that it would use taxpayers' money to repay them if an S&L went broke. In effect, the government made the taxpayers' money into a commons that S&Ls and their depositors could exploit. S&Ls had the incentive to make overly risky investments, and depositors did not have to care because they did not bear the cost. This, combined with faltering federal surveillance of the S&Ls, led to widespread failures. The losses were "commonized" among the nation's taxpayers, with serious consequences to the federal budget (see **SAVINGS AND LOAN CRISIS**).

Congestion on public roads that do not charge tolls is another example of a government-created tragedy of the commons. If roads were privately owned, owners would charge tolls and people would take the toll into

account in deciding whether to use them. Owners of private roads would probably also engage in what is called peak-load pricing, charging higher prices during times of peak demand and lower prices at other times. But because governments own roads that they finance with tax dollars, they normally do not charge tolls. The government makes roads into a commons. The result is congestion.

We know that climate change is caused by human activity, but pinning down exactly who is responsible is trickier than it might seem.

O

One of the most frustrating things about the climate crisis is that the fact that earlier action could have prevented it. With every passing year of inaction, the emissions cuts needed to limit global warming to relatively safe levels grow steeper and steeper.

Many groups have been accused of being at blame for this ongoing lack of action, from **fossil fuel companies** and **wealthy countries**, to **politicians**, **rich people** and sometimes even **all of us**.

Others may feel it's not useful to blame anyone. "If you want to engage with the non-converted and get them to want stronger climate action, blaming them is not going to be a very fruitful pathway," says Glen Peters, research director of the Center for International Climate and Environment Research in Oslo.

Whether we label it blame or not, the question of who is responsible for the climate crisis is a necessary one. It will inevitably impact the solutions we propose to fix things.

But it's also important to acknowledge that allocating emissions to someone – the extractors of fossil fuels, the manufacturers who make products using them, the governments who regulate these products, the consumers who buy them – does not necessarily mean saying they are responsible for them.

You might also like:

- **How flight shame is changing travel**
- **How we mourn a changing planet**
- **The wild places that heal climate burnout**

For example, many people across the world lack access to a steady, clean electricity supply and instead use high-emission diesel generators to generate electricity. You can allocate these emissions to the people using the generators, but it is hard to say they are to blame for them.

“You’re just slicing through the system at one end of the supply chain versus the other,” says Julia Steinberger, professor of ecological economics at the University of Leeds. “That alone is not enough to allocate blame.”

Seventy percent of the world’s greenhouse gas emissions over the previous two decades are attributable to just 100 fossil fuel producers

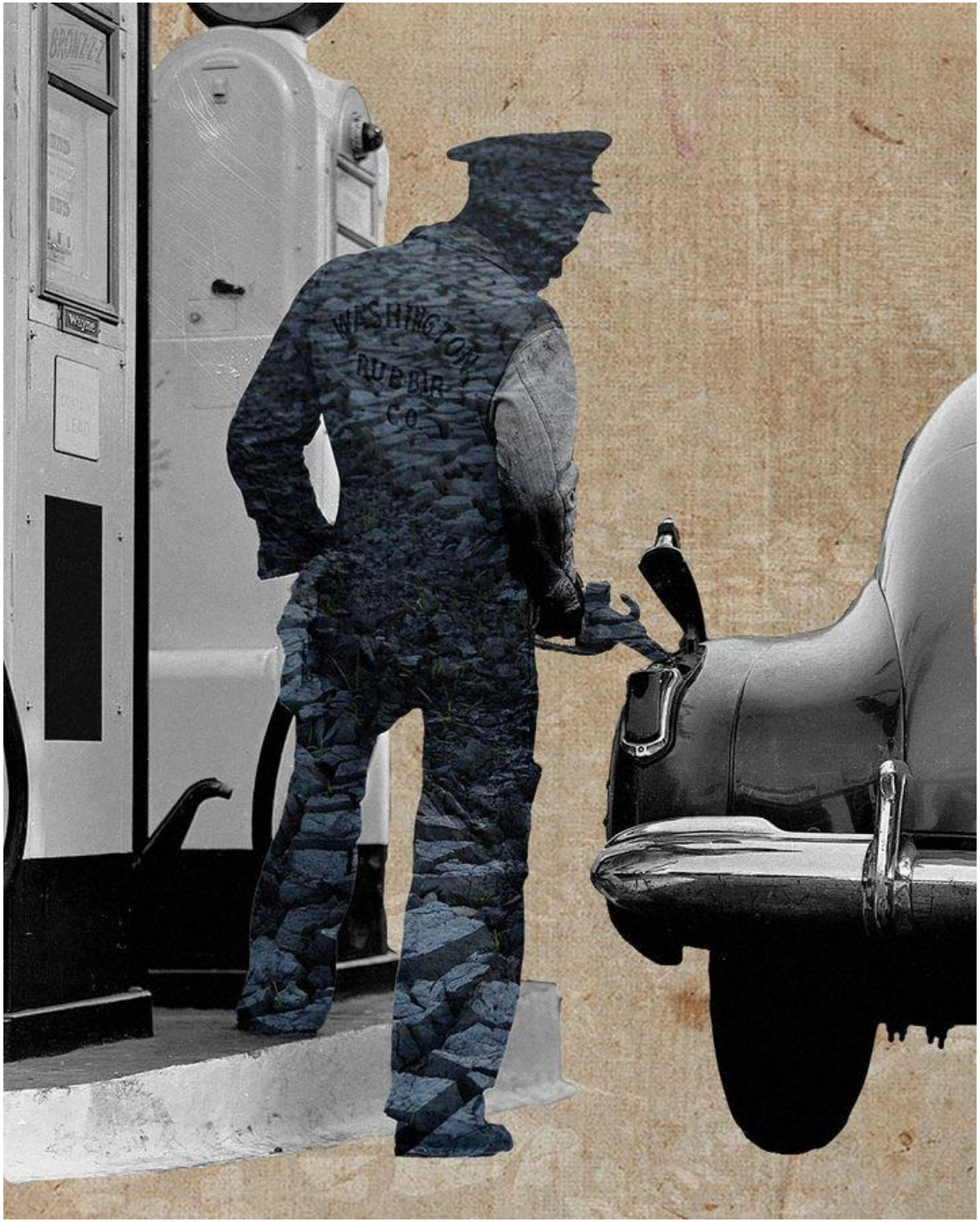
What examining each of these links of the supply chain does do, however, is allow us to understand this complex system differently, she adds.

But ultimately what is important is understanding who holds the power over the choices available to everyone else. By challenging how, and for whom, that power is gained and used, perhaps we can begin to shed light on how to truly turn things around on climate.

Fossil fuel companies

Fossil fuel firms clearly play a major role in the climate problem. A major **report released in 2017 attributed 70% of the world’s greenhouse gas emissions over the** previous two decades to just 100 fossil fuel producers. An **update last year outlined the top 20 fossil fuel firms behind a third of emissions.**

But it is not only through their ongoing extraction of fossil fuels that these companies have had such a huge impact on climate action. They have also worked hard to shape the public narrative. In **2015, an investigation by US website Inside Climate News revealed that the oil firm Exxon knew about climate change for decades** and led efforts to block measures to cut emissions. Revelations like this have contributed to strong public anger at fossil fuels firms. Many now think that such companies have said and done everything they could to be able to continue extracting and burning fossil fuels – no matter the cost.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A tiny proportion of firms are responsible for the lion's share of carbon emissions (Credit: Javier Hirschfeld/Getty)

Amy Westervelt is a climate journalist who has spent years exploring the thinking behind big oil's strategy over the past decades, most recently in her podcast **Drilled**. She says there was a point in the late 1970s when oil companies in the US like Exxon appeared to be embracing renewables and increasingly viewing themselves energy companies, rather than just oil companies. But this mindset had changed completely by the early 1990s due to a series of oil crises and changing leadership, she says. "There was this real sort of shift in mindset from 'If we have a seat at the table, we can help to shape the regulations,' to 'We need to stop any kind of regulation happening.'"

Fossil fuel firms have since done "a great job" of making any kind of environmental concerns seem elitist, adds Westervelt. For example, Rex Tillerson, the Exxon chief executive who went on to be US secretary of state, **repeatedly argued that cutting oil use to fight climate change would make poverty reduction harder**. "They have this talking point that they've been trotting out since the 1950s, that if you want to make that industry cleaner in any way, then you're basically unfairly impacting the poor. Never mind that the costs don't actually have to be offloaded on to the public."

At the same time, fossil fuel companies have long employed PR tactics in a bid to control the narrative around climate change, says Westervelt, **pushing doubts about the science** and working to influence how people understand the role of fossil fuels in the economy. "They have put a **real emphasis** on **creating materials** for social studies, economics and civics classes that all centre the fossil fuel industry," says Westervelt. "I think there's a real lack of understanding about just how much that industry has shaped how people think about everything, and very deliberately so."

A small group of scientists with links to right-wing think tanks and industry have for decades distorted public debate by sowing doubt on well-established scientific knowledge in the US, including on climate, according to **Merchants of Doubt**, the 2010 exposé by historians Naomi Oreskes and Erik Conway. "Ever since scientists first began to explain the evidence that our climate was warming – and that human activities were probably to blame – people have been questioning the data, doubting the evidence and attacking the scientists who collect and explain it," they write.

Scientific evidence that emissions from human activity would cause climate change has a surprisingly long history (Credit: Javier Hirschfeld/Getty)

It's also worth remembering that the very concept of a personal carbon footprint was popularised by a **wide-reaching 2005 BP media campaign**. "It was the most brilliant example of 'It's your fault, not ours,'" says Westerwelt. "It's a framework that serves them really well because they can just say 'Oh well, if you really care then why are you driving an SUV?'"

Rich people

Concentrating on the influence of fossil fuel companies in the failure to reduce emissions means focusing on where the supply chain starts and the push to keep extracting fossil fuels. But we can also look at where it ends – the people who consume the final products from fossil fuels, and, more specifically, those who consume a fair bit more than the rest.

Across 86 countries, the richest 10% of people consume around 20 times more energy than the poorest 10%

A recent international study from the University of Leeds calculated that, across 86 countries, **the richest 10% of people consume around 20 times more energy than the poorest 10%**. A big portion of this heightened consumption by richer people is through transport, the study found: flights, holidays and big cars driven long distances.

So do studies like this **lay the blame for climate change at the doors of rich consumers**? Yes and no, says Steinberger, who co-authored the paper.

Yes, because rich people do have far more choice in how they spend their money. “If you’re rich enough to afford a big car, you’re also rich enough not to afford a big car. If the lifestyles that rich people choose to lead are very ostentatious and wasteful, they definitely have responsibility over this,” says Steinberger. Rich people also tend to be more influential in government and in the companies driving government policy, she says. “In general, if we're talking about who has the power to make decisions, it's probably rich people in different roles.”

But also no, says Steinberger, because even high consumers live within a system that enables, and even rewards, their consumption.

People with high-carbon lifestyles live in a broader system that encourages consumption (Credit: Javier Hirschfeld/Getty)
Recent events have helped put the impact of individual action into perspective. Even at the height of the coronavirus pandemic in April, with many countries in lockdown, **daily global CO2 emissions fell 17% compared with 2019 levels**. The drop is certainly major – emissions were temporarily comparable to 2006 levels – but the fact it was not even more gives an insight into how much deeper emissions cuts need to go than the lifestyle changes available to individual people.

The real importance of studies showing individual carbon footprints is not to point the blame at certain consumers, but to shed a light on the best way to make policies to cut emissions. For example, says Steinberger, it would be foolish to expect to drive decarbonisation of people's homes on the basis of taxes, because home energy is a basic good that everyone needs. Large-scale public investment in renewable energy and energy efficiency would make more sense, she says.

On the other hand, taxing the luxury products rich people tend to disproportionately overconsume, such as flights, does make sense, she adds.

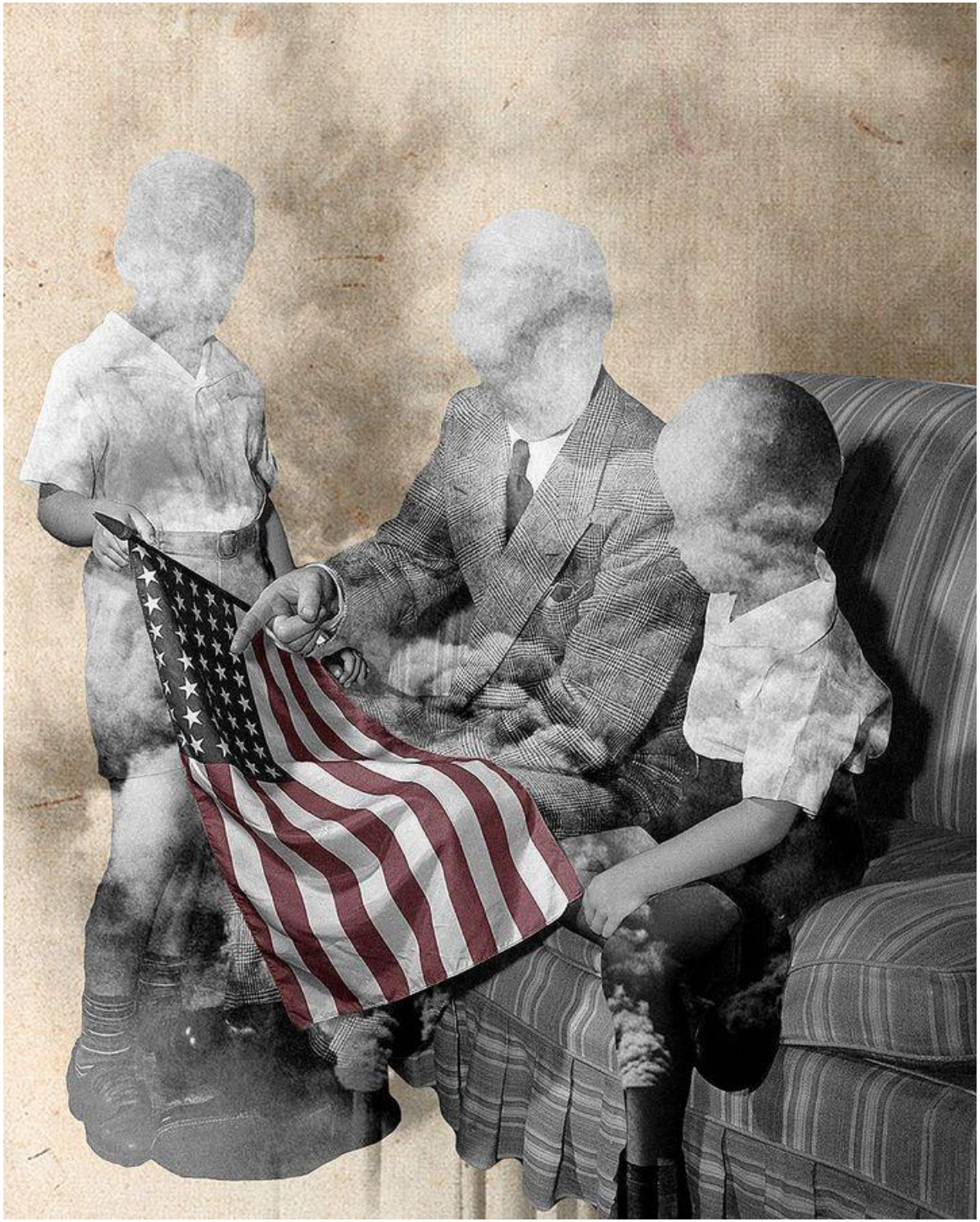
Rich countries

Widening out the frame from individual consumption, another way climate blame is often apportioned is by looking at which countries emit the most. The question of whether richer, historically more polluting countries should take more responsibility for climate change than others has long been a sore point at international climate negotiations.

Back in 1992, when the **first international climate treaty** was signed to set up a framework for future climate negotiations, it included an important – and yet, to some, still contentious – principle. The treaty **acknowledged that countries had different historic responsibilities for emissions, as well a**s varying abilities to reduce them going forwards.

Addressing climate change requires urgent action by all people certainly, including rich and poor, but with wealthy countries taking the lead – Mohamad Adow

The world's richest countries have released the vast majority of emissions, and many continue to emit many times more than poorer ones. The US has emitted far more CO2 than any other country: a quarter of all **emissions since 1751 have occurred there. Despite China's** huge rise in emissions over the past decade, emissions per person still sit at less than half those of the US, while the one billion people living in Sub-Saharan Africa each emit one-twentieth of the average person in the US.



A quarter of all emissions since the Industrial Revolution have been in the US (Credit: Javier Hirschfeld/Getty)
However, negotiations to **divvy out the deep emissions cuts the world needs in a "fair" way** have **proven a political nightmare**, with richer, more polluting countries backing out of strong commitments and talks falling through time and time again. Eventually, a different approach was developed: countries would sign up to a set of common, overarching climate goals, but self-assign their own emission reductions targets, based on whatever they felt able to promise. This was the approach taken in the **2015 Paris Agreement**, where countries agreed to limit global temperature rise to "well below 2C" and strive to limit it to 1.5C, but refrained from setting out exactly who should do what to get there. The treaty recognises that reaching peak emissions will take longer for developing than developed countries, and sets up a **system for ramping up country pledges over time**.

The problem is that wealthy countries still have an "emissions debt" to other countries due to their principal responsibility for climate change, argues Mohamed Adow, director of energy and climate think tank Power Shift Africa and a well-known voice at international climate conferences. Rich polluters should not only reduce their own emissions, but also deliver on promises of **finance** and **technology** to help poorer countries develop via a lower carbon path, says Adow, as well as supporting them to deal with climate impacts which are already locked in.

"At the heart of an effective regime should be a fair process for sharing the effort between countries in a way that is sustainable," says Adow. "Addressing climate change requires urgent action by all people certainly, including rich and poor, but with wealthy countries taking the lead."

However, Adow is still cautious about assigning blame to richer countries. "You wouldn't want to start with a frame of going out and blaming the US," he says. "But you will go with a frame that allows you to talk about the Earth and atmosphere as shared global commons that should be fairly enjoyed by all, including the poor, future generations and all life."

Not all climate experts think more focus on assigning the fair share of emissions reduction to countries is the best way to ensure global emissions are cut. After all, this is the very strategy that has proven so difficult to negotiate in the past. "Basically, countries have to be seen by their peers to be doing enough, not necessarily to be perfect," says Peters. "Don't let perfect be the enemy of good."

"Us"

Whether or not you think emissions cuts should be negotiated internationally, few would argue against the need for richer countries to take more responsibility. So what does that mean for those of us living in these rich countries? Do we all need to take more responsibility for our countries' emissions? Are *we* to blame for climate change?

If you look at the system in a certain way, yes we are. For many of us, the products and energy we consume can be linked to a hefty – and unsustainable – portion of emissions.

Some researchers argue that the idea of "us" being responsible for climate change is a confusing concept (Credit: Javier Hirschfeld/Getty)

But it is crucial to also acknowledge that we are all part of a bigger system that not everyone is equally complicit in holding up. "The *we* responsible for climate change is a fictional construct, one that's distorting and dangerous," **writes climate scholar and author Genevieve Guenther**. "By hiding who's really responsible for our current, terrifying predicament, [the pronoun] *we* provides political cover for the people who are happy to let hundreds of millions of other people die for their own profit and pleasure."

What Guenther is saying boils down to the question of who holds the power to create and change the systems that cause climate change. If you can only afford a home in an edge-of-town housing estate **without access to public transport**, is it really your fault for **becoming dependent on a car**?

“Just because you can allocate [emissions] to an entity or to a location in a supply chain, does not mean that the power of agency lies with that entity or that location in the supply chain,” says Steinberger. “If you’re thinking about these supply chains, are you going to say that final consumers actually have the final decision-making over everything that happens upstream? Who is actually taking the damaging decision?”

The question of blame is a useful one to find the most effective and fairest solutions to climate change (Credit: Javier Hirschfeld/Getty)

Power differences between countries also play a strong role in the outcomes of international climate talks, says Adow. “Sadly, the countries that have the greatest historical responsibility for climate change continue to have the greatest influence on the climate regime,” he says. “They are effectively abusing their power.”

But even viewing climate inaction through this lens of power, those who have less of it can still act to confront it. Climate activist Greta Thunberg embodied this when in 2019 she **told elites gathered in Davos that** many of them were to blame for the climate crisis by sacrificing “priceless values” to “continue making unimaginable amounts of money”. As one **academic essay puts it:** “To avoid [confronting] power is to risk condoning a system that is inherently unsustainable and unjust.”

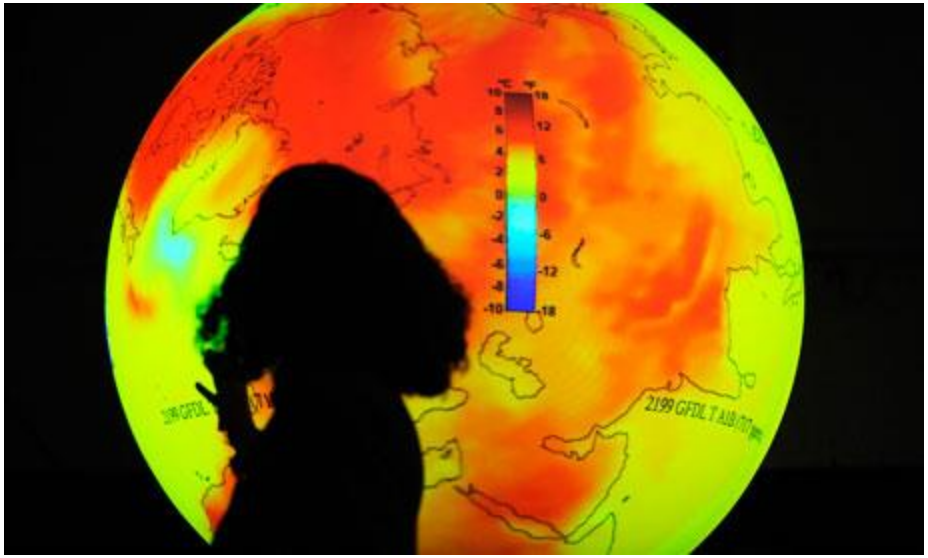
We may or may not feel that the blame for the climate crisis should be placed at someone’s door. But whether we call it blame or not, it is still crucial that we untangle the structures of power and decision-making that continue to promote climate inaction. Only by better understanding how to change these can we hope to make the emissions cuts we now need so badly.

Which nations are most responsible for climate change?

This question and answer is part of the Guardian's ultimate climate change FAQ

- See all questions and answers
- Read about the project

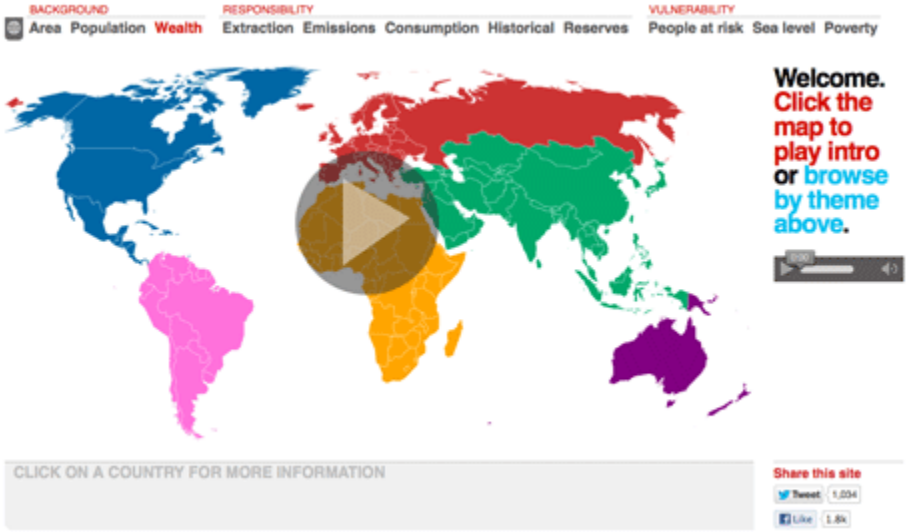
- **Duncan Clark**
- theguardian.com, Thursday 21 April 2011 15.40 BST



A scientist standing in front of a globe during the UN climate conference in Copenhagen. Photograph: Axel Schmidt/AFP/Getty Images

There are many different ways to compare national responsibility for climate change. These include current emissions – which can be viewed in absolute figures or on a per capita basis – as well as historical emissions and the carbon footprint of consumption, including imported goods. There's also the question of whether you include deforestation, or even the extraction of fossil fuels. Each approach gives a different insight – and none tells the whole story on its own. Following is quick guide to the data. For an interactive version click the map below.

View the interactive



Click to explore all these issues and data on The Carbon Map

Current CO2 emissions

The simplest and most common way to compare the emissions of countries is to add up all the fossil fuels burned and cement produced in each nation and convert that into CO2. According to 2011 data compiled by the Netherlands Environmental Assessment Agency, the top 10 emitters by this measure are:

1. China: 9697 million tonnes (MT) or 28.6%
2. US: 5420 MT or 16.0%
3. India: 1967 MT or 5.8%
4. Russia: 1829 MT or 5.4%
5. Japan: 1243 MT or 3.7%
6. Germany: 810 MT 2.4%
7. South Korea: 609 MT or 1.7%
8. Canada: 555 MT or 1.6%
9. Indonesia: 490 MT or 1.4%
10. Saudi Arabia: 464 MT or 1.4%

See more countries

All greenhouse gas emissions

The problem with focusing purely on CO2 from burning fossil fuels is that it ignores other greenhouse gases and non-fossil-fuel sources of CO2. When these are included, the figures change considerably, with countries such as Brazil and Indonesia shooting up the list due to emissions caused by deforestation. Reliable data isn't available, but as of 2005, the top 10 emitters as measured in total greenhouse gases looked like this:

1. China: 7,216 MT or 16.4%
2. US: 6,931 MT or 15.7%
3. Brazil: 2,856 MT or 6.5%
4. Indonesia: 2,046 MT or 4.6%
5. Russia: 2,028 MT or 4.6%
6. India: 1,870 MT or 4.2%
7. Japan: 1,387 MT or 3.1%
8. Germany: 1,005 MT or 2.3%
9. Canada: 808 MT or 1.8%
10. Mexico: 696 MT or 1.6%

See all countries (free registration required)

Emissions per capita

Comparing nations can be misleading, given their vastly varied sizes and populations. To get a more meaningful picture, it's essential also to consider emissions on a per-person basis. From this perspective, the list is topped by small countries with energy-intensive industries such as Qatar and Bahrain, and the large developing nations such as India and China look significantly less polluting. Here's a selection of countries and their per-person CO2 emissions from fossil fuels and cement, as of 2010:

Qatar: 36.9 tonnes
United States: 17.3 tonnes
Australia: 17.0 tonnes
Russia: 11.6 tonnes
Germany: 9.3 tonnes
UK: 7.8 tonnes
China: 5.4 tonnes
World average: 4.5 tonnes

India: 1.4 tonnes
Africa average: 0.9 tonnes
Ethiopia: 0.1 tonnes
See all countries
As with national emissions, this list would look different if all greenhouse gases were included.

Historical emissions

Since carbon dioxide added to the atmosphere can stay there for centuries, historical emissions are just as important – or even more important – than current emissions. The tricky question of historical responsibility is one of the key tensions in the process of negotiating a global climate deal. The following figures from the World Resources Institute show the top 10 nations as measured by their cumulative emissions between 1850 and 2007. The US tops the list by a wide margin – though Chinese emissions have risen significantly since these data were assembled.

1. US: 339,174 MT or 28.8%
2. China: 105,915 MT or 9.0%
3. Russia: 94,679 MT or 8.0%
4. Germany: 81,194.5 MT or 6.9%
5. UK: 68,763 MT or 5.8%
6. Japan: 45,629 MT or 3.87%
7. France: 32,667 MT or 2.77%
8. India: 28,824 MT or 2.44%
9. Canada: 25,716 MT or 2.2%
10. Ukraine: 25,431 MT or 2.2%

See all countries

Of course, it's also possible to look at historical emissions per person, which turns things around yet again. In this view, the UK shoots close to the top of the rankings, while China drops towards the bottom.

1. Luxembourg: 1,429 tonnes
2. UK: 1,127 tonnes
3. US: 1,126 tonnes
4. Belgium: 1,026 tonnes
5. Czech Republic: 1,006 tonnes
6. Germany: 987 tonnes
7. Estonia: 877 tonnes

8. Canada: 780 tonnes
9. Kazakhstan: 682 tonnes
10. Russia: 666 tonnes
See all countries

Consumption footprints

Imported and exported goods add another layer of complexity to the equation. Many commentators argue that focusing on where emissions are produced is unfair, because much of the carbon output of countries such as China are generated as a result of producing goods that are ultimately consumed in richer nations. If emissions are measured in terms of consumption rather than production (that is, each country's exports are excluded from its footprint, and its imports added) the tables turn yet again.
This leads to arguably the best measure of current responsibility for climate change: the total carbon footprint of the average person in each nation. Figures are provided for a selection of countries below based on 2008 data published in a recent science paper.
Belgium 21.9
United States of America 20.2
Ireland 16.2
Finland 15.1
Australia 13.8
United Kingdom 11.5
China 4.3
Brazil 2.1
India 1.3
Nigeria 0.5
Malawi 0.2
See more countries
The numbers would have shifted quite a bit in the direction of developing countries since 2008 but not enough to remove the very obvious trend that total carbon footprints are *much* higher in the developed world

Just 100 companies responsible for 71% of global emissions, study says

This article is more than 3 years old

A relatively small number of fossil fuel producers and their investors could hold the key to tackling climate change

An oil rig exploring for oil and gas. A new report says more than 50% of global industrial emissions since 1988 can be traced to just 25 companies. Photograph: Dazman/Getty Images/iStockphoto

Tess Riley

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Mon 10 Jul 2017 06.26 BST

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Just 100 companies have been the source of more than 70% of the world's greenhouse gas emissions since 1988, according to a new report.

The Carbon Majors Report (pdf) "pinpoints how a relatively small set of fossil fuel producers may hold the key to systemic change on carbon emissions," says Pedro Faria, technical director at environmental non-profit CDP, which published the report in collaboration with the Climate Accountability Institute.
Traditionally, large scale greenhouse gas emissions data is collected at a national level but this report focuses on fossil fuel producers. Compiled from a database of publicly available emissions figures, it is intended as the first in a series of publications to highlight the role companies and their investors could play in tackling climate change.


Hopes of mild climate change dashed by new research

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The report found that more than half of global industrial emissions since 1988 – the year the Intergovernmental Panel on Climate Change was established – can be traced to just 25 corporate and state-owned entities. The scale of historical emissions associated with these fossil fuel producers is large enough to have contributed significantly to climate change, according to the report.

ExxonMobil, Shell, BP and Chevron are identified as among the highest emitting investor-owned companies since 1988. If fossil fuels continue to be extracted at the same rate over the next 28 years as they were between 1988 and 2017, says the report, global average temperatures would be on course to rise by 4C by the end of the century. This is likely to have catastrophic consequences including substantial species extinction and global food scarcity risks.

While companies have a huge role to play in driving climate change, says Faria, the barrier is the "absolute tension" between short-term profitability and the urgent need to reduce emissions.

A Carbon Tracker study in 2015 found that fossil fuel companies risked wasting more than $2tn over the coming decade by pursuing coal, oil and gas projects that could be worthless in the face of international action on climate change and advances in renewables – in turn posing substantial threats to investor returns.

CDP says its aims with the carbon majors project are both to improve transparency among fossil fuel producers and to help investors understand the emissions associated with their fossil fuel holdings.

A fifth of global industrial greenhouse gas emissions are backed by public investment, according to the report. "That puts a significant responsibility on those investors to engage with carbon majors and urge them to disclose climate risk," says Faria.

Investors should move out of fossil fuels, says Michael Brune, executive director of US environmental organisation the Sierra Club. "Not only is it morally risky, it's economically risky. The world is moving away from fossil fuels towards clean energy and is doing so at an accelerated pace. Those left holding investments in fossil fuel companies will find their investments becoming more and more risky over time."

G20 public finance for fossil fuels 'is four times more than renewables'

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There is a “growing wave of companies that are acting in the opposite manner to the companies in this report,” says Brune. Nearly 100 companies including Apple, Facebook, Google and Ikea have committed to 100% renewable power under the RE100 initiative. Volvo recently announced that all its cars would be electric or hybrid from 2019.

And oil and gas companies are also embarking on green investments. Shell set up a renewables arm in 2015 with a $1.7bn investment attached and a spokesperson for Chevron says it’s “committed to managing its [greenhouse gas] emissions” and is investing in two of the world’s largest carbon dioxide injection projects to capture and store carbon. A BP spokesperson says its “determined to be part of the solution” for climate change and is “investing in renewables and low-carbon innovation.” And ExxonMobil, which has faced heavy criticism for its environmental record, has been exploring carbon capture and storage.

But for many the sums involved and pace of change are nowhere near enough. A research paper published last year by Paul Stevens, an academic at think tank Chatham House, said international oil companies were no longer fit for purpose and warned these multinationals that they faced a “nasty, brutish and short” end within the next 10 years if they did not completely change their business models.

Investors now have a choice, according to Charlie Kronick, senior programme advisor at Greenpeace UK. “The future of the oil industry has already been written: the choice is will its decline be managed, returning capital to shareholders to be reinvested in the genuine industries of the future, or will they hold on, hoping not be the last one standing when the music stops?”

The role of indigenous peoples in combating climate change

- Linda Etchart

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Abstract

Until the twenty-first century, indigenous peoples were viewed as victims of the *effects* of climate change, rather than as *agents* of environmental conservation. Representatives of indigenous peoples have in fact since 2008 been actively seeking a role in contributing to combating climate change through their participation in international environmental conferences, as well as by means of activism and political engagement at local and national levels. Using examples from the Amazonian region in the east of Ecuador, home to indigenous communities such as the Huaorani, Sápara and Sarayaku Kichwa originary peoples, this article argues that indigenous peoples, particularly forest dwellers, have a dual role in combating climate change. First, colonized forest peoples have continued to resist the occupation and deforestation of lands they have lived in for centuries; second, a number of indigenous forest communities have since the 1990s become aware of their responsibility to protect the forests in the interests of combating climate change. They have recognized the potential for their having decision-making power at a local and global level that may contribute to saving the planet. In the last 10 years indigenous peoples' representatives have been collectively engaged in lobbying for inclusion in intergovernmental climate change negotiations and to have decision-making power at the United Nations. This comment calls for international support from governments and civil society from both North and South, at the United Nations and at other international fora, to uphold the rights of indigenous peoples—enshrined in international law—who wish to prevent incursions into their territory for the extraction of fossil fuels. Moreover, it calls on governments, (I)NGOs, and private companies engaged in the extractive industries, and in other processes of modernization and development, to respect the right of indigenous peoples *not* to develop and to choose for themselves the level of their integration into the global economy and polity. The choice *not* to develop, not to have

access to the modern world through roads, for example, is itself a contribution to protecting the rainforest and reducing greenhouse gas emissions. This article draws on existing scholarly literature on the Ecuadorian Amazonian indigenous peoples, primary research among Huaorani and Sarayaku Kichwa communities of Eastern Ecuador 2016–2017, and documents from the United Nations Permanent Forum on Indigenous Issues (UNPFII) 26 April—6 May 2017. The aim is to provide policymakers, and those to whom they are accountable, with knowledge and understanding to improve decision-making in the interests of citizens and the environment.

The territories of the world's 370 million indigenous peoples cover 24% of land worldwide, and contain 80% of the world's biodiversity (Sobrevila, 2008; IPS, 2017). Indigenous peoples occupy the sites of precious natural resources, and it is they who protect forests vulnerable to the encroachment of modernity. If indigenous communities are successful in maintaining control of their territories and can preserve their customs, their traditions and their way of life, they may be able to resist development and the deleterious consequences of modernity.

Many indigenous peoples—the definition of indigenous peoples is contested, but for the purpose of this article I shall use the shorthand definition—the "uncolonized"—have lived in a sustainable way for millennia, feeding themselves without damaging the environment, in "Harmony with Nature" (First Principle of the Rio Declaration 1992). It is precisely this knowledge that has protected their environment, and which may be useful in terms of their participation in global governance of the environment; before their incorporation into the modern world their contribution to environmental conservation was inadvertent, as continues to be the case for those indigenous people who choose to live in voluntary isolation. Others, such as the Huaorani peoples of the Ecuadorian Amazon who became selectively incorporated into modernity in the second half of the twentieth century (Lucero, 2008), have become aware of their role in combating climate change only since the 1990s. Their consciousness of their deliberative role has been enhanced by the recognition of their rights under the Ecuadorian Constitution of 2008, which gives them status equal to local government (Yashar, 2005; High, 2015).

The history of Indigenous Peoples' efforts to be involved in global Climate Agreements

Following the adoption in 1997 of the Kyoto Protocol to reduce global greenhouse gas emissions, Indigenous Peoples' representatives began to push for engagement in climate change agreements, but they have continued to be side-lined. One of the sources of their frustration has been that the grounds for their involvement were that indigenous

communities were *affected* by climate change, giving them the status of victims, rather than their being viewed as potential actors in the quest to *combat* climate change.

By 2004, their involvement was given support by the United Nations Framework Convention on Climate Change (UNFCCC)—the international environmental treaty negotiated at the Earth Summit in Rio de Janeiro from 3 to 14 June 1992—which entered into force on 21 March 1994.

Indigenous peoples' efforts to protect themselves and the environment were slow to capture media attention in both North and South. In its December 2015 report, the Indigenous Peoples' Centre for Documentation, Research and Information (DOCIP) reiterated the link between climate change and the rights of indigenous peoples, stating that "Indigenous peoples have been making this link for several decades, taking centre stage in its promotion" (DOCIP, 2015: 3).

Since 2013, indigenous representatives have been meeting at international conferences and other fora that have enabled them to join forces in solidarity to call for their rights to be respected under national and international law on the grounds of both human rights and protection of the environment. The International Labour Organization (ILO) has been a consistent and vocal support of indigenous peoples, notably having secured in 1989 the "Convention concerning Indigenous and Tribal Peoples" that entered into force on 5 September 1991 and which laid the basis for the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) of 2007.

The Rio+20 Outcome Document of 2012 stressed the importance of indigenous peoples in the achievement of sustainable development and the importance of UNDRIP in the context of the implementation of sustainable development strategies. This followed the disappointment of indigenous peoples having been excluded from the Millennium Development Goals (MDGs) in September 2000, which led to their insistence in being including in the drafting of the Sustainable Development Goals (SDGs) of 2015.

Indigenous groups were also frustrated at the way in which the 2007 UNDRIP was omitted from the texts of global climate change agreements, and in particular their exclusion from the main events of the COP21 Climate Summit in Paris

in December 2015, at which representatives of indigenous communities staged their own side-events and established their own platform, the Indigenous Peoples Forum on Climate Change (IIPFCC).

At the Sixteenth Session of the the UNPFII, 24 April to 5 May 2017 in New York, the ILO once again declared that indigenous peoples had a critical role at the forefront of climate action. The ILO's 2016 Technical Note "Indigenous Peoples and Climate Change: from Victims to Change Agents through Decent Work" identifies indigenous peoples as essential to the success of policies and measures directed towards mitigating, and adapting to, climate change (ILO, 2016).

At the UNPFII 2017 conference, indigenous peoples presented themselves as key players in the achievement of SDGs 13, 14 and 15, which include combating climate change, sustainably managing forests and halting biodiversity loss (UNPFII, 2017).

As can been seen from indigenous peoples' own publications, they take their own involvement in combating climate change as vital to the task. Their interest in preventing the violation of their territorial rights by enterprises engaged in fossil fuel exploration and extraction which have in the past also contaminated their water sources and violated their human rights, coincides with the interest of environment groups and of some UN member state governments in their attempts to reduce greenhouse gas emissions and global warming. It should be a win-win situation. Protecting indigenous peoples' wellbeing, their culture and traditions, the forests *and* biodiversity by means of the prohibition of oil exploration and extraction on and from indigenous peoples' territory contributes to the pressures to find alternative sources of energy.

Oil extraction and greenhouse gas emissions: the case of Ecuador

Deforestation is a major cause of carbon emissions, and forests themselves act as a carbon sink. The World Resources Institute claimed in 2014 that community forests around the globe of 513 million hectares store 37 billion tonnes of carbon, 29 times the annual carbon footprint of the world's passenger vehicles—carbon that must be retained on the earth (Stevens *et al.*, 2014a, b).

In Ecuador alone, 39% of greenhouse gas emissions come from deforestation and other land use changes resulting from oil extraction. Much of the tree cover loss occurs in the Ecuadorian Amazon region, where indigenous communities live in the rainforest, from which they derive their livelihoods. Their territories are in theory protected, designated as belonging to the community and not to individuals. The indigenous inhabitants are entitled by the Ecuadorian Constitution of 2008 to exclude others from their lands (Yashar, 2005: 243).

Ensuring indigenous inhabitants' rights over their territories is not sufficient to prevent incursion by the extractive industries, however. This is because, even though they are protected by their own Constitution and by the UNDRIP (2007), to which the government of Ecuador is a signatory, and which grants them rights over their territory, there is a caveat. By Ecuadorian law and by the escape clauses with the UNDRIP, including within the commitment to Free Prior and Informed Consent, the territorial landowners are not owners of the mineral resources in the *sub*soil, which means that oil and minerals can be extracted without their permission.

Despite this, the rights of the Sarayaku Kichwa people were ruled by the Inter-American Court of Human Rights in 2012 to have been violated by the activities of an oil company. A 12-year-long legal struggle resulted in the imposition of a fine on the Ecuadorian government, a public apology and the cessation of oil exploration on Sarayaku land (Inter-American Court of Human Rights, 2012). To date, their territory remains secure.

The landmark ruling in favour of the Sarayaku Kichwa by the Inter-American Court of Human Rights did not deter oil exploration and drilling on other communities' Indigenous Territories in Ecuador, not least in the Yasuní National Park, one of the most biodiverse places on earth (Vidal, 2011). The Tiputini C well platform near the Peruvian border is expected to be the first of nearly 200 wells below the Ishpingo Tambococha Tiputini block. In 2016, President Correa's government sold oil exploration rights on 500,000 acres of forest adjoining the Yasuní National Park for US$80 million to a consortium of Chinese state-owned oil companies (Vidal, 2016).

Direct action on the part of indigenous communities to defend their territories against oil extraction

In 2017, while discussions continued at a snail's pace at the level of intergovernmental organizations and their member states, indigenous peoples such as the Huaorani and Sápara peoples—and their neighbours and cousins the Tagaere and Taromenane, who live in voluntary isolation—watched as the Chinese oil drillers encroached upon their lands (Tagliani,

2004). Their numbers being small—there are just over 500 Sápara people left—individual indigenous groups have little power on their own against armed state or private armies—yet individual indigenous groups are prepared to confront military force and give up their lives (Etchart, 2017).

Governments and private corporations engaged in oil extraction are, therefore, having to confront damaging publicity in the global media and in diplomatic circles, in addition to violent resistance on the ground by communities adversely affected by logging and oil spills. Pressure from UN agencies, other international and regional organizations, from local and international courts—brings alive the possibility of deterring the purchases of more oil concessions in Ecuador by Chinese companies, particularly in the light of the Chinese government's moves in 2017 to take the lead in global Climate Talks.

Small symbolic gestures—when witnessed and recorded by the international press—cause sufficient embarrassment to oil prospectors that they have in the past withdrawn and gone elsewhere. Only concerted efforts on the part of determined actors at all levels, transnational, international, national and local, be they state or non-governmental, will make a difference. As Alicia Cawiya, vice-president of the Huaorani people, commented: "The territory is not just for the indigenous people, it is for the world. Everyone must support it and fight for these territories. Yasuní is important for life on earth" (quoted in Etchart, 2017).

Both the concept of citizenship and that of international law are being redefined (Yashar, 2005; Boyle and Chinkin, 2007) and, with them, the procedures, processes and functioning of the United Nations and its allied institutions. The plan being discussed within the UN in 2017 was that Indigenous Peoples' status at the UN would be no lower than that of NGOs accredited to the UN´s Economic and Social Council.

Indigenous peoples are for the moment a force to be reckoned with. In some countries and regions, including in the USA, their numbers are increasing, though their languages may be disappearing (King, 2016). In Ecuador, only five individuals continue to speak the Sápara language, for example (Gloria Ushigua, personal communication 2017). The last of the world's "uncontacted tribes"—communities living in voluntary isolation—are being brought into the fold of modern society. Those on the frontiers of the rainforest grapple with the challenges of retaining their land and their identity while experiencing the lure of the city, which will soon or later entice them away. It will not be long before there

will be no one left to defend the trees against loggers and prospectors. Much depends on whether roads are built: once one road is constructed, side-roads emerge, creating a “fishbone” effect such that within a few years, large areas of forest disappear and with it, the forest peoples (Eriberto Gualinga, personal communication (August, 2016)).

It is the moment, therefore, for the world’s most powerful institutions—public and private—to support indigenous peoples’ efforts to be incorporated into decision-making with regard to measures that will secure their rights and which will contribute to combating climate change. It is also the moment for the United Nations member states to take action to implement the agreements to which they are signatories and in the fulfilment of which indigenous peoples have a role to play.

Indigenous communities are at the forefront of climate resilience

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Fort William First Nation, an Ojibwa First Nation reserve in Ontario, Canada (Photo: Tony Webster/Flickr)

By Climate Justice Resilience Fund

The impacts of climate change on Indigenous peoples are wide and immediate.

Indigenous land encompasses about 22% of the world's surface and overlaps with areas that hold 80% of Earth's biodiversity.

Hunters, fishers, herders, farmers, and wild harvesters, indigenous communities depend intimately on this ecological richness for their economic, social, and cultural well-being. This makes them especially sensitive to the effects of extreme weather events such as floods, droughts, heatwaves, wildfires, and cyclones. And at the same time, it makes them powerful actors in the fight against climate change.

For Indigenous peoples in eastern Canada, rising sea levels have led to the salination of freshwater, which in turn affects food security and traditional medicines. In the north, temperature rise has seen disappearing ice roads not only threaten transport systems, but also create profoundly negative impacts on the mental health of increasingly isolated communities.

Additionally, through colonisation, “communities were rounded up and put onto reserve systems,” said Eriel Deranger, executive director of Indigenous Climate Action (ICA). “Climate change has not just destabilised the local biospheres, it’s led to communities needing to move, but because of colonial structures, we’ve been unable to move our communities.”

To combat this “underpinning of imbalance,” Deranger believes that Indigenous knowledge must be at the centre of the climate action discussion. “Many of the richest biodiverse regions are protected largely in part because of the resistance by Indigenous communities to those regions,” she said.

It is a close relationship with the environment, and deeply spiritual, cultural, social, and economic connections with that environment, that makes Indigenous peoples uniquely positioned to anticipate, prepare for, and respond to the impacts of climate change.

Indigenous science is based on building deep, long-term connections with the natural world. “You learn to have a different relationship with the environment, it exposes to you a different way of seeing and relating to the world,” Deranger said.

“It’s critical to have that lens,” she added. “Without that connection to the natural world, we’re doomed to repeat this again.”

The ICA works across Canada to raise Indigenous voices on climate change and is currently developing a toolkit to help Indigenous communities plan climate action together. “The best way for us to build the capacity of our people is through gatherings. It’s part of our cultural makeup, we ground a lot of our work in creating space for gatherings to foster a network of indigenous climate champions,” said Deranger.

Using the toolkit, ICA and its local partner group Dene Nahjo are working with Arctic Indigenous communities to host dialogues and gatherings to build community-driven plans for climate action. The workshops are designed to highlight the importance of the unique Arctic knowledge held by the Dene and other Northern peoples. They also centre Indigenous peoples’ rights and values in developing climate solutions.

In other places across the world, Indigenous knowledge has been effective in developing measures to cope with climate hazards. For example, Inca traditions of crop diversification to strengthen knowledge of genetic diversity and, in the Sahel, the use of water-harvesting strategies and weather forecasting.

“Indigenous peoples are repositories of learning and knowledge about how to cope successfully with local-level climate change and respond effectively to major environmental changes such as natural disasters,” said Myrna Cunningham Kain, chair of the Pawanka Fund.

The Pawanka Fund helps communities across the world to build resilience by promoting and supporting the participation of Indigenous peoples in public policies, strategies, and other decision-making spaces. They also fund Indigenous-led plans and projects for adaptation to and mitigation of climate change.

With funding from the Climate Justice Resilience Fund, they are conducting two special calls for proposals on Indigenous-led approaches to resilience during 2019 and 2020. The fund has a transformational vision for these calls.

“Resilience is no longer just about absorbing shocks, but also about harnessing the changes triggered by external stresses to catalyse the evolution of the social-ecological system in question,” said Cunningham.

“Indigenous knowledge is key in building climate change resilience because it includes the interrelationship between diverse aspects: human being, Mother Earth, and cosmos,” she added. “Indigenous peoples have been living in the same territories and ecosystems for centuries and are the best experts in knowing environmental cycles and processes.”

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