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How do Economic Conditions Affect How the Environment is Treated

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How do Economic Conditions Affect How the Environment is Treated?

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at Bowling Green State University in partial fulfillment of
the requirements for graduation with

UNIVERSITY HONORS

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Introduction

Headlines talk of how storms seem to be getting more powerful and frequent or how global temperatures are rising (Hersher). The public is confused about what is going on or how to help the situation. Some think that it is only a matter of time until the world becomes unsuitable for life to exist and that we are doomed to extinction like how the inhabitants of our planet succumbed to extinction in prehistoric times (Pester). Other people do not agree and believe that this is just the next cycle in the ever-changing environment that we have witnessed over the history of the world (Kondratenko). While these represent vastly different opinions on the future of our world and environment, they agree on the same basic principle. Something has caused a change over time, leading to the environment we are currently witnessing. Those who believe that climate change is an immediate problem believe that human actions from industrialization and the progress of human expansion is a leading reason behind it (Pester). Today, much of the public is attempting to counteract the impact on the environment caused by their past actions.

Environmentalism, defined as the “advocacy of the preservation, restoration, or improvement of the natural environment” (“Environmentalism”), can be placed in the late 19th century. In this time, there was an increased movement to counteract the effects of the industrial revolution and economic growth. Environmentalists also wanted to raise awareness so that the environment could be better protected against such harm (“A Fierce Green Fire”). In modern times, environmentalism has evolved into a political movement such as the Green Movement. Through this movement legislation has been passed in the hope of protecting the environment (“A Fierce Green Fire”).

These outcomes, which form a greater cultural understanding of how the environment has been impacted by humanity, did not suddenly appear. These ideas have been cultivated and grown from different areas in history, such as poets like Henry David Thoreau and George Perkins who wrote in a naturalistic style (“A Fierce Green Fire”). Other influences are the first conservation groups such as the National Audubon Society formed in 1886 to save the plume bird from hatters or The Sierra Club established in 1892 with a goal to defend Yosemite National Park (“A Fierce Green Fire”).

In this modern-day environmentalism, there are numerous avenues that people can take to achieve their goal of creating a better environment. Some of these avenues include Green Peace, an international non-governmental organization with a goal to ensure that the Earth can nurture life in all its diversity, and Global Footprint Network, an international group that provides ecological footprint accounting tools to drive policy decisions in a resource-constrained world (Berkeley Library). These non-governmental organizations require donations and funding to continue their research and help them march towards their goals. Other avenues that people have used to achieve a more environmentally friendly world are green energy start-ups. Some start-ups include EcoFlow, Common Energy and Carbo Culture. The funding for all these avenues may come from everyday people or it may come from investors that want to help provide the world with a better future. This funding is not always available and may ebb and flow with the current economic conditions (Ramkumar).

In periods of economic change, certain economic indicators are used by analysts to see how the economy is doing and if a specific country is heading towards a recession or continuing economic expansion (Thangavelu). For this paper, I have highlighted Real Gross Domestic Product in terms of annual growth (the total value of goods and services produced by a country

for one year) and the inflation rate (the increase in the prices of items and decrease of the purchasing power of one unit of currency). Real GDP growth is used by The Department of Commerce to look at quarterly changes in the United States to see if the economy is expanding or contracting. Inflation can show why levels of spending in some areas may grow or dwindle due to different levels of inflation (Thangavelu). For Real GDP growth, in times of expansion, there is a larger amount of spending that a company will be able to maintain which may include environmental measures that the company has created. When a depression begins, these environmental measures are one of the first on the chopping block because of the lack of importance that is placed on these measures. In terms of inflation, a country's interest rate has also been analyzed to see how the country may be combating inflation and how this may influence the allocation of funds within a country (Fernando). These measures were selected because they are standard measures used by investors when deciding on investment decisions, whether this be for investing in a company or in an environmental start-up (Thangavelu). They will also have an impact on a company's decision to keep extra environmental policies. For the purposes of this research paper, my research question is how economic conditions affect how the environment is treated.

Literature Review

In looking at the history of environmentalism and how the environment has been treated by humanity, a larger picture must be developed. As Frank Uekötter argues in "The Turning Points of Environmental History," our influence goes back even as far as the invention of fire. This invention proved to be an essential element in allowing our species to continue through time and not become extinct. As time went on, we became a more complex species by developing a written language and by domesticating plants and animals. This caused humans to lead a more

sedentary life and villages began to take form (Uekötter). In these villages, new lifestyles were born and new needs in society were created which required humans to further cultivate the land and their surroundings. These changes ranged from new farming techniques and crops as well as the domestication of different animals. This was the early start of humans bending nature to their own benefit. Farther down the human timeline, cities were created from these towns and villages that consisted of mass conglomerations of people. These cities dominated sky lines that were once only trees and covered large swaths of land under concrete. Ecosystems have been decimated to make way for the growth and habitation of a city (Meadows). Instead of living in balance with nature, humans have viewed nature as a tool to help us in our evolution.

In the very same spirit, as shown in Doubravka Olsakova's book "In the Name of the Great Work. Stalin's Plan for the Transformation of Nature and Its Impact in Eastern Europe," Stalin evoked this sentiment towards the environment around him. In his drive to provide sustainability to the people of the Soviet Union, he wanted to create a land that was plentiful and void of draughts and famine. He saw nature as a malleable force and something he could utilize in the same manner as he did with the factory industry (Olsakova). In seeing the power of nature as a force to be conquered, he decided that the perceived benefit and progress that could be cultivated by using nature as a main source of power outweighed the potential harm that it may cause to the environment.

While the benefits of these efforts, such as damming many natural waterways, were seen in the short term, the long-term effects of flooding millions of hectares of land are still not fully computable today (Olsakova). It was also in this short-term benefits mindset that the fixation on economic growth outweighed all other thoughts. To support the growing population of the Soviet Union and its economy, crops that produced high yields per acreage such as corn were grown in

all areas that were deemed necessary, including areas that would not be able to support the crop due to its local ecosystem. Stalin's plan to utilize nature reached beyond just the Soviet Union's border. Many of the Eastern Bloc's governments had been established by the Soviet Union after WWII. This caused the Soviets to be able to implement loyal and submissive governments to protect the Soviet Union's western borders from another war (Olsakova). Some of the Eastern Bloc governments did not always follow the same pattern as the Soviets. While other governments were fascinated by the Stalin plan and began their own implementation of his designs, Poland was aware of the plan's environmental effects and had already been implementing their own legislation to stop the degradation of their own environment (Olsakova). They decided to not replicate the Stalin plan, which encouraged them to produce crops that did not meld with their local ecosystem, and instead became more efficient in producing their own native crops. The Soviet Union's focus on growth also extended to the growth of the industrial complex after World War II, causing less of a focus on how the environment was being treated during that time (Olsakova).

The official reasons given by the government for the abandonment of Stalin's plan to transform nature to the Soviet Union's benefit were due to the increased costs and understanding of the technical limitations that the project would have to overcome to be feasible (Olsakova). The economic conditions during that time may have contributed to its downfall as well. During the implementation years of this project (between 1948 and 1953), the Soviet Union saw its average annual growth rate for Gross National Product (GNP) decline by four percentage points, decreasing from 8.9% to 4.9% in that time (Efremov). In trying to reverse this decline in growth, the Soviet Union attempted to spur economic growth by working outside of the traditional confines of economic theory (Efremov). Managers of industrial factories in the Soviet Union

“were rewarded for increasing the gross value of their output, which was calculated by adding up the costs of their inputs, so they were incredibly wasteful with their resources” (Efremov, 44). They hoped this increase in the value of their produced units would make a substantive contribution to increasing the GNP. In the early 1960s, inflation was becoming uncontrollable causing the prices of goods to increase higher than the rate of wage growth (Efremov). The inflation, in part, came from an increase in the consumption of goods (increasing by 4.6% each year) and from people earning a higher annual income each year causing their annual spending to increase. The result of this chain reaction is higher prices (Ofer). While they had been attempting to achieve their past economic growth rate, they caused economic strife resulting in inflation and riots in major cities (Efremov).

This obsession with growth has long plagued humanity. This is further explored in Christy Peterson’s book “Earth Day and the Environmental Movement: Standing up for Earth,” as she writes of how environmentalism changed during the 20th century and evolved into what we know today. One of the early successes of modern-day environmentalists was the passing of the National Environmental Policy Act in 1970. This created a national policy “to use all practicable means and measures, including financial and technical assistance...to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.” (United States Congress Section 4331). In another section, she writes of how the auto industry attempted to halt the Clean Air Act of 1970 that required them to cut their emissions (Peterson). The act required them to adhere to certain emissions standards. To adhere to these new standards, new engines and parts would need to be built to emit less emissions (Peterson). They worried that this implementation of pollution controls would be unattainable if they also wished

to continue their growing profits due to the need to create new parts to comply with the emission standards (Peterson). They saw this environmental protectionism as the antithesis of profit growth. Instead, this protectionism was part of a cycle of continued evolution. This cycle of evolution is further explained by Charles Redman in his resilience theory. He describes how society works in a cyclical pattern (Figure 1). This pattern consists of four phases. The exploitation phase is where rapid expansion leads to misuse of materials, one example being in early Mesopotamia where the food demands of the population caused overexploitation of land and destroyed some of the food producing areas (Redman). The conservation phase is where the accumulation and storage of materials are emphasized. This is demonstrated by the storing of food and the adjustments made by the Mesopotamian people where farming growth was slowed in order to preserve the land available (Redman). The release phase is where the materials are used for a variety of purposes and finally the reorganization phase is where a new system is formed to take advantage of new opportunities. These final two phases work quickly and in combination with each other while the first two phases take a longer time to develop (Redman). In terms of Mesopotamia, their release phase occurred when their crop yield continued to diminish even after switching crops from wheat to barley and improving their farming techniques. Their reorganization phase occurred when they were conquered by the Akkadian empire, who took advantage of the starved and weakened army of the Mesopotamian people and brought its people into a new system under their empire (Constitutional Rights Foundation). By being taken into the Akkadian empire, the Mesopotamian people were brought into a new culture. The Mesopotamians were able to integrate their old way of life into the newly introduced traditions of the Akkadian empire.

In attempting to stop the Clean Air Act of 1970, the auto industry wanted to stay in an exploitation phase of continued growth and halt the progress towards a conservation phase that would require a reworking of their preexisting system. Their assumption that conservation and caring for the environment is a counteractive agent to growth is not a view shared by everyone. The book “Limits to Growth” by the Club of Rome forecasts that the continued consumption of materials at their historical rates will lead to an exponential increase in pollution. The death rate is also increased which causes the world population to decline by nearly half of its peak amount (Figure 2). Their forecasts show that pollution levels will eventually fall only because of a halt in industrialization due to a lack of resources available. To sustain constant growth, the authors state that moderation must be used in the utilization of resources and pollution controls must be placed into effect to continue human existence. With stabilizing efforts put into place, they estimate that the decline of the human population and the increase in pollution will be more controlled. Although the efforts do stop a sharp increase in pollution, there is still an anticipated decline in human population (Figure 3). Their conclusion is that if stabilizing efforts that curb our consumption of resources and production of pollution are enacted earlier, there will be a better chance of stopping a global catastrophe.

These harrowing predictions for the world could be misleading as Kenneth Arrow points out in writing “Rationality of Self and Others in an Economic System.” He states that many economic theories and models created to forecast future events may be inaccurate due to their inability to accurately predict future human behavior. The models used by the Club of Rome, due to the period in which it was written, may not have taken social media and the increase in social responsibility into consideration. These things can cause individuals and corporations to change their decisions faster than if the more traditional stabilizing efforts were put into place. With

these newer stabilizing efforts, there may be a greater chance that the model's predictions could be turned towards a more positive future. With these more modern influences not being considered, the older models may need to be updated in order to forecast a more reasonable expectation for the future. Diana Boer, in her writing, "How and When Do Personal Values Guide Our Attitudes and Society," looks further into the issue. She explains how older models that predict movements in society do not account for cultural diversity within an area under economic observation. The different personal values that may be favored or introduced to people in distinct cultures have a significant impact on who the people in the culture will come to be in the future. This singular idea is further explained in Bronfenbrenner's Ecological Systems Theory. This idea centers around the claim that an individual is impacted by a variety of sources in their upbringing that play large roles in the person they become and the values they hold. The full areas of impact on an individual can be seen in Figure 4. This singular factor of someone's values being influenced by their own culture can have compounding effects on the data and may further contribute to the inaccuracy of the predictions that the Club of Rome and other more modern sources predict (Pester).

In environmental conversations, industrialization has a terribly negative connotation, but there are some benefits that may be ascertained from the development of industry and modernization (Parikha). As explained by Alka Parikha in the journal "Impact of Rural Industrialization on Village Life and Economy: A Social Accounting Matrix Approach," different Indian villages were studied to see the effects of industrialization on their society and surroundings. Two major impacts were seen in both villages. The first is that the decentralization of industry in a major city and the spread of industrialization to more rural areas provide poverty alleviation for the villages and raise the standard of living due to the more modern lifestyle being

introduced to the society. The other impact is that the cultures in the villages became more outwardly focused with increased industrialization. They no longer focused on their personal worldview but developed a larger perspective on their choices and events happening nearby (Parikha). In their research, they did not include the cost of the pollution that was created from the industrialization of the two areas due to the belief that the pollution from the factories was low and negligible (Parikha). Their research showed that industrialization has raised our standard of living and helped us become more connected with those around us (Parikha).

Methods

In researching for this project and its question, economic data is an important aspect of looking at historical economic conditions. FRED, the Federal Reserve Economic Data website, is a vast source of information for looking at economic conditions. It does have drawbacks as it is a source of United States economic data. For more present economic data, there is a multitude of yearly studies that prove useful. Some of those include The Human Freedom Index by the Cato institute, The World Factbook published yearly by the CIA, the Index of Economic Freedom, and data provided by the World Bank. A correlation of these indexes was created to find the Spearman's rank correlation coefficient in the relationship between each of the indexes and to see how the rankings compare and agree with one another. On the other side of the question concerning how humans have treated the environment, I relied on historical accounts as well as studies regarding human behavior when interacting with the environment to be my guide. The combination of books, journals, and studies provide a clearer image of how humans act. In looking at how the economic data lines up with shifts in treatment toward the environment, it allows a relationship to be theorized. Seeing these trends may show whether a relationship does

indeed exist and how much of an impact the economic conditions have on people's treatment of the environment.

Results

Prior to World War II, reusing materials was a common occurrence. Goods were made with the thought that it would be more efficient to reuse them later for either the same or an alternative use (Peterson). When the war started, the economy needed to be rejuvenated and not just from the formation of a war economy. A massive effort was undertaken to cause people to stimulate the economy by repurchasing goods. Some companies began to develop throwaway products in an effort to drive sales. This is due to the fact that the products people were buying were not as durable and could not be kept as long as the older products (Peterson). While this repurchasing of items did not contribute to environmental decline, it set the stage for the change in manufacturing that would occur later. When economic strife hit the United States in the 1960s it caused the United States Gross Domestic Product to contract, as seen in Figure 5. This, along with the rising inflation rates shown in Figure 6, caused companies to seek more inexpensive materials for their products, which also means materials that would not be able to withstand prolonged use. For many other industries, the rising inflation rates and numerous recessions caused an increase in the use of non-reusable items, especially single-use plastics. From the 1960s to the 1980s, plastic waste increased by over 1650%, rising from 390,000 tons to 6,830,000 tons (Figure 7). These plastics, while not initially feared, have now become one of the largest environmental problems humans face today (UN). During 2018, the percentage of plastic waste attributed to total waste was 12.2%, rising from 0.4% in 1960 (EPA). The contracting economy and high inflation rates drove companies and individuals to consume more plastic and non-reusable items which caused damage to the environment.

In a modern-day example, the market volatility and interest rate increase between March 2022 and April 2023 (Figure 8) have caused funding for many green energy programs in the United States to run dry. The programs, prior to the interest rate hikes from the United States Federal Reserve Board, had received steady cash from fundraising but took a turn for the worse in first quarter 2023. Compared to the prior year, the amount of funding has dropped by around 40% (Ramkumar). These green energy and climate change projects can be deemed risky by investors which causes such projects to be one of the first areas impacted by interest rate hikes and inflation. In times of market volatility, investors will reduce their holding in areas deemed risky and move their money towards safer investments that may hold their value through times of uncertainty. While these projects continue to be deemed risky, climate change projects will continue to be cyclical and will follow how the market moves whether that be growth or recession (Ramkumar). Since the current financial situation is still evolving, it is impossible to know if this downturn in funding will continue and, if so, for how long. This, as well as the increase in plastic consumption, shows that economic downturns cause humans to care less about the environment and focus more on matters that are deemed more pressing or necessary.

An economic downturn may not be the only detriment to curbing human efforts against climate change and their shift toward green energy. As described above, the auto industry, in a time of expansion, pushed back against the Clean Air Act as car manufacturers saw it as a detriment to their industry's profits. They did not believe that the same growth rate could be achieved if environmental factors were taken into consideration. Lobbying efforts were led in an attempt to stop these environmental standards from being put into place (Peterson). The Clean Air Act was one that emphasized a limit on production and developing more efficient systems. This would cause profits to dwindle for the companies involved, which causes pushbacks. Others

believe they can achieve a similar outcome without the pushback from diminishing profits. They see profit and economic growth as a way to fight environmental pollution and climate change. In the 1970s, František Toman, the vice-chairman of the Czech National Council, stated in response to the conclusions from “The Limits to Growth” by the Club of Rome, “the main course that the fight against environmental pollution shall follow is, therefore not the freezing of technological progress... Instead, it shall be dealt with by speeding up technological progress and the application of technology for satisfying the material and immaterial needs of mankind” (Olsakova 249). In stating this, he shows a clear difference in what many people thought was the solution to reduce pollution and fight climate change. Some believe that industries should begin curbing their production amounts so that their pollution emissions may be lessened as was shown with the Clean Air Act. While others see that the continued innovation of designs and product innovation will lead to more efficient designs that use less materials. In their view, this will prove the answer in fighting climate change (Olsakova). More data would need to be gathered to see if there is any strength to Toman’s argument.

Figure 9 shows the rankings of a few selected countries listed in different indexes. For inflation ranking, the higher the number a country has, the higher their inflation is in comparison to others. New Zealand is touted as nearly the best in economic freedom, human freedom, and ease of doing business. Environmentally, they are ranked seventh in terms of being the most environmentally friendly county. A correlation to find Spearman’s rank correlation coefficient was run. The correlation analyzed the rankings of 154 countries that were included on all six indexes. In this correlation, it shows a strong positive relationship between economic freedom, ease of doing business, human freedom, and the environmental ranking index (Figure 10). The correlation coefficients between each of those indexes achieves a high enough amount to be

considered statistically significant. The inflation and Real GDP growth indexes showed weak positive correlation with all other indexes and they did not achieve a high enough correlation coefficient to be considered statistically significant. There may be some reasons for why these two rankings do not correlate as well as the others. For the Real GDP growth, countries that have larger Real GDP's and are pre-established in the world economy will not have large growth rates like smaller countries that are continually moving more into the world's economy. In terms of inflation ranking, many countries try to maintain around a 2% inflationary target, which is considered healthy (Miller). In the ranking, there are some countries with deflation, or negative inflation, which causes the rankings to not line up as well with the other economic indexes. These inflation and Real GDP growth outliers could be removed to see if there is a strong correlation between these measures without the presence of these outside factors. From looking at the data across all the rankings, it appears that when a country can achieve better economic rankings in most of the categories, this tends to coincide with them achieving a good environmental ranking. This is seen by the strong correlations between the indexes. For example, New Zealand lands within the top ten in each of the economic rankings that correlate with the environmental ranking while the US is within the top 25 in each of those economic rankings. For the environmental ranking, New Zealand's superiority is again shown in them achieving a spot in the top ten while the US is ranked 30th. This demonstrates how the economic indicators can correlate with a better environmental score. China achieves worse economic rankings compared to the US and achieves a worse environmental ranking as well (Figure 9). Egypt has achieved poor economic rankings that are in line with China's apart from the ease of doing business ranking where they rank 114 instead of China's rank at 37. For environmental ranking, this

relationship continues. Egypt has achieved a far worse environmental rank landing at 127 while China shows much more promise at 50.

In the rankings, there are outliers to the pattern. One such example in figure 9 is China. China ranks nearly the worst in economic freedom and human freedom but is in the top fifty in both ease of doing business and environmental ranking. Their inflation is uncharacteristically low while their Real GDP growth is in the top forty. This irregularity may be due to their governmental and political system. In comparison to the United States and New Zealand, China's government is considered to be more communistic and has a more hands on role in terms of economic activity and areas of business. Further study would need to be done to see if there is any validity to this hypothesis. In terms of inflation, China has been accused of improperly adjusting their currency, purposely causing low inflation that is against true market inflation (U.S. Department of the Treasury). More research would need to be done to see the effects of different governmental systems on the environment.

Conclusion of Research

For economic conditions affecting how the environment is treated, there are multiple conclusions drawn in the paragraphs above. The research shows that in times of economic downturn, there is a negative effect on efforts to help the environment. The harsh economic conditions cause environmental concerns to fall by the wayside and become an afterthought. This can be seen in the increase in plastics and non-reusable materials during the 1960s and 1970s economic strife and the decrease in funding towards green energy start-ups during the market volatility of early 2023. In looking at Figures 9 and 10, there is evidence that the better economic conditions that a country has achieved may lead to better environmental standards and treatment

of the environment. In order to utilize this relationship in humanity's favor, we must utilize economic growth and expansionary economic periods to focus on our environmental goals. We must also be self-aware, and, in times of economic downturn, we must not lose focus on how we treat our surroundings.

Implications for Future Research

For future research, further examples would need to be heavily analyzed to see if this relationship and trend occurs in other areas than just the ones mentioned in the paper. Other examples that could be studied are how Venezuela's economic misfortune has impacted its efforts against climate change or how the economic growth of Japan after WWII impacted their way of life and how they cared for the environment around them. More research should also be undertaken to look more closely at the effects of large economic growth on a society's effort toward climate change as well as the effect of corporate greed.

Another area of future research could be to look more into the effects of the governmental system in place and how that impacts the environment. The current data shows that different governmental structures may cause the economic data to become incongruent with the current theory of economic conditions impacting how the environment is treated. This hampers the ability to see a relationship between their own economic conditions and how their treatment of their environment changes. This impact of government may also be seen over changes in the United States Presidency and how different political parties decide to react to the need for environmental efforts. These examples would be worthwhile areas of study.

Appendix

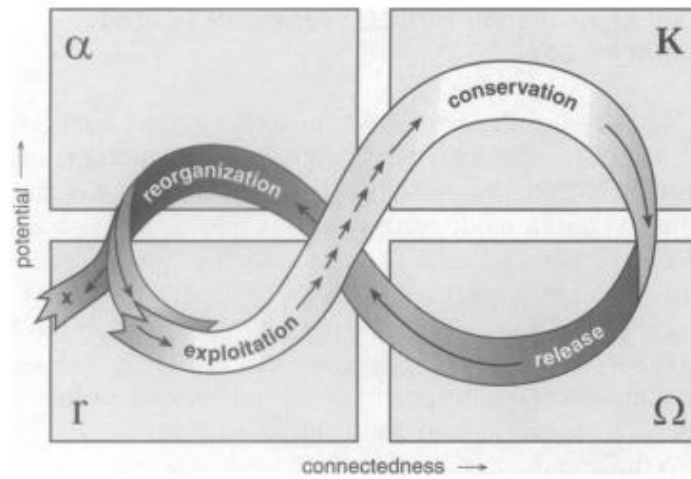


Figure 1. The Resiliency Model showing the movement between the different areas and how they all connect with one another.

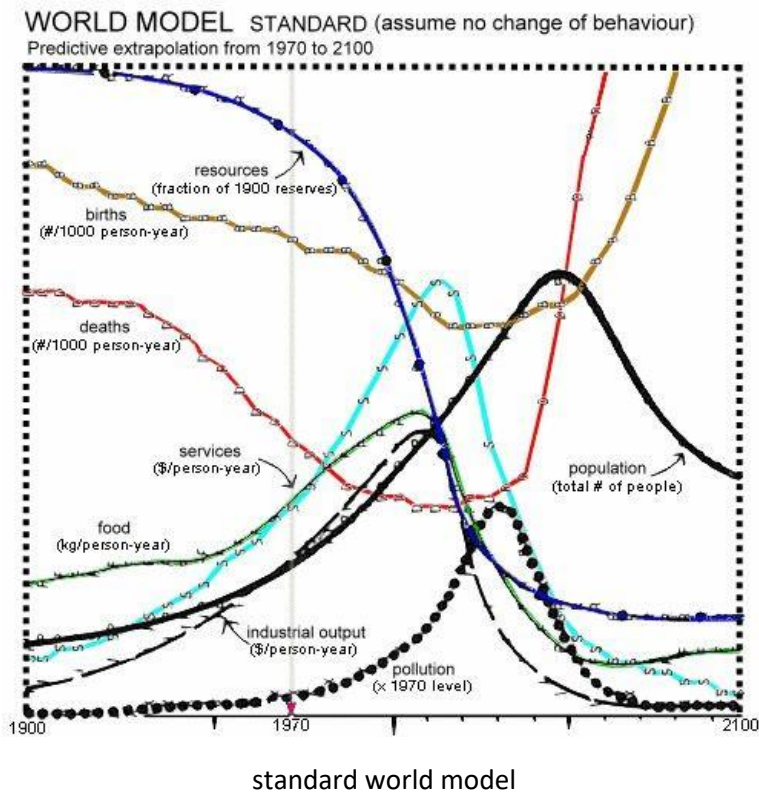


Figure 2. Standard World Model from The Limits to Growth showing increase in pollution as well as the decline in resources resulting in a decline in population.

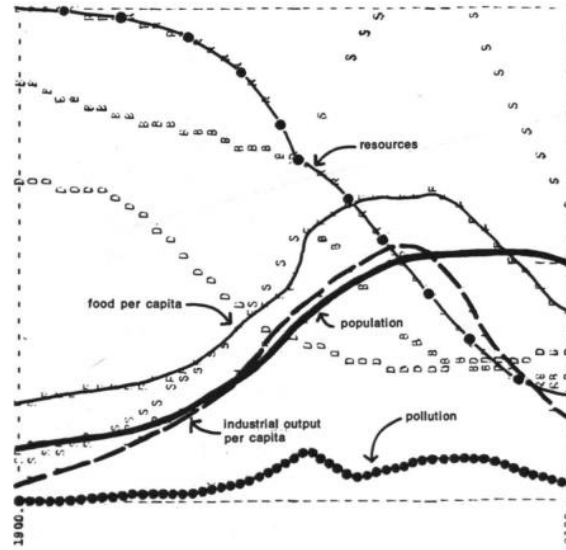


Figure 3. Standard World Model if pollution controls are put into place that cause the increase in pollution to be averted but the continued decrease in resources still result in a stagnation in population growth as well as later decline.

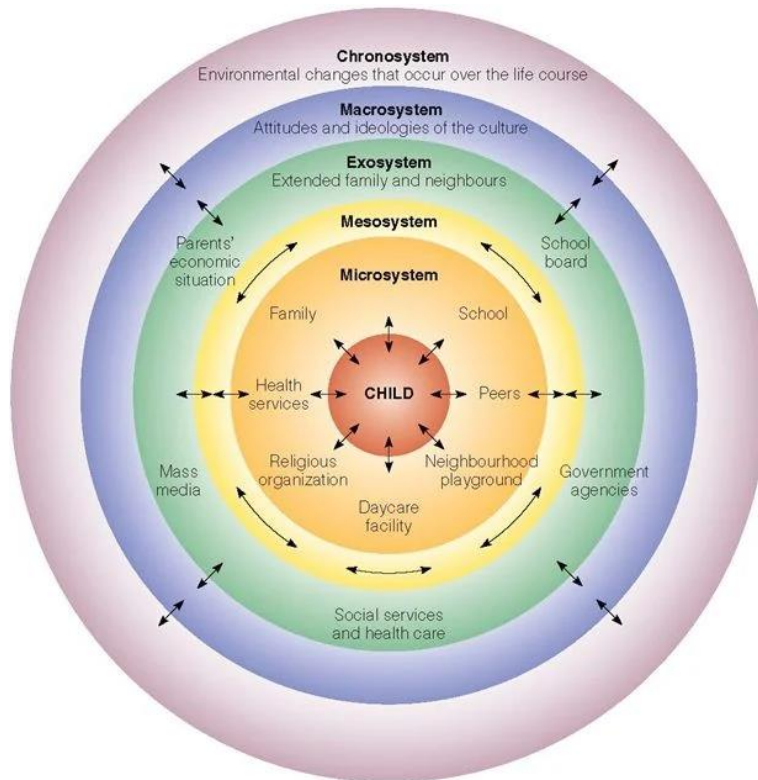


Figure 4. Bronfenbrenner’s Ecological systems theory shows the different areas and systems that affect a child during their life. The closer the system is to the child, the more profound impact that occurs to their worldview.



Figure 5. Inflation data since 1960 in the United States

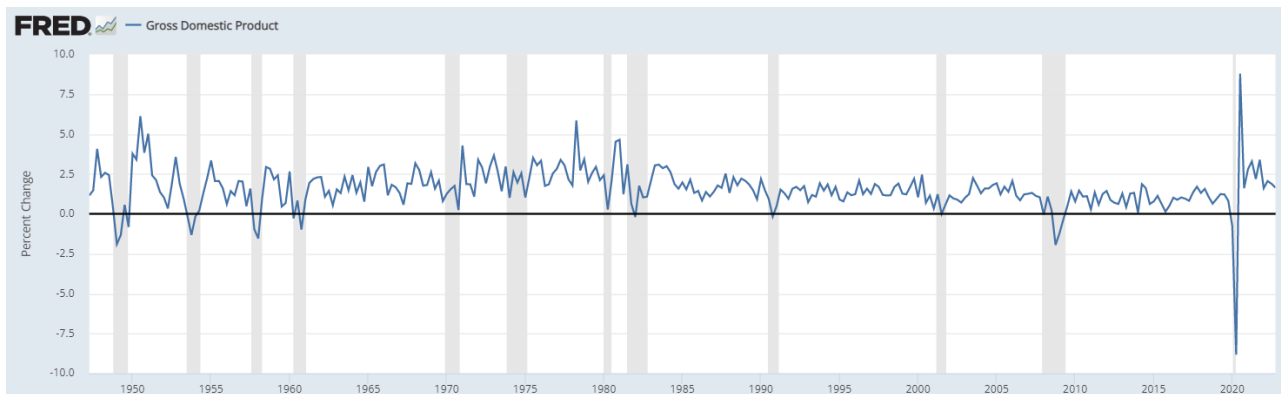


Figure 6. Real GDP percentage change per year in the United States

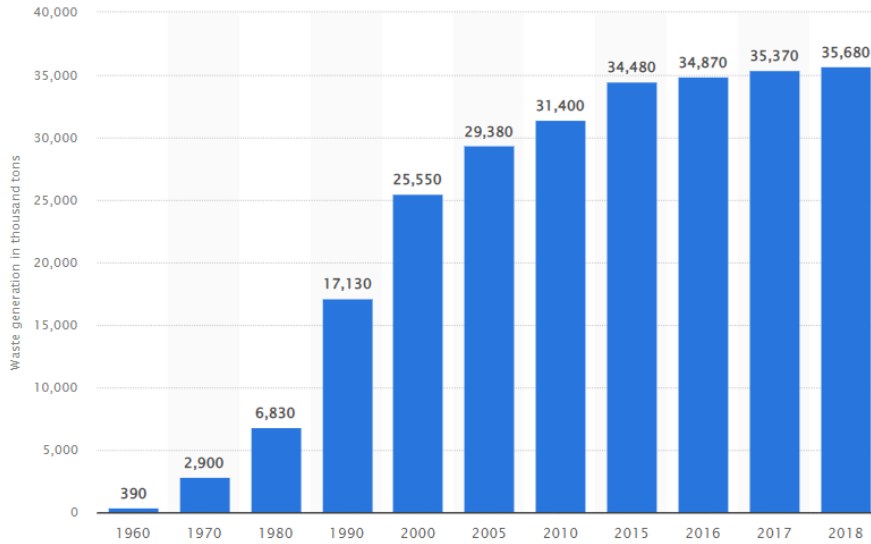


Figure 7. Volume of plastic waste generated in the municipal solid waste stream in the U.S. from 1960 to 2018 (in 1,000 tons)

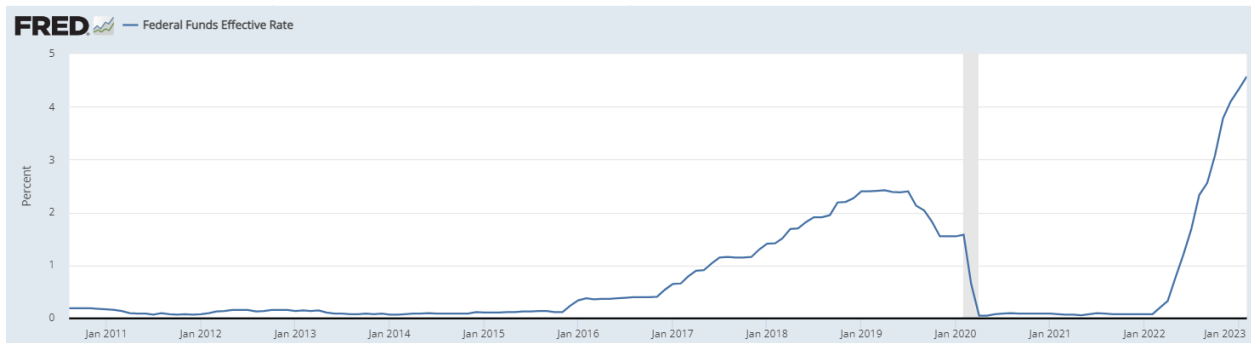


Figure 8. Federal Funds Rate since 2011

Country	Real GDP Growth Rank	Inflation Rate Rank	Economic Freedom Index	Human Freedom Index	Ease of doing Business rank	Environmental ranking
United States	75	156	25	15	8	30
New Zealand	128	131	4	2	1	7
Egypt	138	167	150	161	114	127
China	38	27	158	150	37	50

Figure 9. Comparing four countries between a multitude of indexes and rankings

	<i>Human Freedom Rank</i>	<i>Economic Freedom Rank</i>	<i>Inflation Rank</i>	<i>GDP Growth Rank</i>	<i>Environmental Performance Rank</i>	<i>Ease of Doing Business Rank</i>
HUMAN FREEDOM RANK	1	0.7850	0.2075	0.2348	0.7146	0.5751
ECONOMIC FREEDOM RANK	0.7850	1	0.2876	0.2537	0.6264	0.7684
Inflation Rank	0.2075	0.2876	1	0.0028	0.3216	0.2527
GDP Growth Rank	0.2348	0.2537	0.0028	1	0.1952	0.2481
Environmental Performance Rank	0.7146	0.6264	0.3216	0.1952	1	0.5655
Ease of Doing Business Rank	0.5751	0.7684	0.2527	0.2481	0.5655	1

Figure 10. Correlation Coefficients for the selected Indexes analyzing all 155 countries that are shared in each of the indexes.

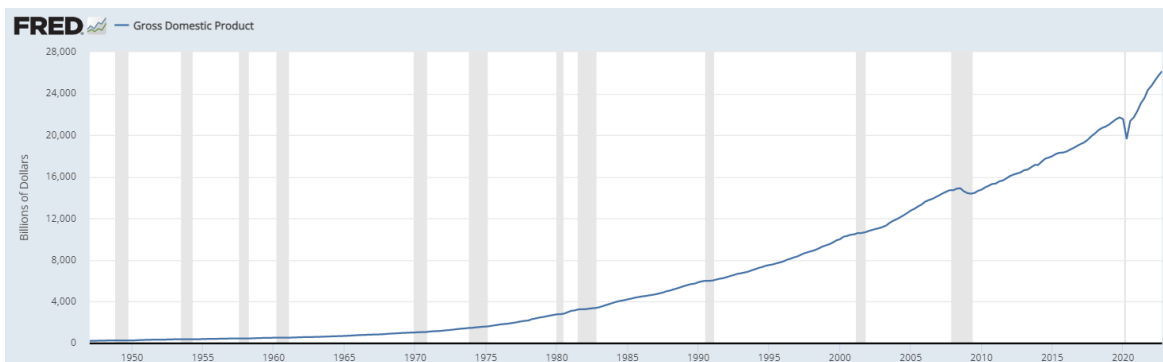


Figure 11. United States Real GDP since the 1940s



Figure 12. Federal Funds rate since 1955

Annotated Bibliography

“A Fierce Green Fire ~ Timeline of Environmental Movement and History.” *PBS*, Public Broadcasting Service, 21 June 2022, <https://www.pbs.org/wnet/americanmasters/a-fierce-green-fire-timeline-of-environmental-movement/2988/>.

This website shows a timeline for the environmental movement as well as key points in history that have furthered the environmental movement. The timeline starts in 1854 with Henry David Thoreau and continues till 2013. More updated information may be added in the future but as of today, it is unclear if the timeline is still being updated. The page also shows the first environmental groups and the main reasons each was formed. For some of the groups, links are provided that will link the reader to more information about the topic.

Arrow, Kenneth J. “Rationality of Self and Others in an Economic System.” *The Journal of Business*, vol. 59, no. S4, 1986, <https://doi.org/10.1086/296376>. Accessed 2 Dec. 2022.

In the journal, author Kenneth J. Arrow looks into the logical fallacies that may occur when looking at the rationality of economics in real-world scenarios and how the rationality of oneself may not always be accurate within a theory. Theory cannot account for all the reasons that a person may act the way they do and how sometimes one may act against what is considered rational in economics. The results seen from real-world scenarios can at times be slightly similar to the theorized results or be completely different. He believes that there should be a new method of theorizing about economic situations in order to take into account this shortcoming of existing theories.

Berkeley Library. “Library Guides: Non Governmental Organizations (Ngos): The Environment.” *The Environment - Non Governmental Organizations (NGOs) - Library Guides at UC Berkeley*, 21 Mar. 2023, <https://guides.lib.berkeley.edu/c.php?g=496970&p=3427176>.

Boer, Diana, and Ronald Fischer. “How and When Do Personal Values Guide Our Attitudes and Sociality? Explaining Cross-Cultural Variability in Attitude–Value Linkages.” *Psychological Bulletin*, vol. 139, no. 5, Nov. 2013, pp. 1113–1147., <https://doi.org/10.1037/a0031347>. Accessed 2 Dec. 2022.

Diana Boer and Ronald Fischer give an in-depth look at many frameworks and hypotheses that deal with how personal values may impact society and culture. In their journal, they conclude that their new framework improves upon the misunderstandings that other frameworks had within them. With personal values motivating individual evaluations of cultural and social items in predictable ways, their framework uses environmental and cultural factors as the two major influencers of individuals. They conclude that future theories should ensure that ecological and cultural diversity are included and accounted for explaining that attitudes cannot be related to values without context surrounding the situation.

CIA. "The World Factbook." Central Intelligence Agency, Central Intelligence Agency, 1 Dec. 2022, <https://www.cia.gov/the-world-factbook/>.

This online database is released every year by the Central Intelligence Agency and provides information on countries. This information ranges from fun facts such as surface area or population to a deep look into the culture in a region and the history of the area. It is one of the best ways to look into a country and obtain a simple understanding of the country.

Constitutional Rights Foundation. "Bria 18 4 a Environmental Disasters in the Cradles of Civilization." *Constitutional Rights Foundation*, 2023, <https://www.crf-usa.org/bill-of-rights-in-action/bria-18-4-a-environmental-disasters-in-the-cradles-of-civilization>.

Efremov, Steven M., "The Role of Inflation in Soviet History: Prices, Living Standards, and Political Change." *Electronic Theses and Dissertations*. 2012. <https://dc.etsu.edu/etd/1474>

"Environmentalism." Merriam-Webster.com Dictionary, Merriam-Webster, <https://www.merriam-webster.com/dictionary/environmentalism>. Accessed 17 Feb. 2023.

EPA. "Advancing Sustainable Materials Management: 2018 Tables and Figures." EPA, Environmental Protection Agency, Dec. 2020, <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/advancing-sustainable-materials-management>.

Fernando, Jason. "Inflation: What It Is, How It Can Be Controlled, and Extreme Examples." *Investopedia*, Investopedia, 20 Mar. 2023, <https://www.investopedia.com/terms/i/inflation.asp>.

Hersher, Rebecca. "Climate Change Makes Heat Waves, Storms and Droughts Worse, Climate Report Confirms." *NPR*, NPR, 9 Jan. 2023, <https://www.npr.org/2023/01/09/1147805696/climate-change-makes-heat-waves-storms-and-droughts-worse-climate-report-confirm>.

Inglehart, Ronald. "Modernization, Cultural Change, and Democracy: The Human Development Sequence". Cambridge University Press, 2010, Accessed 2 Dec. 2022.

In this book by Ronald Inglehart, he takes an in-depth look into how humanity has changed over its history and the process it seems to go through during these changes. These changes stem from values and beliefs that humans hold and as they change throughout time all of society changes with it. One of the book's main tasks is expanding the modernization theory to include socioeconomic development, cultural change, and democratization. He attempts to present a unified theory in looking at all of these factors. In their conclusion, he mentions how democracy and its process are the culmination of human development and progress as it signifies all that humanity has tried to achieve over its entire history.

Kondratenko, Tatiana. "Is Global Warming Merely a Natural Cycle?" *Dw.com*, Deutsche Welle, 28 Dec. 2022, <https://www.dw.com/en/fact-check-is-global-warming-merely-a-natural-cycle/a-57831350>.

Meadows, Donella H. *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind*. Universe Books, 1982.

Miller, Andrea. "The Curious History of the Federal Reserve's 2% Inflation Targeting, Explained." *CNBC*, CNBC, 20 Feb. 2023, <https://www.cnbc.com/2023/02/20/the-federal-reserves-2percent-inflation-targeting-policy-explained.html#:~:text=The%20%25%20inflation%20target%20is,to%20the%20International%20Monetary%20Fund>.

Miller, Terry, et al. "2022 Index of Economic Freedom." *Index of Economic Freedom: Promoting Economic Opportunity and Prosperity by Country, 2022*, <https://www.heritage.org/index/>.

In this index, that is created every year, the economic conditions within a country are analyzed based on a variety of factors so that a culminating ranking can be created. Each country can be looked at individually so that one can look at how life in the country may look as well as compare economic situations between countries.

Ofer, Gur. *Soviet Economic Growth, 1928-1985*. Rand/UCLA Center for the Study of Soviet International Behavior, 1988.

Olsakova, Doubravka. *In the Name of the Great Work. Stalin's Plan for the Transformation of Nature and Its Impact in Eastern Europe*. Berghahn Books Ltd, 2017.

In this novel, the author goes through the massive Stalin plan that hoped to transform nature into an asset for the Soviet Union. Stalin hoped to manipulate multiple facets of the environment to a better life and economy in the country. The plan included feats such as planting more efficient crops without regard to what crops would be able to grow in a region, building more dams to cultivate energy growth, and planting more trees in order to stop the growth of deserts in the areas within the country. Some areas of the Soviet unions did not fully embrace the efforts which may have saved their land from damage that may have occurred from this environmental policy. The book also details how some parts of the plan, while it did not become fully enacted due to Stalin's demise, are being put into place today by different countries that also hope to harness the power of the environment.

Parikh, Alka, and Erik Thorbecke. "Impact of Rural Industrialization on Village Life and Economy: A Social Accounting Matrix Approach." *Economic Development and Cultural*

Change, vol. 44, no. 2, 1996, pp. 351–377., <https://doi.org/10.1086/452218>. Accessed 2 Dec. 2022.

Alka Parikh and Erik Thorbecke look at two different Indian villages and attempt to see the effects of industrialization on the villages to see if certain patterns arose. It concludes by showing that the decentralization of industries and the industrialization of other areas do have a substantial effect on rural development and provide poverty alleviation no matter the distance between the factories and the villages. With industrialization comes a more outward-thinking approach that exposes the village to an almost entirely new world. In bringing the rural areas of a population towards modernization, industrialism in their areas proved to have the largest effect.

Pester, Patrick. “Could Climate Change Make Humans Go Extinct?” *LiveScience*, Purch, 30 Aug. 2021, <https://www.livescience.com/climate-change-humans-extinct.html>.

Peterson, Christy. *Earth Day and the Environmental Movement: Standing up for Earth*. Twenty-First Century Books, 2020.

The book attempts to be exhaustive in showing the long history of environmentalism. It goes very in-depth into several environmental issues that have appeared throughout history. It begins with describing an oil spill that occurred off the coast of California and how that drove a large number of people to push for more environment-friendly efforts to be started. It also explores the creation of the Clean Air Act that attempted to curb emissions produced and lessen their environmental impact. The energy crisis of 1973 is also described and its impact on the push for cleaner energy is described. The novel attempts to describe how the climate change debate did not start to become a full debate until the nineties as it suggests that there was no opposition to climate change until lobbying powers attempted to discredit the scientific undertaking.

Ramkumar, Armith. “Climate Funding Gets Squeezed by Volatile Markets.” *The Wall Street Journal*, Dow Jones & Company, 29 Mar. 2023, https://www.wsj.com/articles/climate-funding-gets-squeezed-by-volatile-markets-66f008e5?mod=hp_lead_pos11.

This WSJ article looks at current economic variability and the banking crisis that is disrupting the economic markets. This volatility has caused great concern among investors who are looking at investments that can be considered risky. Many environmentally focused start-ups are considered risky due to their attempts to disrupt the global energy sector that is slowly moving towards more sustainable energy sources. This perceived risk has caused much of the funding to dry up and some of the start-ups have been forced to halt their efforts.

Rivelli, Elizabeth. “What Is Car Buyers Remorse?” *Car and Driver*, Car and Driver, 27 Mar. 2023, <https://www.caranddriver.com/auto-loans/a32799874/buyers-remorse-car/>.

Thangavelu, Poonkulali. "Top 10 U.S. Economic Indicators." *Investopedia*, Investopedia, 14 Apr. 2022, <https://www.investopedia.com/articles/personal-finance/020215/top-ten-us-economic-indicators.asp>.

The World Bank. "Ease of Doing Business Rank." *Data*, 2019, <https://data.worldbank.org/indicator/IC.BUS.EASE.XQ?end=2019&start=2019&view=map>.

On this site, the world bank demonstrates which countries are easily accessible for businesses to interact with and even enter for their own business. Its ranking is compiled using a variety of information such as culture within the country as well as the political situation within the country, all of which can either cause business entrants to diminish or increase in amount.

Uekötter Frank. *The Turning Points of Environmental History*. University of Pittsburgh Press, 2010.

This massive book attempts to combine multiple writers' ideas into one and show a complete history of environmentalism. Each writer has a different aspect on how environmentalism has changed, most view it as different periods of time. Others see the history of environmentalism as changing with specific events or turning points in time such as industrialism or urbanization. One writer describes how agricultural changes changed to become more friendly to the environment and also improved the efficiency of the crops being grown. Continuing off this, another writer explains what they call the knowledge society and how science has improved our efficiency in using different items and becoming more knowledgeable of their impacts.

UN. "Plastic Pollution." *UNEP*, 2023, <https://www.unep.org/plastic-pollution#:~:text=Plastic%20pollution%20can%20alter%20habitats,t%20exist%20in%20a%20vacuum.>

United States, Congress. Public Law 91-190, National Environmental Policy Act. *govinfo.gov*, 1970. *U.S. Government Printing Office*, <https://www.govinfo.gov/app/details/USCODE-2019-title42/USCODE-2019-title42-chap55-subchapI-sec4331/summary>.

U.S. Department of the Treasury. "Treasury Designates China as a Currency Manipulator." *U.S. Department of the Treasury*, 5 Aug. 2019, <https://home.treasury.gov/news/press-releases/sm751>.

Vasquez, Ian, et al. "The Human Freedom Index 2021." *Cato.org*, 2021, <https://www.cato.org/human-freedom-index/2021>.