ON THE NATURE OF THINGS

&

ENVIRONMENTAL DECISION-MAKING

by

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Abstract

This project compiles knowledge from personal experiences and reflections, and graduate level coursework and research at the University of Michigan School of Natural Resources and Environment, and it encompasses a) influential fields of study that shape decision-making in relationship to the environment: environmental conservation, environmental governance and corporate sustainability; and b) cases and examples that nudge human awareness, education and behavior in the direction of environmentally-conscious lifestyles through environmental citizenship.

Conducted alongside experienced professionals and professors, this work gathers insights on past, current and potential scenarios for human agency, belief, and comprehension of the environment. Its main goals are to inform and push the reader to think deeply about and act on environmentally sensitive matters through personable and pragmatic examples of work done in the United States and abroad. Therefore, I will be 'bringing home' the seriousness and the realities of climate change to enable people to grasp the dimensions of past and potential contributions, both positive and negative, to this worldwide phenomenon via the content of this practicum.

In the face of the alarming threat of anthropogenic climate change and the lack of philosophical inquiry of men's ventures and reasoning, I was spurred to produce this piece so that readers could be enlightened on part of the intricate causal web that exists between human agency and environmental phenomena. My expectation is that through the lenses of veteran decision-makers, negotiators, researchers, and vivid, relatable examples readers will be moved to engage in new efforts to change individual and communal behaviors that are environmentally predatory.

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Introduction

We the people have, at last, reached the point where we live in an era of accountability, an era where the end of the colonial mindset of growth is within our grasp. 'At last' because, for those who comprehend the finite nature of our world and are able to see the historical purge of nature and native peoples by the hands of visionary men as they are, this shift in mindset is a light at the end of the tunnel for human decency. The distant lands and foreign peoples are no longer in need of 'civilizing', or evangelizing, or eradicating, the 'us vs. them' premise of world conquest has run out of room to proliferate. Albeit those devoted to the colonial model or the industrial model might perceive this light not as a freedom from their dark past and present but as a train coming full speed in their direction, those who see less environmentally harmful and vicious ways of being, individually and jointly, have the opportunity to truly foster what some have called 'sustainable societies'.

Now more than ever before, in any moment in history, the exponential expansion of human ventures and extraction of resources by our overdeveloped species faces the insurmountable obstacles of natural limits and human rights vindications. Pleasantly however, the conceptualization of 'development' and, most importantly, the inquiry of its meaning is finally shifting gears away from the escapist desire of people to relocate and rip rewards out of exotic adventures and sites. Instead, 'development' is headed towards the betterment of local conditions, taking the burdens of change and unsustainable development into consideration for future generations. Yet, by no means the overthrowing of the current establishment, the kingdom of economic growth, will come overnight. The road to sustainability is one that fundamentally challenges and changes what it means to be 'well off'.

There is no secret remedy or a one size fits all answer for the cultural, environmental, economic, political and social imbalances of society, besides one that originates in a new purpose for human endeavors. Moreover, the almighty technology, which many hail as the holy remedy to men's ills, will also crumble in the face of our inner tendencies to exploit and endlessly want more. As Douglas Rushkoff, author of 'Throwing Rocks at the Google Bus: How Growth Became the Enemy of Prosperity', puts it in his recent interview with the BBC Business Daily podcast: "it is not a matter of lamenting the facts of global capitalism, it is about lamenting the movement from the Industrial Age to the Digital Age where we use new tools to merely exacerbate the worst problems of industrial capitalism. The growth paradigm of industrial capitalism is no longer working for many companies

and certainly not fit to the planets constraints. It is up to us to choose a more distributed digital economy. Either the boom-and-bust pyramid we are still building will have such a big bust that we need to rely on more disturb urged mechanisms to just survive or, we will be able to, in essence, see the light and slowly transition our economy toward something where land and labor are respected as much as the capital that is going into production."

Very much an adaptation of the [Rohyt Belani's](#) approach to the issue of cyber crime, this project draws a similar line of reasoning to environmental issues and many more. Belani, founder and Chief Executive Officer at [PhishMe](#), asserts in his article ['The Danger of Sensationalizing Phishing Statistics'](#) that while the focus in cyber security is in building technology to address cyber attacks, what grabs people and causes havoc around worldwide online security is the lack of focus on the human element. In this context, PhishMe deals with assessment and education of clients and partners against hackers and marketers that abuse the notion of 'humans as the weakest link' to benefit from their ignorance. Hence, this approach is one that makes its way into this work, as I try to amalgamate personal experiences around the environmental – and essentially philosophical – woes of our society, to help people catch themselves in their naivety and ignorance before making bad choices.

Coming from an undergraduate program replete with argumentation, critical thinking, poetry and skepticism across different fields within [Philosophy and Religious Studies](#), I am thrilled with this chance to pose to the reader of this material some valuable insights about where mankind is, has been and can be through this era of enormous turmoil. This capstone project was prepared for the School of Natural Resources and Environment ([SNRE](#)) to grapple exactly with the nature of reality (how our world works and why) and where it is going, as conceptualized through the current state of affairs in three fields of study in particular: environmental conservation, environmental governance and corporate sustainability. Fifteen expert professionals, professors, researchers and thinkers were selected and interviewed, and coursework material from the [Behavior, Education and Communication](#), and [Environmental Justice](#) fields of study at SNRE were used as sources to this work's underpinnings.

Moreover, this practicum will put to practice my eloquence to convey and convince the reader of a better way forward. *What in the world does that mean*, you ask? Given the subject matters this piece is devoted to, namely environmental issues rooted in flawed human agency and rationale, a 'better way forward' is one in which people, all people, are as literate, if not more so, in vital matters economical,

environmental, scientific, political, social and psychological as they are in trivial entertainment and superficial illusions of wisdom. 'Vital' here meaning the substances which are of extreme importance for one's competency and familiarity in civil capacities and obligations, and moral deliberation of human wellbeing. 'Trivial' in the sense that information and stimulus that drives people further away from pursuits and understanding of his/her contribution to his/her and neighbors short-term and long-term wellbeing.

I am well aware of the can of worms these generalist and normative ethical claims may open, yet, I emphasize, and I believe some readers and many of the contributors to this project will empathize with the notion, that one's life journey is anything but productive or righteous if s/he does not find in his/her path a distinction between those things which are trivial and those which are vital for his/her wellbeing. For that matter, I carried on with this project so that readers can begin to dig through their presumptions about the 'true nature of things' and the purpose of their studies and work, and perhaps get closer to being proficient thinkers and actors in the local and global stages of environmental and social interactions. The 'better way' may very well be an unreachable utopian ideal and 'wellbeing' might be posed to have different meanings to different people. However, in the face of the critical anthropogenic destruction our times make evident, those ideals must be ones we discuss, experiment with and strive for.

By no means am I claiming to be the sole teacher who knows it all and seeks to embarrass students in their empty-mindedness. My goal is to bring to the table theoretical and practical experiences, and information that can dissolve chaotic perceptions and misconceptions people, young and old, have about the way the world works. Ancient, medieval and modern philosophical treatises, modern anthropology, psychology and environmental education principles and research have thoroughly captured this lack of literacy and self-awareness. Meaning, men, used by me as a synonym to mankind, desperately needs reconnection with the natural world and him/herself. To move beyond my romantic ideology and tech business examples, a central illustration of this disconnect can be observed in the [Ecological Roadmap](#) developed by Pike et al. (2008). A product of [Earth Justice](#), researchers of the Social Capital Project conducted a study on American's awareness, concern, knowledge and approach to social values and environmental engagement.

And the results were alarming to say the least. Based on their thorough questionnaires and surveying of approximately 2000 people from diverse backgrounds, they gathered data which made evident that over 60 percent of the

American public does not identify as caring for the environment. Their study separated responses between 10 worldviews of the environment, out of which only three, correspondent to 36% of the US population, associated the wellbeing of the environment to the wellbeing of themselves and their families. Moreover, as expert scientists have reached a consensus on the anthropogenic roots of climate change and begin to unveil the horrendous scars our species has left on the planet as observed in the concept of the Anthropocene, illogical and unreliable figures, and hardwired and unchallenged belief systems sway people array from the reality of our planet's state.

Politicians, religious figures, corporate leaders and others influence people to the degree that the evidence yielding from accredited professionals and researchers is distorted or hidden in the peripheries of media for the sake of deleterious interests. It must come with no surprise that ExxonMobil and Koch spent millions to bury the truth on climate change's roots for personal profit, and much less is to be expected from politicians who are vastly at the mercy of campaign funders and primitive sectarian moral guidance around the world. These factors are the supporting pillars for the gap that exists between the potential of our species and the actual state of our development. 'Development' here not meaning anything close to what is preached over and over by governments and corporations. 'Development' for humans ought to mean the maturity to make decisions wisely, in manners that benefit current and future generations, which gets to the later portion of this work that is concerned with stimulating the reader's will to thoroughly reassess personal and social values that feed the status quo.

As related to stimulus, one of the main sources of inspiration for this project, beyond my own ignorance of human dependence in nature growing up, was the joint work of Andy Hoffman, Holcim Professor of Sustainable Enterprise at University of Michigan Ross School of Business and SNRE, and one of his mentors John Ehrenfeld, retired Director of the foundational MIT Program on Technology, Business, and Environment, and Senior Research Scholar at the Yale School of Forestry and Environmental Studies, in the book titled "Flourishing: a Frank Conversation About Sustainability". Through both the content and the structure of their book, I was moved to attempt something similar with educators and professionals in different areas related with the environment in one way or another.

It is my intention to emulate the best qualities from that piece and relate the work of the experts I interviewed and their valuable insight to the reader as a rough guide to what created the current state of society and what lies ahead in the path of

'sustainable living'. Through the years I have grown ever more keen on and thirsty for understanding the fibers of the world from multiple perspectives, a world that is deeply rooted in natural mechanisms the general public neither comprehends nor is aware of. In my mind, our species has seized to be one geared towards survival to one that is geared towards comfort, taking for granted how environmentally costly it is to sophisticate civilizations endlessly. For that reason, I will approach this extremely complicated aspect of our character through the spectacles of social and natural sciences. My hopes are that this work will help people become more aware of their role in shaping their quality of life by taking from these dialogues some ideas and practices that spur improvements in individual habits, communities and the environment, despite of personal struggles or external pressures.

Before dropping the archaic and pompous tone of English in this rhetoric and diving into carbon taxes, political influence, legal jurisdictions, ecological disturbances and technological innovations, another work that moved me towards this path of skeptic inquiry and thought deserves mentioning, the work after which this project is named. De rerum natura, "On the nature of things" was written by 1st Century BCE roman poet Titus Lucretius Carus and it opened my mind, through both his erudition and wisdom, to what I deem to be a simple yet discrete principle that guides human cognition and purpose in multiple ways. As we seek lives of pleasure in an indeterministic universe over which we have minute influence, our subtle thoughts and actions still possess the causal potential that can create outcomes we deem desirable – not too far from the story of the hummingbird told by Wangari Maathai, founder of the Green Belt Movement and 2004 Nobel Peace Prize Laureate.

This principle, originated in natural philosophy, the predecessor of modern science, has inspired me in my quests to lead others to question, know, respect and use wisely the tremendously fortunate opportunity of living in this world, regardless of how systemic certain issues have become or how insignificant individual gestures and ideas may seem. My propulsion to spread knowledge down from the ivory tower of higher education, scholarly journals and exclusive institutions to those who will benefit enormously from the gracious heights of said privileges but do not have the means to approach, climb or sustain a place at its summit come from that precise fountain of reflection. The efforts I carry out, here and elsewhere are my attempt to be that very spark, that very drop of water that causes a ripple in the oceans of change, and I hope to one day see a new wave of thinking and being that brings us humans closer to that which gives us everything, our environment and its wonders.

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Chapter One - Environmental Conservation

Man is a complex being: he makes deserts bloom and lakes die

Gladys Bronwyn Stern

In this section we will enter the realm of environmental conservation through the perspectives of two University of Michigan Professors, a leading professional in the mining industry and a coordinator of governmental efforts. Beyond the misconceived idea I had that conservation was merely a method to maintain pristine environments, this field of study focuses on understanding and interfering in different scenarios of human impact to secure what current and future generations of as many species as possible need to survive. Hence, environmental conservation is as much a field concerned with people and their relationship to the environment as it is a field that aims to accurately assess and address disturbances for the sake of assisting in the maintenance of landscapes, wild fauna and flora, minerals and other natural elements.

Dr. Allen Burton, Professor with double appointment at the U-M School of Natural Resources and Environment, and the Department of Earth & Environmental Sciences served as an advisor to this project and connected me with two of the interviewees I had the pleasure to chat with regarding environmental conservation: Dr. Elaine Dorward-King, Executive Vice President of Sustainability and External Relations of Newmont Mining Corporation, and Dr. Jon Allan, Director of the Michigan Department of Environmental Quality Office of the Great Lakes. Allen is also the Director of the Cooperative Institute for Limnology & Ecosystems Research and his areas of expertise are in sediment and storm water contaminants, bioavailability processes, effects and ecological risk and ranking stressor importance in human dominated watersheds. The fourth person featured in this section is another SNRE professor, Dr. Bilal Butt, with a focus on human-environment interactions and post-colonialist legacies. Bilal's work has allowed him to combine technical expertise in geospatial technologies with regional expertise in Sub-Saharan Africa to study ecological monitoring and social-scientific appraisals. As this is the opening chapter, notice the line of questioning attempts to bring about key elements within each field while, at the same time, presenting distinct examples and perceptions from each individual on mankind's quest into 'true sustainability'.

Chatting with Allen Burton about environmental toxicology

V: I get the impression that when people think of environmental conservation they immediately picture a wildlife sanctuary in a distant rainforest or incredibly vast state and national parks, when in reality that is only part of the matter. Hence, would like to start by asking you to think about what it meant to you and where it all began. Tell me a bit about yourself and how environmental risks, stressors and assessments became of interest.

A: I was recruited by a chemistry professor as a freshman to work in his lab. He was doing water quality projects on a local lake and I ended up working for him for four years while I was in school [were] and that really got me into water. It was a great experience as I learned all the basics of storm water to water chemistry. The influence that professor had on me really changed my whole life and made me want to be a professor. So at that point I graduated with a bachelor's. I did not know how to make a living off with a bachelor's so I thought: 'well, you know, the best part of biology where I can go on to make some money is microbiology' so I got a master's in microbiology - which was a good experience but was not exactly what turned me on - so from that I went into a Ph. D program in aquatic toxicology and that is what I really enjoyed doing. The aquatic toxicology area was what moved me towards the ecological risk assessment field. That has just slowly developed through the years with my focus on sediments, that is where most of the chemicals end up, so there are lots of issues. It is kind of natural to get sucked into eco risk and all of these sites where complicated and you have to look at all these stressors, so it kind of has been a natural progression since my Ph. D.

This area is hugely challenging because so much is going on and there is so much interaction going on and but we don't understand the science. When we pull out one of them and we just talk about nutrients, or we just talk about metals, or we just talk about PCBs it is pretty easy and straightforward. But the science of mixtures is just really crude and I have been to a couple of big workshops this year on mixtures. That is what everybody is trying to figure out. I think the genomics area is going to help us because it is going to show us what in an organism is responding in being up-regulated or down-regulated, so I am very hopeful for the future, we will do a better job of it. And I am just talking about the science! If you start looking at the

management and the social, political and economic issues that is another whole crazy area.

V: I remember a class I had with Arun (Agrawal) and he used to say "rocket science is easy. You add a certain number of variables, you calculate it in a well known formula and at the end and you have something". But when people come into the fold and thresholds for toxicity in the environment are added, what can we expect? Meaning, are there any particular entities or organizations that have led the way doing assessments in the 'right way' in your opinion?

A: We have these nice correlations so we think this is it but with people… Yea, and that is the other thing that makes eco tox fun and challenging. Human toxicology is focused on one species and we are talking about hundreds to thousands of species, and they all respond differently. To certain extent, it is a highly uncertain science in the area, but it is fun for me to try to make it more certain so that there is less ambiguity, there is less bias and people can make better decisions at the end of the day. I think you can talk really generally that there are a few government research organizations that have been very good at moving things forward in the toxicology and risk area. If you look at the EPA research group that is in Research Triangle Park, they are focused on human health and they are doing great stuff.

If you look at the Duluth, MN Research Group they are really leading in the adverse outcomes pathways for ecotoxicology. And in Europe, there is the National Institute for Public Health and the Environment (RIVM), which is the Dutch group that has done a lot of great stuff for multistressors. So there is a handful of government groups and then there are just a smattering of academics around that have done a good job. The crude parts where things aren't moving forward are some of the government regulatory groups. They really want to use the old fashioned, simple way: the hazard quotient, the chemical threshold, and the single chemical approach. Then consultants that are supporting industry and government, who are doing it the cheap, old-fashioned way, so you have got this real range of quality out there, with a few people doing a great jobs and a lot of people doing a very mediocre job.

V: You mentioned how genomics might have an impact, what have been the biggest strides in eco toxicology to, like you said, make it a more exact and less biased

science? Or if perhaps 'more exact' is not the right way of phrasing it, what mechanisms have made it less erratic?

A: That is a good question and I haven't really thought much about. It has really been just a slow progression of the science at all levels, obviously from chemistry to ecology, to hydrogeology. Now that we are getting into understanding the role of climate and climate driven events, I think that has helped a lot. But, at the end of the day, if you are looking for sub lethal effects in organisms instead of acute toxicity, these genomics tests are starting to get us forward. Right now we can see an exposure very easily but we are still not good at translating that into an adverse effect. That is where there is a huge number of scientists trying to do what we call adverse outcome pathways, so if I have got this gene up-regulated is that going to end up in a population effect. There are two or three chemicals like estrogens people are starting figure out. Like a crime scene, there are a lot of pieces to that.

V: How do you see political influences swaying environmental regulations, when perhaps expert voices should be heard with more emphasis? What comes to mind is the water crisis in Flint, what happened there?

A: Oh it is huge. Just look at what happened to Canada in the last few years. I had some good colleagues up there that were career scientists that got laid off because their whole organization was shut down. They just grounded all their regulations to a halt. I spent a to of my career in the state of Ohio and they had the best biology group in the nation. But their administration did not do enforcement. So even though they were really great at doing these ecosystems assessments nothing came of it, there was no enforcement and they still had all kinds of problems. You've got to get the buy in at the top that you are going to enforce regulations. China has a lot of great regulations, but they just don't get enforced. At the end of the day - people do not like to hear that but - there has to be this mindset that if you break the rules you are going to get in trouble.

And as far as Flint is concerned, it's a 'oh my god' moment. It is an embarrassment, because you are talking water treatment 101. I mean that was such a basic, well known risk there and it was ignored. In the New York Times, did you see the article yesterday? The question was something about "was it stupidity or negligence". I

suspect it was some of both. You probably had administrators who thought they knew the science and didn't [as if they thought] "ah, this will be fine". And, at the end of the day, if you do not have good data you do not make good decisions. Some good data was ignored; there was some bad data also. That is going to be one of those cases you talk about in the classroom forever; it is just a classic screw up. I think it will be the end of Governor Snyder. His emails kind of tell a story. But the culprits have been let go. The head of EPA Region 5 is responsible for the states in this region that had ineffective programs so I was glad she stepped down. The two people from the DEQ stepped down and they were the most responsible. It will all play out in the investigations so we will see how much the governor is to blame.

V: When an organization of EPA's caliber drops the ball in a major way and you have people at the very top that are responsible, who comes in to put out that fire? In other words, how is a viable, top-quality replacement found within reasonable amount of time when key leaders are taken out of the picture?

A: I think it really varies with the organization. I would guess, since I have worked with government a lot, that the typical mode of action is to put in an interim. So somebody who is just below rank gets moved up in an interim position, or somebody of equal rank in another department gets moved over. Rarely do they go outside very quickly and do a search. They keep it inside because they know the regulatory process. It is just like here, it is easier for us to hire some staff assistant who knows the U-M system. It is a convenience thing. But what you will see in the government at those top positions is, eventually, they often go off and do a nationwide search and try to get the best person. But that takes a year or more sometimes before that happens.

I think I worry more about the really great expertise retiring because that is the more common scenario. You have probably heard of the "graying of the government" and there is a great preponderance of old people like me that are in the government that are retiring. There has been so little hiring over the last decade that you kind of have this void of middle to middle-upper management. Hopefully some of that 'brain-drain' can be tapped into as consultants later on, I have some friends in industry that are retiring and they are fantastic. I think industry will be calling them for a long time to give them consulting because there is nobody that can step in and fill in their shoes.

V: It might not be just an 'American thing'. I know my father has been an engineer for over thirty years and he is getting jobs right now, he is close to his seventies! He gets stacks of papers on his desk. He has been involved in education for many years and he has evaluated all the ratings of how people rank when they get out of college [in Brazil] and he says: "It is terrible, there is such void in the quality of engineering being done everywhere that you need the older dogs to do it."

A: Yea, I think you are right because I have seen this in Europe. It is probably a global thing. So few kids went into sciences a few years ago, everybody was going into business. I think we lost a generation almost, of kids coming in, and part of that was because the jobs were not there. Government was not hiring much. Most of my graduate students have ended up going into consulting because they could not get a job in government or they did not want to do the post doc thing and going into academia so that kind of left them with consulting.

V: Where do you see environmental risk and remediation moving forward, taking into account the disparities in assessment methodology, and the environment changing in many uncontrollable and unpredictable ways?

A: I think it is a really bright future - if you care about there being a focus on the environment - because we have so many problems. All of our problems in climate change and the explosion of urban areas really gives people like me in this field job security because people worry about the environment. Human health always trumps the environment but, at the end of the day, you are worried about having a clean environment for humans if for nothing else. As people become more educated that is going to become bigger and bigger. In this country, environmental advocacy has always been big and will stay big. It is not as big in other parts of the world but that could change. I am more worried about countries like Brazil, and China, or India that, as my colleagues here tell me: 'we are like you [USA] were forty years ago". It is kind of like the Wild West in the environmental field, you've still got a lot of bad stuff going on. The money and the economics rule tremendously. You will never see a country really get serious about the environment until they have a strong economy; so it is essential that these countries have a strong economy to protect the environment.

V: I wonder to what extent countries like Brazil - facing very turbulent times at the moment in our economy - can grow the 'right way'. I am trying to see if sustainability can be an opportunity for growth in a way that doesn't tare down the country.

A: I am sure Brazil is going to figure it out. They did it before when I was down there and you guys were having a thousand percent inflation. It was unbelievable. You got the right government in place then – even though that seems to be the hardest thing now. Brazilians, like a lot of Latinos, are passionate people. I have no doubt you will make it better and it will just take a little while. Get the bad, corrupt people out, and get some good ones in there. It will happen.

V: I mentioned this to you before, about the Conference of Parties in Paris, how do you think the agreement will impact your area and the United States, especially considering the current political circumstances?

A: That is a great question. I am hoping Rosina [Bierbaum] can give you the answer because she has had more experience. When we start talking about international agreements I think a lot of people get cynical. At the end of the day, they never have a heavy hammer for the enforcement. You have to got have a lot of people like Obama that really are trying to push clean energy to make things happen. I think in many ways the EU is ahead of us – maybe not so much southern Europe but in northern Europe – in a lot of countries everybody, every house that you see has got solar panels and wind energy is really common. The Europeans have really bought into it. Despite our senate and Congress, the American public is slowly moving in the right direction. It is going to happen. The vote last week, or two weeks ago, was 50/49 that climate change is not caused by humans, but that kind of ignorance is rapidly changing. The military gets it, the insurance industry gets it, all the people who are out there that are affected by it get it, it is just politicians [that do not]. I think in your generation you are going to see dramatic of changes. There will also be dramatic impacts of climate change but if we can just slow it down and learn how to adapt I think it is going to work out. You guys need to get rid of my generation and once we are gone it will be easier.

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An unfortunately brief yet incredibly rich call with Elaine Dorward-King

Unlike all other interviews, my chat with Elaine was unique in that it was not transcribed. Therefore, this will be the shortest of commentaries in this piece, however, by no means the least valuable. Her perspective gathers extremely valuable experiences through over 25 years of work with large corporations such as Monsanto, Ebasco Environmental, Rio Tinto Richards Bay Minerals and now Newmont Mining Co. Elaine started her journey into sustainable development in environmental science. She got her Bachelors of Science magna cum laude from Maryville College and went on to get her Ph. D. in analytical chemistry from Colorado State University. Elaine wanted to be involved in the solutions to environmental problems and she approached these by becoming familiar with multiple disciplines, which include biology, chemistry and toxicology. In her transition from environmental consultancy to the mining sector, Elaine observed that companies were beginning to invest heavily in efficiency training for their employees, which would later become the prominent notion of sustainability. She ventured into positions that incorporated health and safety in order to understand and disseminate environmental and social impacts through community engagement.

Elaine's main source of satisfaction from her work in an industry that is widely perceived to be detrimental to the environment has been the efforts companies like Rio Tinto and Newmont are compiling on the social responsibility end to alleviate the impacts of their activities. She also emphasized the advancement in the comprehension of chemical endpoints and negative effects in humans, wildlife and the environment. Different types of pressures push the mining sector, as she describes it, including internal expectations for higher and ethical performance, regulatory frameworks around the world and the influence of other entities and actors. Among the most distinctive groups is the International Council for Mining and Metals (ICMM), an industrial NGO that works in partnership with 23 mining corporations on global, multi stakeholder and analytical research. With the purpose of getting at what can be done better in mining, the ICMM was funded by companies in 4 continents upon the conclusion of best practices research for 2 years prior its establishment. The ICMM follows 10 sustainable development goals and form partnerships within the sector to tackle issues in climate change, environmental governance, and the value chain, and creates standards for good practices that publically available to keeps companies accountable and performing transparently.

'Mining is different from any other sector' she says 'out goals are to improve people's lives'. Yet, she recognizes that the footprint is large and very visible: 'we have to go where the resource is, be it gold in south central Brazil or diamonds in South Africa, we are constantly entering areas where companies and the environment are going to be heavily impacted by our business. Hence, our role is to make the directly impacted communities aware of our disruption through the currently existing methods, what we are trying to do differently, and how certain benefits can be gained.' Mining causes huge effects and it is vital to get communication and execution of mining right between varied stakeholders (public, government, academics, etc.). Skills are needed to manage the tradeoffs of development of mining activity, ad according to Elaine, their focus on transparency about operations by disclosing information on exploration, water use and waste makes a difference. The establishment of green spaces is something she perceives to be extremely important as well. Setting aside land gives a framework for community learning but national parks and preserved areas are usually too far out of reach for people to enjoy their benefits. Because of that, parks and green space are ever more important to educate urbanized commutes on how the world works. Unless people get in contact with the nature that gives them their clothes and foods and comfortable lifestyle we lose the battle against unsustainability.

On the matters of conservation and human wellbeing, Elaine highlights the work by the [Extractive Industries Transparency Initiative](#) (EITI). They make available funding used between governments and corporations for mining purposes and this tackles the idea that mining's benefits are only harvested by the private shareholders, or take place due to deals 'under the table', and that costs and externalities placed as a burden on the environment and stakeholders. Because of the push the mining industry is making on the sustainability and social responsibility fronts, Elaine has an optimistic outlook. It is a fact that mining requires relentless performance to suffice demand and environmental and social outcomes are evermore part of that performance. Moreover, nothing can be recycled or refurbished forever, mining is needed and will be needed for many centuries ahead, so we have to find the best ways of doing it now to create a healthy framework. Meaningful commitments have been made and investment in cleaner development all around the world is coming at the right time. Society must keep their governments accountable for the agreements they signed. Business will also play a role and the collaboration of these two entities will drive change.

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Paddling through metaphorical streams with Jon Allan

V: Beginning with your personal story, out of all possible areas of interest within environmental conservation, what brought you to the field of environmental quality?

J: Where do I start? I'll say this, my mother never drove – boy, this is a strange way to start a conversation – which meant we walked everywhere. She never learned, never had a car, never drove so we walked to the school, to the library and she taught me about birds and trees. She taught me sort of how to live life in a little slower pace just to kind of observe and listen. It [interest for the environment] started really early, I did island ecology programs at the age 14 to learn about fresh water and I wrote scientific papers. It has been a long, long path. It continued through high school with the student conservation association in a program called Hardwood Isle Biological Station in my teens, and later boy scouts and the whole bit, then through college and grad school. I knew it in my pre-teens that I wanted to do this type of stuff.

I went to this program at 14 with the Cleveland Museum of Natural History. It was a three-week program at this biological station off the coast of Maine, on a small island, and we needed to write scientific papers. We needed to write about something we observed, saw, tested or understood about the natural world. It was very natural history related, we didn't have a lot of the scientific instruments and labs, so it was much more observational. You learn early that the world is a complex place, but it is knowable through a series of observations, intuitions. You know? I'm a systems guy, that is my work, and I began to see the system as whole early. There are pieces to it but there is a holism about it, and I think you have to counterpoise both of those pieces. Evaluating back and forth between the micro and macro scale, to me, is the best of way to understand the world. Some people want to focus on one or the other, and I understand it, but that is not how my mind works.

V: In regards to this question and speaking on the complexity of a system, the recent crisis in Flint and how it impacts people has come up a lot in the news but I have not heard anything about wildlife. Could you talk a little bit about that situation?

J: Well, Flint is still unfolding and I think I am not ready to reflect on it. We are in the middle of a crisis so I'm not going to opine on it. But we have other pivotal moments in our history that are as critical in different ways. Some of the great examples of complex changes that we are seeing right now are two things: one is the profound effect that biological pollution, invasive species, is having on every single piece of each of our ecosystems. In terrestrials, even earthworms, I don't know if most people know that earthworms are an invasive, non-native species, they came over with European settlement and have been slowly migrating their way up into the northern forests, fundamentally changing the forest layer. In the aquatic systems, zebra and quagga mussels in our Great Lakes, or phragmites on the shoreline, these have profound effects at really stripping and ripping apart in what have been generations and millennia of food webs and food systems.

That I not to say that systems don't change, they do change and they inevitably will change, but they are changing at rates that are faster than we can understand and fasters than our systems can incorporate. That is one of the existential crisis that is going on in our world, this dispersal and communization of all of our terrestrial and aquatic systems. The other one that we are in the middle of right now is that we have spent three and four decades of dealing with point-source toxicity and point-source discharges, industrial and waste discharges, and municipal water systems. We have spent trillions of dollars nationally and internationally on controlling point-source pollution. But what we see is the emergence underneath that, both structurally and functionally, of non-point-source threats (farm runoff, urban runoff) partly because they were masked by the level of toxicity and partly because of certain changes on the land. What I'm suggesting is: we will not address our non-point source problems by using the 30 or 40 years worth of point-source tools that we developed.

30 years ago we didn't have any point-source tools, we didn't have all sorts of things, we had to invent them with social policy constructs and regulation. Non-point-source problems do not lend themselves to point-source solutions. We will start again and reinvent the whole array, the whole panoply of tools to deal with these issues. I mean, how do we get people to care about them is a big question. If I told you we were going to spend three trillion dollars, or four trillion, or some ungodly amount of money, and at the end of the day you are going to believe the environment is worse, how will you see the benefits of those investments and will you continue to want to invest more? People don't know what a clean environment means, or how clean it was comparing to how it is. Business models are built on

continuing to tell the public that there is the next existential crisis, there is the next horrible wrongness happening.

If you poll the public, the public generally believes the environment is getting worse, not better, after trillions of dollars of investment. That is a tough message to get people to continue to stay the source. It is a complex problem. At the end of the day – I can shorten this up because we only have a half hour here but - stewardship, care takes two forms: it takes knowledge of the very systems we are talking about, so there is an educational, literacy component to it, but it also takes an experiential component. Just like we were talking about before, people have to see, AND feel, AND contextualize, AND personalize the benefits of the investments, they have to see that the investments matter. They cannot believe that for all of our investments things continue to get worse.

V: What have been the challenges to creating successful mechanisms and resources to provide stewardship opportunities to help environmentally illiterate people?

J: I don't think it is that complicated. For us [at the DEQ] in regards to water, water literacy has to be a core part of it, the science side of it, the empirical side of it. If people don't understand they live in a watershed, if they don't understand that what they do at their sink shows up at their beach, or in their toilet shows up at their beach, or in their face scrubs show up on their river, whatever it is, then it is an abstraction. There is no substitute for literacy; there is no substitute to understanding. We are not talking about one visit from some scientist in fourth grade saying 'hey, look at all this stuff'. We need to build up on the fundamental underpinnings of what we think STEM-based education is, fundamental understandings of the way water flows and matters - that is number one. Number two is: for centuries, decades, communities have literally backed up to their waterfronts with their factories, and their stores and their parking lots.

Turning those communities back around is not easy and it is not cheap but it puts people back in context with the resource they are meant to care about. If the park is closed or kids can't play in the water because it is not healthy or safe they need to know that. We have to build our systems to change that; it is something very simple about human context and story telling. I think the best [resource] is nothing less than a good teacher that is well prepared, that can understand how to bring this into a classroom, bring this into a child's life. I think websites are fine for finding certain

things but I don't find them to be, sort of, epiphany pieces. I think it is well-prepared teachers and materials, from that standpoint, and outdoor activities. I remember in six grade, I was already pretty much thinking like this because we walked everywhere and my mom taught me this stuff, Mr. Witherup took us down to the park and we planted a tree.

Little stuff matters to people, little stuff matters to kids, that brings the context to their life. I'm not saying that in and of itself will do it, I was already predisposed, but I think those kinds of experiences matter, they bring context into the thing you learn. We believe that when learning about local water and watersheds, your own river, matter more than learning about anything else. You are still learning the same lesson but contextualizing it in a place, a place-based education is critical. I don't see a book or a website doing it, those are just resources to prepare people to teach. It is about people teaching, that matters the most, providing experiences in the intellectual component and the experiential component.

V: How about the issue of 'colonizing the mind'? That is, when we are dealing with adults who need to learn the basics of how the world works, adults that are not prone to it and have lived their 40 or 50 years and need reeducation? What are subtle yet straightforward ways to get those who are not kids and will not stop their routines to go to a classroom but need to change their mindset?

J: That's a tougher question, but I still think it is about contextualizing the experience. It is about understanding what those things mean in their community, understanding social fabric, identity; these more important social components, understanding the network that they live in and are influenced by. This isn't nefarious stuff; this is how networks inform belief. The problem is that we live in a world right now where people are deeply self-selecting, so isolated with tribal ideology. It is very hard to penetrate those because they are keepers of belief, and keepers of belief on both sides are very adroit in getting people to believe a narrow set of things. There are some social forces that are very profound right now. It is very hard to penetrate [that rationale]: 'I listen to 'x' therefore I believe 'x'. 'y' doesn't matter, 'y' is antithetical to what I believe, 'y' is dangerous, 'y' is crazy – whatever, pick your word, right? – un-American'.

V: What is your take in the Paris agreement? How is an agreement like this with barely any teeth going to be binding or take effect in the US, in particular with the partisan divide and the presidential race?

J: Well, many countries do, but the US doesn't approve it unilaterally. Parts of the US government do but I don't think I would constitute the Senate and the House as agreeing yet. I see the long view. I think these are certain inevitabilities. We are already seeing a lot of corporate actors moving by practice, not by philosophy, not by words but by deeds. I don't know if you know this or not but, there are going to be nine coal plants shut and shuttered in a month here in Michigan, nine of them! It didn't take a proclamation from whomever. It took individual actors making the business case that that was not longer the path that was viable, given all the things out there. I don't necessarily think it has to only be in the hands of the government. There are a lot of actors in our system and some of those actors are already moving, some for their own economic interest, and others for philosophical interest. I think the US side is going to be more fits than starts, there is going to continue to be a divide. Both sides will continue to flow based on political power and voice.

But I think there is a degree of inevitability to this, it may not be fast enough to some but there is an inevitability that is coming. Well, that is already here, not even coming; we are in the middle of it. It is hard to see the change when you are in the middle of it as opposed to when you look back and say 'oh yeah, that was an important 5 or 10 years'. We are in the middle of it, this isn't something theoretical. City governments are moving, municipalities; again, it is political even flow: some communities couldn't touch it with a ten-foot pole even if they wanted, some communities are adamant that [climate change] is not real and it's a hoax, and is perpetuated by those who want other things, and some communities are saying 'hey man, we are going to do this regardless of what these people say because it is the right thing'. It is happening, and it is happening inexorably. I understand the frustrations but, like I said, I take the long view because that is the way society changes. There are very few moments that come with epiphanies, quick, sharp and cataclysmic, most of them are geological.

Any shifts moving forward are not going to be dramatic but incremental. Europe is pretty heavily aligned around the realities of climate change, the Pacific Islanders are, many parts of the world are aligned with this and other issues. Where I don't see the alignment yet is on the national crisis level – I started with this so I think I'll end with this – in the profound effect of the homogenization of diversity,

biodiversity. We have such rapid movements of biological species around the Earth. They have always dispersed, they've moved, they've moved from continents, dispersing through wind or through water, but we are seeing a rapid dispersal and homogenization of systems. Those species that are really well adapted to be aggressive in new environments, Asian carp up the Mississippi River as an example, zebra quagga mussels, are the ones that start dominating and fundamentally changing the underlying system. We make a social determination that what was there was good and what is new is bad, a social determination of what is good and bad. You know? 'If these species are gone, that is bad, these new species are here and are dominating the system, that is bad.' That is as much a social as it is a scientific determination. But it is the social determination sells the story, the crisis.

When you start to rip apart the stability of food webs you start to get places like [Lake Erie](). Even though, phosphorus reductions have happened and we are at the goals that were set 20, 30 years ago for phosphorus, the system underneath it changed so profoundly, not the least of which was with invasive species, zebra quagga mussels, that that goal we had set 30 years ago is no longer valid or viable. Now we are going to set a goal that is 40 percent less than that. I dare say that in 20 or 30 years, or 10 years, when the system changes again, that goal may or may not be valid. I don't know the answer to that, there is no there. It will be a series of adaptations and accommodations on the system as it is, based on what society says it wants it to be. There is no more Eden. There is no more Eden. But I am terribly hopeful, otherwise I couldn't show up for work. I am tremendously hopeful but it is not without effort though.

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An opportunistic sit-down with Bilal Butt (*between research trips to Eastern Africa*)

V: Bilal, you are one of the few people I am interviewing that come from another country, like me, and work directly and out on the field with wildlife, could you give me a brief introduction of your background and how you ended up doing this type of research and work?

B: My interest came about largely from being in the field. I was born and raised in Kenya, and my family used to take me on safaris. We used to do family safaris and I grew up seeing wildlife and people very much within the same ecosystem. As I tried to develop this into a thing that I could continue doing, for me it was the love for being outside, I think I needed to find a way to take that sort of passion and turn it into a career, without actually knowing where it would fully go at that time. When I came to America I had really good mentors along the way who introduced me to research, and how I could take the things that I was observing and put them into a research context with a problem that needed research questions and field methods to try to answer them. One thing led to another. That is from a personal point of view, which also merged with a research problem, which was things that I was seeing first-hand, on the ground were very different from what I was reading about. So I thought to myself at that point: 'well, there needs to be an alternative voice here'. That is largely where I see myself, trying to produce narratives, good scientific narratives, that blend ecological and social sciences to provide a more accurate picture of the transformations that are going on in these dry land areas that have both people and wild life rather than the very singular narratives that see animals and people as existing in separate spheres.

There is one particular research project that really speaks to the complexity of issues in my field. This is the idea that technology, technologies in general and mobile technologies specifically, necessarily has a positive impact, and that translates into everything we think about. If it comes to the environment or development or something like that, if we need more robust geographic information systems ([GIS](#)) or finer resolution imagery, if we simply improve our technology it is going to that these really good payoffs. It is the secrete medicine for everything, technology is the solution to environmental and development ills. Largely by accident, I was with my field research team in the middle of [Maasai Mara](#), and we went to a place were there were some cattle grazing and I was looking at the ecological effects of grazing. There were two things about that scenario that struck me so let me paint the picture for you. Imagine you are in this beautiful tree/grass savanna landscape. In the distance you can see elephants, you can see impalas, you can see zebras but most close to you is a heard of about 80-100 cattle. That is not the surprising thing.

The fact that you can see livestock and wildlife together is not surprising, that is the way that savannas have been created. The surprising thing was that there was a woman that was doing the herding. Traditionally, pastoralism and cattle herding has predominantly been a male-centered activity. The more we are finding out about it,

the more we realize that women play all these incredible though less visible roles. But even though that appeared to be surprising it really wasn't when you really thought about it.

The second thing that happened was that as we were there the lady's cellphone rang - she had a little, beautifully adorned cellphone holder for very cheap phones, 2g phones with monochrome screens - and there was a very loud, animated conversation that ensued. From what I understood, with my basic knowledge of Maa, somebody was calling this woman to find out where the cows were, how the cows are grazing and whether there was any hazardous wildlife around. This led to the question: 'are cellphones in herding good, bad, or indifferent?' and so, when sitting at an airport lounge in Aricibaba, Turkey, I put together a short proposal to try to investigate this. It ultimately produced this journal article called Herding By Cell Phones where our research unveiled a couple of things. One was that even though cell phones are being used to transmit information much more readily, as opposed to the person-to-person communication, that information is not always correct. There were two things going on, there are shifts going on in the political economy of labor (who is doing what, where, when, how) and as younger male herders are increasingly pulled into more fiscally advantageous labor, like working at the tourist lodge, that removes that male labor from the herding process and it is being taken up by women.

The other shift has been that where herding occurs jointly, which is often the case, the networks of information previously revolved around kin-based networks, family connections. You would call your cousin and say: 'hey, where is the good grazing? I hope there are no wildlife there' and that information was thought to be accurate because it was less likely that people would deceive each other of they were kin-related. Now what we see is that the networks of communications surrounding grazing knowledge and grazing information tend to occur between non-kin-based connections, people that you went to school with but that you were not related to. Because you had grown up with them they were more likely to trust you and each other. There is a shift between kin-based information sharing to more friend-based information sharing, which can also be thought of as family. So there was a shift that was occurring in who the information exchange was between.

Now, depending on whom that information exchanged is with, there are questions about whether the information exchanged is accurate. In some instances people would call you that you don't necessarily know that well. You know of them, you might be acquaintances, and they might you where the good grazing area is. And you

may intentionally deceive them as to where it is. Because, maybe, you don't want too many cows in that area, maybe if there is a water hole you don't want them to end up mudding the water hole, and so on. So here was this idea that technology has this uniform benefit, that everyone would be a recipient of that information exchange and that that information exchange would be accurate, and we found neither to be true. That is one of those things where you think: 'oh, surely, that must be the case' and a nice example of thinking about this is, compared to ten years ago, are you more or less efficient now with email? Instead of thinking: 'I am going to walk down to Bilal's office to ask him a question" you just fire off an email, and instead of knocking on the door maybe you have to wait two days for a reply via email.

V: Coming from another country myself and trying to take an objective look at conservation efforts and sustainability, I began to notice some issues with the way these are used and deployed in western societies versus eastern societies. Have you seen anything similar? In particular in terms of defining what they mean and how men interacts with wildlife?

B: The term 'sustainability' has been around for a very long time, you can trace its earliest sort of emergence to broader development discussions to the [Brundtland Commission](). But if you ask Maasai about sustainability they will say: 'I don't know really what this term means because it is what we do'. When you think about pastoralism as a livelihood system, it is probably the most sustainable livelihood system on the planet. You have herders, who are born and raised in this area, who raise cattle, which are renewable, who eat grass, which is renewable, and then fertilize the grass. The houses are made out of bush, sticks and croton bushes and things like that, wotted together with cow dung and mud. Every resource is renewable. I think the term sustainability has come about as a mechanism to try and get us to think beyond the some of the immediate things that we utilize in our everyday life. Is it sustainable for me to buy a certain type of vehicle and run it for four years? Do I buy an old vehicle and keep it for twenty years because there is an environmental cost associated with buying a new car? I think that is what sustainability is meant to make is do, think more deeply about those particular choices.

Academically, I think the term remains problematic and elusive. 'Sustainability' according to whom, for whom, by whom? That is not very clearly articulated and

that raises some problems when you try to operationalize that within a global context. Recently we have begun to shift from the [Millennium Development Goals](#) to the [Sustainable Development Goals](#) and for lot of people this is a good thing. But I think there is a counter narrative, which is: 'well, we didn't really know what the MDGs were to begin with and now you're transitioning us to SDGs?' Maybe this is something to make us just feel warm and fuzzy, but does it actually have any real or practical implications?

Especially for parts of the world that many others and I work in, which are areas that don't conform to particular western tendencies and idiosyncrasies about naming and operationalization in those particular ways. It is incredibly problematic and also context dependent, but I think we have many more pressing issues to concentrate on rather than to define what sustainability is and to whom. I think what we try to do as a school here is to take the basic elements of sustainability, which is to try to conserve resources and do better with what we have, and maybe sustainability is the way in which we can do it. I don't think our focus should be on trying to have a preset definition as to what sustainability is to really say, 'ok, if we are looking out in terms of climate change predictions to the year 2050, what needs to happen to ensure that we conserve the sustainability of particular livelihoods as well as biodiversity?' That is a very normative approach, as to say what ought to be the case. I would much rather focus on trying to understand what is happening now and to understand it fully and in depth rather than try to speculate how future changes might affect it. We need to understand the nature of the problem before we can pose solutions to it.

When we dig deeper into a particular problem nothing is new, right? Everything has occurred in the past and we put new framing and lenses on it. If you take the issue of wildlife poaching, the narratives that emanate today are ones of vast herds of elephant and lots of rhino being poached to extinction. But when we put that narrative into a historical context a number of things turn out a bit different. One is the science of how we understood that poaching was a problem. Now, I am in no way trying to suggest what we see happening today is not problematic, it is problematic. What I am taking issue with is what we attribute those drivers of poaching to. Historically we had colonial scientific ideas of what constituted too many or to little of a particular animal. Kenya, at the time of the British colony, had commissioned a big white hunter, a guy by the name of [J. A. Hunter](#), to kill 936 rhinos because they thought there was an overabundance of rhinos. Rhinos could still be legally shot until 1978 in Kenya. And you can still shoot wildlife in certain countries today, legally.

The issue of poaching then rapidly transitioned in the 1980's and 90's to local people being responsible for poaching. When we take the image of say, a white hunter, standing next to a dead animal we call it big game hunting, or trophy hunting. When we see a local person net to that same animal we call it bush meat. The same thing is occurring but we label it two different ways. When we take the issue of poaching today we are increasingly finding that the news organizations and the wildlife-based NGOs are trying to attribute the increase in elephant and rhino poaching to crime syndicated and gangs, and so on. But, inevitably, enforcements surrounding that problem inherently alienate local people who reside around and often with the varied wildlife. So rather than trying to empower local people to protect biodiversity we end up militarizing the nature of protected areas and castigating local people as part of the problem rather than as part of the solution.

V: What are some resources that have stood out to you as catalysts for change in the manners in which conservation research and work is performed?

B: I think here our biggest example comes from the work of Nobel Laureate Elinor Ostrom who talked about governing the commons. Wherever you have resources that are mobile, that are not fixed and transcend traditional boundaries, it necessitates a creative form of institutional structures to govern those resources. That might mean that we have to devolve authority to local people but we cannot magically expect that if we handle authority to local people things will be magically ok. Elinor Ostrom and her colleagues have talked extensively about these rules for common property resources that say you need strong institutions, there needs to be consensus, there is needs to be sanctions for rule-breakers, all these other sort of criteria that are necessary. In terms of a climate change adaptation framework and management of wildlife conservation areas, I do think we continue to not listen carefully enough to the voices of indigenous peoples. There are broader debates here, especially in the Horn of Africa, that the Horn of Africa is one of the places that is going to be most impacted by climate change. Yet, they are the ones that have contributed least to climate change.

There is a question of proportionality, where the international community suggests that they will deliver some efforts to reduce or alleviate the effects of climate change. But that tends to come from very alien mechanisms like REDD and REDD+, which offer financial benefits and people are not necessarily asking for financial benefits.

They want to try and retain or revert to some of their indigenous coping strategies. Pastoralism, for example, has been constrained because there is reduced mobility due to expanding urbanization, greater fixed boundaries, and drought coping rules are increasingly being infringed upon. What people want to do, I think, is to revert to ways they are able to move freely between different grazing parcels, and in doing that they will not tend to graze for long periods of time in a particular place, they will keep mobile. But that means they need creative institutional structures to facilitate that. People need flexibility in order to cope with climate change and wildlife management. The more rigid rules, regulations, structures and institutions are, the less flexibility they have.

V: This reminds me of a lecture we had here at SNRE with Craig Packer, wildlife conservationist from the University of Minnesota Lion Research Center. He does research on lions and other big cats, and he mentioned how fencing can really impact how people move about with their herds and what type of legal or illegal movements are practiced. But the legality or illegality is determined by whoever set up the fences and that is not properly communicated, basically incentivizing a conflict.

B: Here the interesting point is that somebody benefits and somebody loses, in whatever type of change you try to affect. We have to think carefully about who gets most impacted and try to privilege that a little bit more.

V: What is the future of Kenya and pastoralist societies and wildlife conservation? Do you think the Paris agreement at the COP 21 will have significant impact in this context?

B: I haven't looked, to be perfectly honest, in too much detail into the outcomes of Paris, what I have looked at is the responses of the Paris agreements by certain indigenous groups. Even though the world media has looked at this as a positive step, I think within the finer details you find that it tends to privilege a certain few. I think financing for initiatives such as REDD+ increases and that goes back to the point we talked about earlier. This should not be about delivering finances for climate change adaptation, it should be about ensuring that peoples' voices are

heard and that we can maintain flexibility and strengthen indigenous institutions to facilitate adaptation and mitigation to climate change. There is an initiative to try to have communities take ownership of conservation efforts, and on paper that sounds really good. But behind the scenes you tend to see that it is really a few elites that are controlling the strings. And that is inherently problematic because you don't have very many Kenyans who are at the top of the Chairman of the Board-level positions, although that is changing a little bit. It is not just about whether the person is white or black, it is about the substantive issues that they bring to the table. I think the jury is out.

There are an increasing number of scientific papers that say that these community conservancies work. I am not sure that I agree with that. I think, that there needs to be a lot more basic research to actually look at what the effects of these community conservancies are, not just for wildlife, but for people also. We don't want to end up into a situation where people become wholly reliant upon community conservancies. And we don't want to see the wholesome abandonment of livestock either because livestock production, pastoralism is the only livelihood system that is potentially, and increasingly is, combated more with wildlife conservation. You can't have wildlife conservation next to crop fields. If you look at the ecological history of those areas, as I mentioned previously, people and livestock are an integral part of the history and the current functioning of protected areas, such that if you remove either wildlife or people and livestock you end up with a very different type of ecosystem. So 'what do you manage for, who are you managing for, who benefits who loses?' are questions that have been polarized either by a pro-livestock group or a pro-wildlife group, without looking at the really important bits which is the stuff in between. I think regardless of which position you take somebody benefits and we need to figure out who those people are and figure out ways around it. We have to look at the politics of knowledge here: who produces it, who benefits from it, who loses from it.

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Chapter Two – Environmental Governance

> If men were angels, no government would be necessary
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> James Madison

This second chapter will present key factors that mold the field of environmental governance through the perspectives of: [Rosina Bierbaum](), U-M Professor of Natural Resources and Environmental Policy at SNRE and the [Ford School of Public Policy](), Chair of the [Global Environment Facility's Science and Technical Advisory Panel](), and Advisor to President Obama's Council of Advisors on Science and Technology ([PCAST]()), [Henry Kelly](), Senior Advisor to the [US Department of Energy]() and former Principal Associate Director for Environment and Energy in the White House Office of Science and Technology Policy ([OSTP]()), [Fouad Khan](), Senior Fellow at the [Luc Hoffmann Institute]() with a research focus on the sustainability of cities in developing countries, and [Lana Pollack](), Chair of the US Section of the [International Joint Commission](), appointed by President Barack Obama for her extensive experience with public policy and education through twelve years at the [Michigan Environmental Council](), three mandates with the State of Michigan legislature, serving as a state senator and a Fellowship position at the [Institute of Politics at Harvard University's Kennedy School of Government.]()

This field is one that is concerned with institutions and persuasive mechanisms (i.e. policy making) in which multiple stakeholders and actors influence the gaps between public and private interests that are to some degree related to environmental issues. However naïve the notion of men governing the environment sounds, this particular area of academics is devoted to asserting that groups of people (villages, cities, states, nations, international allies) evaluate main elements of society in order to manage environmental outcomes. Environmental governance attempts to weigh in the influence of economic, social and political factors in the making-processes for dealing with environmental issues at multiple scales, which includes different dimensions of local, national and global leadership and power, scientific research and governing mechanisms. And it is as concerned with guiding powerful rulers as empowering the ruled to recognize and cry out against injustice.

Rosina Bierbaum's take on environmental science and policy

V: Rosina, you are one of the most distinguished, if not THE most distinguished, people here at SNRE. How did your career go from environmental interest as a child to national political advising next to the most powerful people on the planet?

R: I read [Rachel Carson](#)'s other book when I was young, "[The Sea Around Us](#)", and I lived in smoggy Bethlehem, PA. I grew up really thinking about air pollution, but also loving the water, so I decided to become a marine biologist and went on to college and grad school with that intention. I worked on parasites in shellfish, something that few people since Aristotle had actually worked on, so nobody was going to scoop me. But, while I was in grad school I worked as an editor to make money as a student for a fairly famous scientist, [Bentley Glass](#), a geneticist whose thesis advisor was [Herman Muller](#), who was an eugenicist. Bentley worked on genetics and he worked with x-rays and fruit flies, but he became very active in speaking out against eugenics, against the bomb, and was helpful in the beginning of the group called [Pugwash](#), which we can go back into if you want to know about it. They spoke out against the bomb and there is a student chapter of it now and they still meet every single year with the faculty chapter around the world.

Anyway, he was upset that I was this lab rat and that I didn't really read the newspaper, or anything. He finally said it to me one day, I both worked with him editing papers and then I was his teaching assistant, and he said: "no scientist is worth their salt unless they can interact with the policy process, and I want you to learn something about the policy process. So, first of all, you are going to start reading the New York Times everyday and, secondly, I want you to apply for a Congressional fellowship in Washington D.C.". He had been editor of science; he had been just an amazing person in this kind of public advocacy for science, freedom and responsibility for science, so out of respect for him I applied for a Congressional fellowship, which I really didn't want to win. I had never taken really a policy course at all, except one seminar that looked at acid rain and environmental impacts, so I wrote my essay on acid rain. I went and got interviewed by [Jerry Wiesner](#), who was Kennedy's science advisor, he chaired the committee that interviewed us (candidates).

And darn if the [Congressional Office of Technology Assessment](#) wasn't starting an assessment on acid rain! And they needed an ecologist! They had an economist, they had an engineer, they had a policy person, but they needed an ecologist for this team to figure out how the [Clean Air Act](#) could, in its reauthorization, deal with acid rain. So darn if I did win! I interviewed on a 102F day, no air-conditioning, and the only other woman who interviewed with me had the same suit on! I had no suit, I bought it to go to Washington from grad school and everything. Anyway, I won the fellowship so I had to go. On the first day (I am going to get to the end point very soon haha I am sorry) I literally went to a hearing September 2nd of the [House Science and Technology Committee](#) on stratospheric ozone depletion. There were eight scientists who were in the hearing facing one member of Congress, who was a lawyer. These guys were from Harvard, this guy was a lawyer, and they had the worst conversation I have ever heard. It was like the lawyer couldn't access their information.

One of the people testifying actually had an equation on the front page of his testimony. It was one of those. Some people talk about epiphanies, this was really an epiphany where I thought: "Oh my god, they can't talk to each other!" So that panel left and then the second panel was one lawyer from an environmental group and the same lawyer from Congress. They actually had an okay conversation. It really was that moment when I thought: "there is a role for someone to translate science into useable information, and if you (I) don't get involved, and that information may be out there in the academic, ivory tower world, but nobody can access it or use it, it wont be used, it may as well not be there." So that became a 20-year derailing from an academic institution. I worked on eight different assessments for the Congress on acid rain, on stratospheric ozone depletion, on marine mining, on urban smog, or climate change energy and, believe it or not, climate change adaptation. Then I went to the white house in 1993 and worked in the first Environment Division.

It was the first time the Science Office there ever had an [Environment Division](#). Clinton and Gore let the Science Advisor setup the Department any way he, it was [Jack Gibbons](#), wanted and he picked four divisions and declared Environment (as one of them). We had to figure out what the budgets were for the environment, what the federal agencies were doing collectively to make it better and how we could improve that, how they could truly share information and make sure we had strategies in place for emerging issues. Like, $PM_{2.5}$ was becoming a hot issue for air pollution and we didn't even have monitors to measure it. So (we dealt with) how do you do everything from making sure you have distributed monitoring program to making sure that people are analyzing it, that you are getting the data and you are

comparing it to end up marrying that up with the health effects are and protecting people. It was a very heavy time.

I stayed into the transition into the [Bush administration](#) only because I thought [Gore](#) was going to win. I thought if he didn't win, well he did, you know the story, I thought even if Bush came in they would want someone who knew a lot about climate change. I had gone to Kyoto with Al Gore and Air Force 2 was very exciting, and you know, what was I thought a great break through, blew my appendix in the process of coming home, yea, I gave a body part to the [Kyoto Protocol](#). I had spent a long career working at that science policy interface based on that original epiphany. But, seeing that, I could really help make policy based on sound science. Never completely because of sound science, but you could make sure things are moving in a direction that would solve problems and also use the information and make sure the research coming behind with solid research strategies will give you the missing information in a timely way.

V: What is a case you have witnessed in Congress, or elsewhere, that illustrates the complexity of environmental policy?

R: Actually, the lesson from acid rain was that the science was fairly incomplete. We knew where the emissions were starting, we knew where the emissions were ending up, we knew lakes were acidifying in the northeast. We didn't know what ecological endpoint one would want to control for. The best guess was limiting hydrogen ion deposition by about 50 percent would probably help. We gave that science to the Congress and over a period of 7 years they developed 19 different acid rain bills, all of which just said: "okay, those are the endpoints we want, 50 percent of hydrogen ion deposition. We should probably go after sulfur first, then nitrogen second, you need a big region of the country…" That was built into every one of the 19 bills. What was the really tricky part, and I think gets to your question, is who pays and how do you deal with those distributional costs. In the end, to make sure the high-sulfur coal miners didn't go out of business, we would use scrubbers that would keep those guys in business. Those distributional aspects took most of the many years to resolve. I saw one study that said even if you had paid every high-sulfur coal miner $400,000 it would have been cheaper than the cost of the Clean Air Act.

Also, thinking about the emissions trading system was very tricky. Of course, you probably know, the cost they thought it would be as a lot more than it turned out to be. That was one where you had regions pitted against each other, you had very nascent science, but I really think that it was one where people look at these curves of sulfur and said "that which cannot go one forever must one day stop". They knew they had to begin to bend the curve. They did not know exactly how much but they could find tune it along the way. That, I think, is very similar to what the whole world decided to do on ozone and chlorofluorocarbons. That had a very similar set of decisions, as we saw chlorofluorocarbons steeply rising in the atmosphere. We set a goal of trying to reduce it to 50 percent, and the sequential science assessments eventually said: "you got to zero them out" in each successive international accord. Following the Montreal Protocol, these did actually bring it down to zero. In those days I felt that the idea that 'you should air on the side of tackling the problem that looks like it is only going to get worse' was where the statesmen in Congress and in the international negotiation were headed.

I think climate change, before we went to Kyoto, was certainly a tough one too. But, then, Clinton and Gore administration believed it was a problem, the Congress didn't. It was about how to negotiate some progress that would make both the rest of the world, the US and the Congress feel like no one had given away the store. The emission trading system and developing what then was called the Clean Development Mechanism, which meant the rich countries could pay poorer countries and essentially buy the emission reductions they needed from them, that was a way to at least say to the Congress that US negotiators had found a way to kind of begin to bring developing countries into the mix. Even though the President signed the Kyoto Protocol he never submitted it to the Senate because he knew that it wouldn't be ratified. Those tricky things where even if you are convinced something is a problem, developing a solution that is feasible, not just technically feasible but economically and socially feasible, is what we ended up spending a huge amount of time on. Science was never the loudest voice but it was our job to make sure that whatever the answer was incorporated the best science.

While I was in the Clinton and Gore administration, the Ozone Standard for Human Health was reanalyzed. I still remember going into meetings with Carol Browner and EPA, and this was a very 'green' administration, we would say: "well, the science says the number should be somewhere between here and here. You should decide between the lax and the tight end. As long as you end up in this box that is my job. You can argue the politics and the distributional aspects, but don't get out of this box of .06 to .08."

V: From your time in environmental policy, do you see the agreement at the Conference of Paris having significant effects? How will words on a paper that cannot be enforced beyond international scrutiny impact the United States?

R: I think everybody got something in Paris and I think every country gave something in Paris. It is better than many expected when you look at it in total because all countries are on board. The agreement there to ramp up 'ambition', I guess that is how they put it, every five years I think is really exciting. The fact that they have written the role of forest and land in there, but not yet specified, suggests to me that those will be things they will be flushing out. When we look for more emission reductions or sequestration they are going to be very important, and so I think that is great. I think the acknowledgement that even two degrees is not so good by having the one 1.5C is there. A lot of the report said they all got to Paris having done the homework and knowing what they were pledging so they didn't have to spend the whole time over what they were going to pledge and how much, and all that. None of those add up to enough to keep us even at two degrees, but the really hard work of operationalizing that will come next. That will be really tricky, the transparency, the monitoring review, evaluation, the rules of engagement of all of those. But I think it is pretty exciting because the whole world is on board. The big scary thing now is what is going to happen with the centerpiece of the US position and the Clean Power Plan.

I guess another thing that I think that has happened in recent years that is very positive is that you are hearing new voices that are coming out in support of action. The Dalai Lama made a statement about climate change, the Pope, and you actually might be interested in looking at the Yale 360 Forum. Those guys, there are two professors, Anthony Laiserowitz is the one in Yale and Edward Meibach is the one in George Mason, and they keep checking on polls. They actually did a poll six months before the Papal Encyclical and certain amount of time afterwards, and they have some interesting graphs, which they call the "Encyclical Effect" or the "Pope Effect". They do it across categories of liberals and conservatives, and it is pretty interesting when you have religious groups speaking out. I think the fact that the President of the World Bank, who is a medical doctor, came out in 2013 and said: "I can't achieve the goals of the World Bank lifting people out of poverty if we don't confront climate change. We got to do that together." Now every project that the World Bank funds in the poorest countries, the IDA countries have to be screened for vulnerability to

climate change before they build the road, or whatever. It is uncertain and like, how can you know? But they are trying and I think that is pretty exciting.

In Paris it was something like a thousand companies stood up and made pledges, and then the investment community. For example, TIAA Cref, which has all of the retiring money of most of the faculty, they are trying to think about: 'what does it mean, really, to do green investing? They can't quite divest but they are thinking about how they can be more sustainable. Certainly, my own portfolio is invested in the sustainable and the socially responsible, which is less about energy and more about not child trafficking and drugs and alcohol. I made them remove Exxon Mobile for a different reason because I was one of Exxon Mobile's dangerous scientists in 2001 (haha). The investment community, the financial community, even bunches of colleges stood up. You got many sectors, not just the scientists screaming: 'it's awful', but people who think there is money to be made, and you see the price drops in solar and so on. I think there is kind of a confluence of changing public opinion, and changing private sector opinion, religious opinion, World Bank and development opinion.

And then, don't forget the Sustainable Development Goals, which the United Nations took all these years to develop. If you look across the seventeen, even though there is one, I think 14 is discretely climate change, they all interact, almost all of them have an environmental aspect. That is going to be another force in deciding how to monitor towards that and in the coming years will be coincident with what we are doing in Paris. I am really more optimistic now than I have been since Kyoto, when I blew my appendix. It was then when I thought we made a start and it was so hard to see how things unraveled.

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Talking energy efficiency – from refrigerators to secret weapons - with Henry Kelly

Before beginning, I wanted to clarify where this next interview took place. For the science fiction aficionados, think of Umbrella headquarters throughout the Resident Evil film series. For everyone else, think of an academic spin-off of the Area 51 depiction in Independence Day featuring Will Smith. Located a solid 25-minute bus ride northeast of U-M's central campus, the North Campus Research Complex felt

just like that. Little did I know my next conversation would end up taking me through an underground tunnel connecting two facilities I never heard of, but my interviewee had actually worked in secret weaponry for the US government. So… without further suspense, here is my interview with Dr. Henry Kelly.

V: I can barely shake off the amazement I have with this place but I will try to focus on the questionnaire and maybe you can tell me what brought you here. What drew you to do work related to clean energy and environmental policy?

H: I guess it was sort of a random walk but I got a Ph. D. in physics, and my father also had a Ph. D in physics and had put his life into public policy in one way or another. I was groping around trying to decide what I wanted to do and I ended up getting recruited by the Arms Control and Disarmament Agency – at this time my heart actually raced and I thought 'wow, I wonder what this guy has seen in his life, and what they are hiding next door' – They were an organization that was setup to do arms control grievances, anti-ballistic missile treaties and testing. It was intriguing; I did the verification part, the intelligence part so if the Russians cheated I'd figure out how we could catch them. That was interesting – 'JUST INTERESTING'? I thought – but very confining because everything was highly classified, you couldn't talk about it. I know one of the most painful things was that just because something was on the New York Times you couldn't that it was true, even though everyone you know knew it was true. Clearly there was a major public purpose there and after four years, maybe more than that, I applied for this AAAS fellowship, which Rosina (Bierbaum) also did, and I got it.

By the way, my daughter also is a AAAS fellow, I think we are the only parent and child there. But, anyway, I ended up in the Congressional Office of Technology Assessment, which is a think tank set up to do public policy for the Congress, it was also where I met Rosina when she was there almost at the beginning. And there was a very large project, we did a couple of things, but there was a very large project on renewable energy that was foundering, about to fall apart, and on the following day they said, as they handed me this large steaming pile: 'can you fix this?' I didn't know anything about the subject but I just became fascinated. It was a place where there was a lot of basic science involved so I thought I could make a contribution. I did a lot of early calculations and work, and that is how I got into the field to begin with. I was very excited to get opportunities that address a need. Research is

certainly obscure, but you don't have to worry about locking everything up at night. But, I spent quite a while in the Office of Technology Assessment and have been in an out of a bunch of jobs related to sustainability.

V: So, besides the national secrets you can't share with me, what cases in your career stood out in regards to their complexity?

H: One of the things that were really not visible at all in the beginning was the understanding of where energy was used and where it went. There was a seminal piece by Amory Lovins from Foreign Affairs called "The Road Not Taken", you'd think people would know about this. He basically said we could either drill our way or mine our way out of a bunch of problems or there is a simpler way for it. Almost exactly at the same time with the energy crisis coming up, the American Physical Society had a summer workshop, which I didn't attend but a whole bunch of people who since became my friends did. They started digging into where the energy went and nobody had any clue. How much went to cars? What was the difference between the theoretical optimum? What was the minimum amount you'd need to move them around or heat buildings? They were just appalled with how far they were from the optimum. That was really a very exciting and intellectually stimulating discourse, we were essentially inventing a field. And the whole idea of building up the energy efficiency wasn't even on the radar screen, but it is a huge, huge matter. 76 percent of all electricity goes into buildings and a lot of it is being used in these appallingly stupid ways. There are many breakthroughs but that was certainly one of the bigger ones. A big thing is just to understand where the opportunity space is. Nobody actually saw that fixing buildings had anything to do with the issue of energy efficiency. But it turns out it is a very big deal.

A lot of energy goes into refrigerators, for example, so we dug into how do refrigerators use energy. Nobody buys their refrigerators because of their efficiency, certainly not back then. People just bought their refrigerator and plugged it in and there was no way to tell which one used more energy, even the manufacturers actually didn't know. But we looked into it, what they were doing was appallingly dumb. They were building the motor into the freezer box so the heat of the motor was being conducted into the freezer, you know? There were whole series of really easy things they could do. Over the years they have almost four times the efficiency they had back then but nobody even had the idea that was important to cause worth

pursuing. A bunch of other things started emerging too. Why did cars use so much energy? Was it pushing air aside? What was it? And, over time, we doubled the fuel economy of cars and we are about to double it again. We are still a long way away from the theoretical efficiency but we've made strides. This, of course, is all on the demand side and on the supply side there has been some terrific success stories in renewables, photovoltaic and wind design, getting more and more sophisticated. Even into the much more modernly efficient natural gas generator, but at some point we are going to have to get rid of all fossil fuel generation unless you can sequester it. And even if you do find a way to sequester the emissions from a natural gas plant you want that plant to be as efficient as you possibly can make it, that is a major step forward.

V: What does sustainability mean after all? Different industries seem to blend their interests in their definitions and a common agenda always seems evasive.

H: You can get hung up on trying to define sustainability because it can be a very slippery term but at the end of the day you would like to have everybody on the planet live a very comfortable life in a way that doesn't put unsustainable strains on the environment. Of course that, means water you can drink, beautiful natural environment you can live in, the air you can breathe, the fully functional climate and atmosphere, all of which is entirely possible but is going to take a major change. One of the question marks of climate change is: can societies like the US reduce its emissions by 80 percent and do it 2050? That is heavy lifting. But it is ENTIRELY POSSIBLE TO DO IT. As you point out, the issues here are partly technical but they are also economic, political, and behavioral, and getting people to change their behavior has been incredibly exasperating. The technology has in many cases been way ahead of the policy but the technology can make everything easy if it is cheaper. If you have light bulbs that produce better quality of lighting and are more controllable, or windows that are more comfortable to stand in front of, it is a hell of a lot easier to get them accepted into society rather than cramming it into a document. I mean, energy is a problem, you have this giant incumbent industry, which includes the construction industry, the automobile industry, and you basically say: 'what do I have to change so the work can get far?' So, it certainly helps if technology can say: 'hey, look! The more efficient one is actually more attractive, or at least cheaper.

V: What have been the most significant mechanisms for improvements and setbacks in sustainability based on your experiences?

H: Labeling is one of the big success stories. The very first thing we did with refrigerators was put a label on it so people would at least know which one used more electricity than another kind. That might not influence your decision a lot but the likelihood is more than zero. That eventually led to the labeling and appliance standards, but the labels alone were a bid deal. One of the goals [in this area] is to put extend this and put labels in whole buildings, not just components, and the Europeans have done a good job at this. We are gradually getting to a point where there is a label that some states are requiring because the real estate agent will always tell you it is an efficient house. There are also some places where people are doing a behavioral thing: it turns out you react more to what your colleagues and neighbors are doing. So in NY you are now required to publish the energy consumption for all buildings larger than fifty thousand square feet. You can go to the map, because of Google Earth and other tools, and you can color the buildings and go 'oh, my building is red and every body else in my block is green!?!' But it starts affecting the real estate market because no one wants their building show on this map with a bad color. That is undoubtedly helpful.

And, of course, the labels on cars, the fuel economy standards, aren't perfect but that is mostly because with [VW](#) it turns out the labels don't really mean anything. The sustainability people turned out just to be confection on top of a real problem. About, it must have been more than ten years ago, I was working with these guys at the [Transportation Research EPA Center](#) just up here, you can practically see it out the window. They had a car where the manufacturer realized that the emissions test was always done with the hood open, so they had it so that it would only connect the emission control when the hood was open, it was a mechanical equivalent to the software [VW implemented]. Fortunately, it was obvious enough that they got caught over it. They [VW] still actually haven't announced what they are going to do about the retrofits. My understanding is that they are probably going to have to have some kind of ammonia bottle attached or a tank that needs refill, which is a pain on the rear end. They are doing it for heavy trucks but to try to persuade all the VW owners that now they got to have this urea in a tube and get it refilled or they wont pass the emissions tests. It is going to be really interesting. They' will need a whole new infrastructure to fill everybody's tanks with urea?! If you add urea in small

amounts you can take the NOx out of the equation to meet the extremely low NOx emissions in a diesel. This Tier 3, at this point, rules out almost all the diesels except, I think, BMW who was able to meet the standard without the urea. Big trucks either carry big tanks or need to get inspected every six months and they get six months worth of urea, so it is just when they get their trucks inspected they fill it up and it is not that big a deal. This is one strange story.

As we are talking about labels, one of the more interesting recent labeling problems is with the lighting, where you are now going to lights that are technically different from the incandescent bulb. Everybody was familiar with a 25 watt bulb, everybody knew what it was, they are all the same color, the same shape. And all of a sudden you have to get a label and tell them what color that bulb was going to be and do it in a way people understood what the hell you are talking about. This one is a classic [case]: the first round we had the physicists who helped invent the light bulb come up with this label where the color rendering index and black body temperature in degrees Kelvin! We said no way, nobody will understand what the hell you are talking about. So we basically booted all the physicists out of the room and the label now says warm or cool and there is a little bar. It is still not perfect, if you buy a bulb you will probably see there are labels everywhere and it is still pretty damn confusing. This is a place where you need to get behavioral scientists in and have them say what is it that will get peoples attention to and understand. So, certainly, this idea of labeling, getting the information out there and getting some competition has been a big deal.

One of the big sleepers has been standards, efficiency standards. They did in fact double the fuel efficiency of cars and the appliance standards program has been a major factor in getting refrigerators to be four times as efficient as they used to be. You sort of keep ratcheting it up and say: "guys, we have done an engineering study and we know you can increase this by 20 percent so five years from now the standards are going to be 20 percent tougher and you need to catch up." The negotiation process for this is very elaborate to build into the law. You publish the notice of the proposed rule and the proposed rule has all kinds of engineering calculations based on a really detailed study of what is actually on the market, and often there are products on the market that already meet the standard so they can't come in and say this is technically impossible. It tends to be that the most efficient, the extremely efficient ones tend to be more expensive so the big challenge is not doing it but doing it cheaply, so there is a big engineering analysis that factors in manufacturing costs and learning curve, etc. That is one of the things we have introduced over the last few years since the first time you produce something it is a

lot more expensive than the millionth unit because you just line it up, and this is based on very well known economic research.

You go through all of this, you interview people, do market surveys, manufacturing studies and do really detailed reports of how many people use their washing machines how many times. If you only do a batch of clothing a year then why make it efficient, but if you are doing twenty a day, you can imagine the data. So you publish the proposed rule, you get hundreds and hundreds of comments on the rule and then it gets turned into a standard. It has had a huge effect on production. Yet, things like refrigerators have a label but how many people actually pay attention to it? There are remarkable things about refrigerators, they have gotten almost four times as efficient but they have also gotten bigger, and cheaper so the economists go crazy when we show them this, saying the market would have taken care of it, but it didn't. Part of it is, when you are buying at a refrigerator, you are looking at five thousand things but energy use is probably not one of them, they just do not pay attention to it. If you put up a standard where the price actually goes down no one is complaining. The economics are not as dramatic with cars because the more efficient ones are slightly more expensive, basically due to higher quality components, lighter building materials. But in fact, you are getting all these learning curves and people are getting much more clever about using low-weight plastics, super high efficiency engines, isolated design, highly efficient transmission, all these things you got to do. The fact that you can double the efficiency of an existing car, I mean, it wasn't all that hard to do to be frank, though manufacturers may start to screaming when you are getting a $1.50 a gallon and that [standard] is really hard to justify. We'll see how that goes on.

V: All evidence shows we need to reduce greenhouse gas emissions. If we were to adapt all current existing vehicles, what can be done with the incredibly large car fleet in the US? And to what degree can buildings be retrofitted to consume less energy?

H: The one thing is that cars last fifteen years and you can get out ahead of this. If you work back from 2050, all the trouble is these super efficient or all electric vehicles have to be the dominant vehicle in the road by 2050, which means they have to be the dominant car for sale in 2030, basically. That doesn't give you a heck of a lot of time, but it is feasible, there is no question. People have to get their act

together. If you are going to have these be the dominant cars sold in 2030 that means you have to start introducing it in 2020 and you have to stat the clock early, but is possible. The same is true for most building appliances and you tend to have a 10 to 20 year lifetime. Now the shells are a problem, windows, walls, and roofs. You are going to have a lot of buildings in 2050 that are standing here today and that's a tough problem. I am thinking here, you can replace all the equipment, the air conditioning, the lights, the controls, the sensors, all this stuff can move, but we keep windows and walls up. This has proved to be a challenged. Some things are easy like finding leaks and plugging them, but if you have got a whole building with a lot of lousy windows in them you are going to have to suck it up and replace all of them. Do you know the story about the Empire State Building? They replaced every window of the Empire State Building and they did it by putting a window factory in the Empire State Building. They actually made them in the building and sent them up the elevators.

You can really do dramatic things in retrofits. Though plainly it is a lot easier to do in a new building, but you can replace the lights and controls. What you can't do is redesign the day lighting in most cases, well, sometimes you can. You can get these blinds so they automatically open and close, or you can get electrochromic windows that wouldn't change. Basically, everything in a building can get switched out except the walls and the ceiling. Probably the most successful retrofits have been East Germany where you had these Stalinist disasters and then they put insulation on the outside of the buildings that made them look nice colorful and cheerful looking buildings. So these things that used to be these cinderblock monstrosities are now really attractive looking townhouses and they are well insulated. So, there are things you can do, but the real estate market is not really reflecting this. What Bloomberg did in New York City was really good. He got people beginning to realize that their reputation suffers if it was known that you were selling a poorly rated building.

Though the underlying problem of course is that there is no way to put the externalities in the price of energy. Even when the prices are super low you can't do anything about it, you have to be chewing rub. All the economists say: 'that is the way to solve a problem, put a tax on the fuel and then don't bother with all this labeling'. They are wrong but even if the price is increased by 30 or 40 percent people are still not going to pay attention to it and buy a refrigerator for the standard system necessarily. The fact is you are probably not going to be able to get by with cap-and-trade or even fuel tax in a serious way. You are going to have to resort to second or third best [techniques] one of which is trying to use the Clean Air

Act to regulate emissions, which is where the fuel economy standard came from for cars.

V: What do you see the US doing moving given the international pressures for more sustainable practices and internal political division?

H: Well, forecasting this is impossible. The one thing that I fear is that if American politics turns in a way that makes the US walk away from any interest in emission control it is just going to sabotage worldwide efforts in this area. Everybody will be able to say 'hey, the US is 25 percent of the problem and they are not doing anything! Why should I do something?' Obama has been doing everything he possibly can under the constraints and you have a bunch of states that are doing interesting things. If this Clean Air Act implementation goes through, the proposal is pretty aggressive and asks each state to have its own plan, that's good. Actually, each state is going to have its own plan regardless, probably not Texas, but there are probably a third of the states included in the plan. Interestingly enough, even cities in very conservative states, often have a mayor who sees this is actually a good thing for the real estate market and the construction industry, like Salt Lake City and Phoenix, or around very interesting transportation infrastructure. This election is going to tell a lot about which direction the US is going to go, both in what happens in the Senate and the Presidential election.

You know [as we touched on the difference between the local and federal government that has been mentioned in other parts of this work] for mayors, their decisions have real consequences if the snow doesn't get removed, or the trash doesn't get picked up. Whereas a senator can just bloviate about some theoretical ideology and nothing happens directly, you don't get them out of power often. I tend to think they are much more practical, and less ideologically fogbound because they have to deliver. I don't know if you have talked to anybody around here about this but transportation infrastructure is another thing people are really interested in, the future of mobility. Right next door here is this automatic connected vehicle road-test track. Though it is not clear whether or not it increases or decreases emissions but it could have a dramatic effect if one could come up with a mass transit infrastructure that people really wanted to use very heavily. People could track it and use it faster, and that is not ridiculous. You could take out an app and say 'I want to get there' and

–boom- some vehicle picks you up and takes you to the transit center and you blast for twenty miles to wherever you want to go.

The dilemma of it, a couple of nightmare scenarios: one where everybody lives sixty miles away from town and just get their automated vehicle and sleep on their way in, or the other I heard last month where you give up your hope for a parking space so you just have your car orbit the block until you get off work. So, the energy implications are not at all clear. The one thing that seems to be the easiest to calculate is that these automated vehicles accelerate and decelerate in a perfect way, and turns out that it equals a 25 percent difference in fuel economy because they have the engine map in their model and they are always in the most efficient point of the engine map.

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An inflammatory dialogue about 'sustainable' cities with Fouad Khan

V: I never had to chance to ask you what led you to this area when we last spoke – I previously interviewed Fouad for the [Our Common Future Under Climate Change Conference](#) in Paris in 2015 – so, tell me a bit more about your path into the development and management of cities.

F: It was partly the circumstances of my life really. I was already trained in environmental engineering when I got to the U.S. form my masters but I was a little bit, sort of disappointed. I arrived in Houston and I was expecting, I don't know, coming out of a third world country, I was expecting to have my mind blown but it was a depressing city. Everything was just spreading, just suburbia spreading for miles and miles. You could see there were a lot of resources invested in the system but it all was immediately killed, they weren't getting value addition in their quality of life. So that became the impression that I got. I then saw this talk by a writer called [James Howard Kunstler](#), he writes on urban issues, about his book "[The Geography of Nowhere](#)". I read it and, basically, cities were my entry point to understanding complexity. Through his writings I got introduced to the work of a mathematician named [Nikos Salingaros](#), who I worked with on my Ph. D. later on. He

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is at [U-T San Antonio](#), he works in architecture and urban planning, he was a mathematician but he now mostly works in urban planning issues. He worked with a very famous architect called [Christopher Alexander](#), who is a major critic of the modern understanding of how architecture is being practiced, and they basically rate cities wherever they go. Nikos' work is, of course, about cities but it explored what makes cities complex and what reduces that complexity, and what is the linkage between complexity and, I guess you can say, beauty and implications in resilience. Once you start looking at it mathematically then you realize that you are looking at a complex system.

V: What do you perceive to be the most significant challenges to a just and sustainable city design and governance?

F: One of the biggest challenges is the same challenge that our civilization faces, which is realigning what it means to have progress and development. I think we have an outdated idea of that and there are lots of cities in the world that are still working towards that ideal. The worst and scariest part is cities in Asia, which are growing really, really rapidly; I wouldn't know another way to describe it except the word 'ridiculous'. It is a pace at which cities are growing and developing and new cities are popping up, and all of it is just built on a model that has been debunked, it is a failed model. Educating practitioners in the very nature of what it means to have a good city, what it means to have a nourishing urban space that adds value to life is going to be such an uphill gasp. The conversation is not even close to where it should be. And with that, understanding things at a quantitative, mathematical level where they can be practiced and, in a measurable way, incorporated into the planning phases of cities is going to be so difficult. We still live in a world where examples of the kind of bulls*** buildings that they built just before the Olympics in China, the [CCTV](#) building, are still touted as examples of good architecture. They are horrible buildings, just horrible, and they completely destroy the urban construct. They are not sustainable, they re not beautiful and there are many other things that are wrong with them. And that is this whole dogma that has been preached in architecture schools and elsewhere, it is just going to be impossible to work on this.

V: I was reading just this morning about [Qatar and the World Cup in 2022](#), and one of the stadiums is going to be in a city that doesn't even exist yet. That got me

thinking: 'wow, what and effort just to hold an event.' I imagined all the resources that have to go into this considering that other cities exist already and they are going to make a whole new hub for people to move into. It was just mind-blowing to think of that. How will complex infrastructure be done moving forward?

F: It is a huge f***ing scandal what that woman is doing over there, [Zaha Hadid](). She is building one of the stadiums and it is an air-conditioned city that is going to hold an outdoor stadium somehow. There is a lot bulls*** being thrown about how they are going to do it sustainably, and there is a lot of lip service to these ideas of sustainable ideation. They are probably going to paint it green or something and make it look like a leaf and say it is a green building, some bulls*** like that. That is the level of discourse right now where this symbolism has replaced actually practice. Most, if not all of it, it is all bulls***. There is no compromise and they are so pervasive at every level. These things that they build, these cities that they build now are just bad at every single possible level. If you want to see an example of global income inequality at work, which is another great problem intricately linked to climate change, if you want to see a concrete example of how these two things are linked just go to this stadium being built in Qatar right now. You can see first-hand that this stadium is going to have huge construction costs, maintenance and cooling. It is going to have a huge climate impact, it is going to have a huge footprint and, at the same time, there are people dying building that stadium.

Part of what is being used to build this stadium is almost slave labor. It is horrible, the living conditions that these laborers have to suffer through in order for cities like [Dubai]() and this one in Qatar to emerge. If you want to build things like this you cannot disassociate yourself from that level of income inequality and human suffering. That is why you don't see s*** like this being built in the Western world anymore, the Western world cannot match the scale of this madness. There has to be that level of disparity in power and distribution of income resources to have these things built in the world that we live in. Obviously, that is also reflective of who pays for the s*** when you consider climate consequences. It all ties in. Unless you challenge that fundamental narrative about what 'progress' really means, instead of holding that World Cup that they are organizing there and building a big f***ing phallic tower, or whatever you think, it is going to be impossible to see positive changes happen anytime soon.

V: What have been some significant mechanisms driving change, both positive and negative, for the sustainable development in cities?

F: China is now kind of starting to take lead, especially at the city government level at least, on thinking about and wanting to actually do green development, they are making an effort to understand it. But they don't understand it because on the one hand they have to grow. There is a maddening push to grow in some manner. It is possible to build a sustainable world where, at the same time, you don't have these kinds of cities built. The kind of understanding and the skill it requires, not just in terms of planning but understanding what it means to have a good living environment, what it means to have places that people should care about, places that people are naturally attracted to and they don't have to be a gimmick to make people feel good, it is just not there. The skillset is not there. And the narrative is so f***ed up that there are very few institutions that are even embodying that skillset. When I talk about bad urban planning and bad architecture, it is coming from the top, the Office of Metropolitan Architecture (OMA), the Harvard Schools of Architecture, Business and Economics. These are the people who are teaching this s***. I don't know how change is going to come about, it is going to be very difficult. There is lots of potential worldwide, especially in governments. They don't have to deal with the inertia of the narrative of our civilization if they want to change things.

If the governing institutions suddenly decide that is not the direction they want to go in and they want to go in this other direction, they can get it done very fast. There are lots potential there and some of these people are listening. But then, again, the problem is: what do they do when they listen? They try to talk to the experts and who are the experts? The experts are the people coming out of these cutting edge Western institutions, who themselves have this grounding in the narrative of growth, the philosophy of growth. They cannot overcome their own wiring. Unless this potential of change takes shape… I don't know. Like I said, there is lots of potential for change. Definitely, I feel Europe is leading in this are, they are the ones doing things right in localized, small cities, medium-size cities. But they don't have scale on their side. As beautiful as it is, at a global scale, it is just not sexy enough and it doesn't attract enough attention. There is already leadership in Europe and there is will in China, but I don't know about India and elsewhere. There is potential for China to evolve into something new but there are a lot of hurdles. That is why in our project, by the way, we are really focusing on China. We are just want to talk to Chinese mayors and tell them what the real deal is, that is one of our main targets.

V: How and when will the US come into the picture? They are such a big player in the world stage and I wonder to what extent the partisan divide in the country will keep these vital changes from being done. They consume and pollute at an incredible rate while the whole world watches and follows their 'perfect' growth model to build, build, build, and fix their mess by building some more. It seems to me they have wasted a lot of potential for positive action.

F: Yeah, I mean, I have always been very interested in American politics but with this election coming up right now the s*** started to come out of the woodworks. It is just obscene. It is unbelievable the level of discourse right now, and coming from some good people, that you know are good people. The lack of intellectual inquiry is incredible and you see that reflected in the behavior of the general public. When you hear people that you know personally - people that you are friends with and you know they are not bad people - try to justify some of the things that Ted Cruz is saying or Donald Trump is saying, the gap is so deep you can't even imagine how you can start a conversation about the reality of where the world is going, the realities of the physical world. It is like they are at another level completely. The people that I respect, even just the names that I mentioned, I wouldn't say they have been put out of the mainstream but they have been sidelined. Their work is respected, and there are a lot of people who know they have put decades and decades of their heart and soul into it but they are nowhere near what people would consider mainstream.

'Mainstream' is way off. That is the problem: we know the US is heading in a certain direction and the fear is that China has been following the same direction as well. If they don't change, I don't know where we are going to end up. Pollution is a big problem for them, and life is almost unbearable just because of pollution is their major cities. That is why they are changing things and the hope is that something is going to come out of there. I don't know if even I myself really believe in it because I don't think events have that much of an impact in the general progression of history. But it seems like this election is really important for the U.S. Because the U.S. has that role of leadership, whether they take it on or not, that is ultimately very important for the world. I see things evolving in completely different directions if Bernie is elected versus if Hillary is elected. And based on where the Republicans are I think it is a really long shot. I don't think any of the Republicans are going to make it. Or it could happen that Trump could defeat Hillary.

But if that (Bernie's election) happens, there is hope for the process. I practically have given up on the process like most people working in the field, by the way, even most people involved in the process itself. If you actually ask them when you go to conferences, few of them would say anything hopeful. Even at the Conference of Parties in Paris before the agreement, a lot of it was despair. There was hardly a note of hopefulness in there. I have been like that about the process for a while. One thing, for instance, that you see in our data is that Kyoto, on average, had a major impact, which is in a way a surprising thing to see because we are not looking at a national level. We are looking at cities and we don't look at cities comprehensively so there is no summation of the reductions happening on a larger scale.

Even then, if you look at the global scale, if you compare the database that we have, the pre-2007 and post- 2007 there is a significant difference in the rate of increase. The inventories were still increasing, but they were increasing at a significantly lower rate. The agreement seemed to have had an impact at the city level, there was some translation down to city governments from the national level. And I think that potential is still there, especially because cities, medium and small-sized cities, are now taking the lead to put things forward and get things done. Like so many people in the field, I am a little bit caught up in the optimism of Paris right now but I do think that what has already happened will start reflecting at the city level. Part of it has nothing to do with the nationally binding commitments but with the generally true fact that, for almost all different types of government from India and Pakistan all the way to the U.S. and Sweden, if national government says 'we are going to do one percent' cities usually step up and do twenty percent.

I hope that even if national governments take something of a symbolic step, cities will step up. I don't know if that is going to be cumulative and transformative impact or not, that's all needed obviously, but I think it is going to have a positive action, I feel a positive vibe. China is very important, the current U.S. elections are very important, and I think Europe is very rapidly changing. Europe has been changing now for the past twenty years but the politics is starting to get complicated with the refugee crisis. I don't know what the impacts of that are going to be but I am cautiously optimistic.

V: Lets talk a bit more about this dynamic between cities and national-level thinking. It seems to be a resounding theme among people I have talked to. The local scale seems to cause the ripple in the water and the big national systems, led by people who are supposed to know how to lead and how the world functions don't have a

clue. It is incredible to think that a president has less knowledge available, or at least accurate knowledge of what is going on, than a local representative that gets people to behave differently.

F:You know what is even more surprising? And you can see this in U.S. politics: as they actually rise through the ranks they start forgetting the knowledge they already have. They are working at the state level or the city level and they seem to be fine with global warming and they believe that it is happening. But the minute they are running for president of the US they just forget all about it. It is a game of interest, the funding of campaigns and the whole Citizens United thing has been very, very dangerous.

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A robust conversation on political interests, environmental values, religious beliefs and leadership with Lana Pollack

V: Thank you so much for coming here for this interview, based on what Rosina told be about you I really wanted to have some time to sit down and pick your brain. So, to kick things off, how did environmental policy come to be of your interest?

L: I'm going to answer in two ways. One, in terms of the environment, I grew up on Lake Michigan and people that grew up that close to the lake, something as large and powerful and magnificent as one of the Laurentian Great Lakes, I think have a heightened sense of sensibility for the power of nature. Plus, I was in a very small town, my father was a grocer and a butcher, and on those days I would go to the auction at the farms and he would bid on a couple of steers, bring them back and slaughter them. I understood pretty much where my food came from in ways that would be hard to understand today. That was in the 40's, that was a long time ago and it was, as I said, a small town and my father's business was directly involved with the land, the people, the animals and what we ate. You put all that together, and although I was not conscious of that at the time, it was responsible to certain sensibilities that I have. Then if you fast forward to my adulthood, I went into

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politics without any expectation of doing so, in part because of the generation in which I was born where women, at least middle class women, didn't have to, and seldom did, have the opportunity to work.

It wasn't as if I had planned a career, I did not plan a career, but at 39 years old I had been involved in politics as a volunteer for more than a decade. I had been trained as a teacher, couldn't get a job as a teacher at period the time, and went instead to an elected position, but not a partisan elected position, on a school board. So I had the educational background, I had the electoral background, I had the political background, and then I found an opportunity to run for our state's Senate. I won that seat and I was representing 275,000 people in this area, it was a full time job and a serious job, and I was given good advice by a seasoned person who had worked on the staff of other people and then was working for me, and he said 'Lana, if you don't pick at least one big issue, one visionary effort, you will be eaten up by the day-to-day obligations that you have.' And so I thought about it and, after quite a bit of discussion, I decided I wanted to pass legislation that would hold polluters accountable for their pollution, which would work both to generate funds to clean up the pollution and would also work as a warning, as a way to prevent future pollution.

So, I spent twelve years in the legislature and it took me seven years to see that legislation pass. By that time I had worked so much in environmental policy, environmental law that the die was cast. That is why I came to be so focused on the environment itself, on the force of nature, the interaction of humans and nature, but also on the impact of law and politics on that. After I stopped being in the senate I found an opportunity to run an NGO, the Michigan Environmental Council, which is a coalition of 65 environmental and public health groups. So for the next twelve years then I was an advocate, which was a different role than being in the senate, and now I hold a third position, which is not exclusively environmental, but related to environmental interests in the waters the US and Canada share. That is the story of my 'environmental life' in brief. But, I will say this, much of it was not planned, it was serendipitous. I looked for opportunities and married those opportunities to my interests and background.

V: Expanding on one of your last points about dealing with two countries and for a long period of time, my second question is about how hard it is to get things to work. What are a couple of situations you have lived through that illustrate how complex it is to put in place systems that deal with environmental issues?

L: I'll give you a short and a little bit longer answer on two different stories. One is that the legislation I said took seven years to pass pulled a coalition together to negotiate it. That was done at the table, eventually, on a bipartisan way, with industry, the chemical industry, the auto industry, the labor and environmental interests, and the municipalities on the [polluter pay legislation](). All of that was developed with a lot of negotiation and a lot of interests in order to put something together that was able to pass. And it passed; it was passed into law in 1990. In the next five years, it generated $100 million dollars in Michigan, which was a lot, to pay for clean ups of old contamination when there was a clear polluter that could be identified under the law. But five years later it was repealed. It was gutted. There was a new governor, the political dynamic had changed, and the same people who sat with me at that table to negotiate were, at their first opportunity, ready and, in that case, able to pull that structure down. They didn't say they were repealing it but they changed it enough to make it not effective. So, the moral of that story is: there are no final victories, and there are no final losses either. You have to keep the coalitions together, what happens in the political feeling of the moment, of the day, that will make a difference.

A different story is a current one now. I am now with the International Joint Commission. The International Joint Commission is a 110-year-old treaty organization {*yielding from the [Boundary Water Treaty of 1909](}* with Canada, as you know. And we don't have much authority, most of what we do is outreach to the public and we advise the governments, on a science based, bi-national [basis]. The authority that we do have is always shared with the governments, the two parties: the government of the United States and the government of Canada, and they can withdraw our authority at any time, we are a creature of these two federal governments. But, the treaty says that unless the governments decide to make a separate treaty, a separate agreement - for instance the [Columbia River Treaty]() was done with minimal authority involvement with the IJC - in most cases, wherever there is a structure that would obstruct or divert a flow of water that is shared by the two countries, say there is a dam to be built, then the two countries have to get out concurrence for the dam.

We put an order on that dam and say 'under these conditions, in January, the flow will be so many many cubic feet per second or cubic feet per second, if there is this much ice it will be different. It is different in different months and different places, and so on'. And it is all done to try and balance the interests and the needs,

according to the treaty, for municipal water, which has to be met first, and the second is that shipping interests have to be met, then hydroelectric power and industry interests that have to be met, and plus other interests that are not specified but that are there. So, in the 1950's, when the Saint Lawrence Seaway was being developed, a new dam was built. The IJC created an order as we concurred with the governments, and that order effectively ignored the environment. It was the 50's, there was virtually no consideration for the environment. What they wanted to do, besides the interests I have mentioned, there were riparians, people who had property on the shore, and the governments asked and the IJC agreed, foolishly, to try and keep the variability of the waters of Lake Huron to four feet.

Now, the natural variability of the Great Lakes over time is six feet, not in a year for sure but maybe in a half a dozen years it will go from a high to a low, and that is a normal six-foot, near two meter spread. And they [IJC] said 'fine, we'll do it'. What that caused to happen was that, without the natural variability, the wetlands were degraded. There are 64,000 acres of wetlands, I don't know how many hectares that is {*roughly 26,000*}, and they weren't totally lost but the ecology went to monoculture of cattails. Now, for decades people have known that this has happened, the dynamic is understood, so why not go back to the natural [state]? Well, because of the competing interests. About fifteen years ago the governments of Canada and the United States gave the IJC $20 million and said 'go study and figure out how these water levels can be controlled and improved.' And so there was a lot of study, a lot of money spent, a lot of modeling. That couldn't have been done in the 50's because they didn't have computers to understand it.

There was great science that was advanced with new papers on the ecology of the area if it got flooded through so many times, through different years, [getting to] what does it take to restore the natural ecology and the wetlands. All that was done and out of that came a draft order, a plan from the IJC that went to the governments as we said 'here is a new order we are proposing'. We submitted that almost two years ago. Canada has come back, although they haven't shown us anything in writing, in September said they could probably accept this. But on the US side you have got interests that are opposing it. Do you have a clue whose are the interests that are holding things up on the US side? You are moving back towards the natural variability, which is six-foot instead of four-foot, a little bit higher highs, and little bit lower lows. You got the riparians on the shores, who years ago wanted to build on sand bars, and did, in other words they built on flood planes, and they expect and they want protection for their property. It is understandable once they have built

but that protection has come with this environmental cost that is huge, which also has economic costs. On then on the low side are the shippers.

The shippers do not want a light load and the science indicated to us that you have to, a few times a century, three maybe four short seasons in a century, have low water. That may mean that a few times a century they would have to light load their ships, and they don't want it. They have had enough political clout so far to hold this thing back and this has been going on for a year and a half now. What you have in the United States government, the way this works, is when you have a proposal like this there is something called the [interagency process]. So they bring together the EPA, the [Army Corps of Engineers], the [Department of Interior], the [Department of Justice] to see about any laws, and the [Department of Transportation] because they have the shippers who are invested and embedded in the [Seaway Corporation]. There is something we call 'death by review'. If they don't want it, they will just hold it up, they can just keep reviewing it. And if the can get to the end of Obama's term, then they are going to win. Right now there is tension and a race as we are trying to find individuals who are high enough up in the White House, which we know, I know.

But still, there is a question of, although they want it and they really like our proposal besides the shippers, are they going to spend their political capital? When there is a war in Syria? All sorts of things. But I'll just say this, today there was a story that Obama reversed himself on permitting drilling in the Atlantic off the eastern coast. That was explained that there were some security issues, but I think more that he decided 'well, I've got business interests pushing on one side and I've got environmental values pulling on the other. Which way am I going to go? I am going to go to the environmental values.' Our challenge is to get this high up enough, close enough to the President that he makes the environmental decision. The question was about hauling different interests but those two storied were meant to say that you are dealing with multiple interests on all of these things. And, on the first instance that I gave, on the polluter pay law it is all dynamic. You can be ok on one day and not ok the next, and the second principle is it is a lot easier to stop something, to prevent new legislation than it is to pass it.

Someone can set up as many roadblocks as they want, and change up language. All you have to do is enough of a barrier and it is harder to get it over where it needs to be. I would say that opposition is universal. There is always somebody who has an interest that is different from the perhaps 'optimal sustainable approach', if you can figure out what the optimal sustainable approach is. To get the political will you need to localize issues, even if it is an international one. This is an international

issue on the Saint Lawrence, what we are doing there is localized for those riparians, for all the people who are pushing to change it. There are local organizations and their chapters: there is [Friends of the River](#), the [Nature Conservancy](#), there are all these environmental groups. But then you also have some chambers of commerce, local business boosters who are for it, those would be: people who seek tourism, bird-watching, and kayaking and all the things extending the season, the recreational boaters, they are for it. And you have some local chambers and interest groups who are against it because we are also hearing the voices of the people who built very close to the waters, and changing water levels would impact them.

V: What is missing in the 'American world' so that the whole nation can embrace the truth about climate change and its global implications? Is this a matter of political stubbornness and will? Or is there something significantly wrong with how people are/were educated and informed about how the world works?

L: I think of one of the reasons climate change has been so hard to catch fire in this country is that global things are rather abstract, and I will also say too the United States, depending on leadership and the time, we are not in a particularly proud moment of history in terms of our sympathy or understanding of the dynamics of many situations. It is true when [they saw a single child wash up on a shore in Turkey](#), but generally, if it is not brought down to a very human, local and tangible level it is hard. My last comment on this is: it is all relationships. At the end, if I can't build the relationships and build the trust, the science is there and it has got to be there, but the science will seldom carry you across the finish line. It [science] doesn't have kind of dynamic, it is a too to understand and to develop policy but it is not the fuel that will drive it forward, that fuel is relationships. I think that happens if you are [Secretary Kerry](#), or historically, if you look at Ronald Reagan, who was not know as an environmentalist, he was willing to sign on to the ozone layer depletion treaty in Montreal because [Margaret Thatcher](#), who was a chemist, said 'Ronnie, this is important'. They had a good relationship, he didn't get the science, she did, and he got where he did because of the relationship. So: relationship, relationship and relationship.

But back on the science for a moment because it is also important, about 40% of the United States doesn't really get evolution, which has been a scientific understanding for a long time. The United States has a particular challenge -well, I only understand

the United States I don't understand so well many other places- : a religion. The [political] right has used religion as a wedge issue against science. People are then asked to choose between their religion and science, and religion being important to them and science being not well understood by them, they choose religion. There is also the religiosity that is associated with authoritarian answers, and science is driven forward by questions, answering questions and also questioning the answers, and in religion you are not encouraged to do that. In this country, religion and politics have used each other. With your background in philosophy and religion, do you see this as particular to the United States?

V: No. Historically the Catholic Church disperses an underlying set of doctrines that still resonate across divergent denominations despite of some conflicting values, and that impacts multiple cultures. And it is very paradoxical to me how people all over the world are more comfortable not knowing, and would rather not challenge what they have 'known' their whole lives than instead ask the right questions about whatever larger questions about the way the world works and get a better answer. And based on what I have seen, people are either scared of whatever new answers and alternatives might bring, scared of not being able to fit in the new way of things and scared of having to deal with being told they have been wrong all along.

L: When you say people don't like not fitting in, that is really well phrased, that is something I have been thought a great deal about. Did you read any good materials or research on that?

V: Well, something I have encountered pretty recently is from a class at SNRE on decision-making. Joe Arvai teaches this course and, among sessions on individual thought processes for behavior, we have looked at how groups often sway people to make decisions they would not consider or carry out on otherwise. Often follow the principle of conformity assuming that a larger number of people is correct about a given issue, also called social proof, or to gain relief from persecution or to garner admiration for behaving as the majority, known as social influence. So these can be easily translated to the context of religion we were talking about in regards to the child molestation scandal made evident recently in the movie Spotlight. Another aspect of group influences is groupthink, coined by social psychologist Irving Janis in 1979. And, within that notion, a couple of examples that Joe presented to us in

class were the failed invasion at the [Bay of Pigs](#), and the [Challenger Shuttle disaster](#). Both being instances where group pressures reduced mental efficiency, reality testing, and moral judgments, outright ignoring key divergent points of view that could have led to better results, which could have been easily sorted out through the designation of a given member as a devil's advocate similar to the [tenth man rule](#).

L: I have read two books, and I might be conflating them, but either "[What's the Matter with Kansas](#)" or "[Don't Think on an Elephant](#)!" have this strain in it. They talk about the difference of how one is raised in the United States and why we are divided. People who are Liberals tended to have been raised in households who were not authoritarian and were not religious, at least in the sense we are now referring to it, and they were very comfortable with questions and uncertainty. People who are Conservatives in this country tend to have been raised in families that give answers, and they are very uncomfortable when there is uncertainty. So, for example, in Obama, where I see him as thoughtful, they might see him as weak. And, along these lines, I actually thought of writing a book about this and go further on asking: why are some people able to be leaders? By which I mean: leaders, in any direction, they are willing not to fit in. But most people find that very frightening and very painful. In Spotlight you saw people who, in part because of the definition of their job but, in part their character, they just kept driving toward that truth. My husband wrote a book called "[Uncertain Science, Uncertain World](#)", focusing on science and people are uncomfortable with science because, like we have talked about earlier, climate change is incompatible with people's feelings and religions, there have been billions of dollars spent, like the [tobacco lobby did confusing people](#), and there is also a frightening lack of critical thinking, which I think is a matter of a lack of education.

V: From this point, do you think the US is moving in the right direction with its environmental policy and educational efforts?

L: The United States is definitely not a monolith. It is not as if we were split, that would imply two and there are many forces, but the Donald Trump phenomenon is a surprise. I thought I understood politics well enough, long enough, but I never would have dreamt that we could have moved to this brown shirt mentality. Of course, he has yet to get 50 percent of the Republican vote, which is about a third of

the voters, so I think he is beatable. But what is unfortunate is that if he has a platform for the next eight months that is a platform for hate and divisiveness and fear. Have you heard any good conversations amongst your contemporaries, specifically the Bernie Hillary debate? What do you hear form young people?

V: Amongst my friends, the support is overwhelmingly in favor of Bernie, and I have barely heard anyone in my circles say they like Hilary because of this or that.

L: Have you heard them talk about why they don't like her?

V: No, it is just a pro-Bernie feeling. It is his message of giving opportunities to people that deserve them, no matter how much it costs, so that the government is working for people.

L: That is interesting because, with the language that you use, I have heard her say that 'giving people opportunity' bit over and over but it doesn't penetrate. Which is another question of why does in penetrate? They are hearing that message from him, they are not hearing it from her. It is clear he is further to the left, and that could be most of the answer, and he, for better or for worse, he doesn't clutter his conversation with complexities and he doesn't clutter it with a lot of different issues he would have to deal with if he were present. What is your take on all of it?

V: I think Bernie's platform is attractive and is something people should push for but I don't see how it can become a reality by the simple stroke of him being elected. I am very skeptical of how much he can deliver. I am also skeptical of Hilary, not to mention the other environmentally ignorant candidates on the right, inasmuch as I see them in the hands of the people that invest in their campaigns. Bernie says it over and over, and I think the likelihood of that being impactful in governance is high. Based on my knowledge of Brazilian politics and other instances of international bribery and corruption, the funders expect benefits from their investment. And, from a couple of pieces I have read and the "Inside Job" documentary on the 2008 crash, some of her advisors were linked to the scheming of that scandal that ruined millions of peoples lives in the US and elsewhere in the

world. That is deeply problematic to me, I find her extremely difficult to trust when her advisors have been directly involved and responsible for the crashing of the system, and I don't hear anybody talking about that.

L: I think people have talked about it, not in language as clear as yours but, like you say, they do it in the short hand. People look at her as the person who took money to talk, and question 'why else would they [companies] pay her [if not to serve their private interests]?' there is some truth to that. But, I'll say this, I like her. She is not perfect and, to me, the worst thing she ever did was vote for that war, which was apparent at the time that it was the wrong thing, I have plenty of criticism. I don't see these people as Hilary's advisors as much as her husbands' advisors like Robert Rubin, and even for Obama, he started out with Larry Summers. Jesus, excuse me, but Larry Summers? And yet I think Obama has not only been a good President, I think he has been a great President. And he got better as he figured it out, he wasn't so good at the beginning because he lacked experience.

Bill Clinton was president at a time where, I thought he was too far to the right then, I still think he was, my son was a speech-writer for him so he had some close contact and was a great experience, it might have been as far left as you could get in this country. Bill Clinton was brilliant. In the Democratic Party at that time people were saying, whispering 'I am a Liberal', they couldn't say the word 'Liberal', and there was no currency in it. I am further to the left of Clinton, I am further to the left of both Clintons, but I think that Bernie, through those years, instead of engaging with those who were making policy, and recall that I said I passed polluter pay because I sat down at the table with all of those interests: Dow Chemical, General Motors, the trade groups for all the chemicals, all the 'bad guys', they were all at that table, he wouldn't have been at that table. Bernie would have stood apart. There is a role for that, and there is a role for this. If you look at Hilary's history, you see a very different history.

Hilary was the first person to successfully pass healthcare since Nixon in the 70's, where everything was easy because the country was on the left. Children by the millions got healthcare because of what Hillary did twenty years ago. So when she says she has a history of achievement, she has a history of sitting on that table, and she also has a history of things the two of us sitting in this room don't like. If you are going to judge her on what she's done wrong, you need also to at least account for her many achievements, whereas, Bernie doesn't have that many achievements but a different kind of achievement that is the voice of accountability or ethics. They

both have claims. There is no doubt that Bernie seems well intentioned, and [Elizabeth Warren](#) before him, who I am surprised has not been more visible. Somebody said yesterday, I have no idea of the truth of this but, talking politics and I heard Elizabeth Warren doesn't really like Bernie, so I thought ' could that be?' They do share that [type of intention]. But, Hillary has a great record on children, she and her husband have a great record on racial things, there is a lot that is good, and then there are the disappointments. You got to pick your tradeoffs and this country is not going to elect a 75-year old Jewish socialist. It is not going to happen. Which doesn't mean that the voice and the movement are not important, he would only get nominated if something weird happened, which I just don't think [is possible]. His message is strong, his message is good, his message is clear. Go Bernie, but elect Hilary.

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Chapter Three – Corporate Sustainability

Whosoever desires constant success must change his conduct with the times

Niccolo Machiavelli

This third chapter enters the universe of businesses, development and, the most loosely used term in the English language in the past twenty years or so, sustainability. I must admit that in the earlier days of my graduate experience I saw business as the sole and stubborn antithesis of all that was environmentally conscious and friendly. The image of the big corporation using as much of a particular site as possible until it is bare without animals or local people given any respect or opportunity was deeply engrained in my mind. But studying and maturity helped me see that the other side of this coin was also possible, albeit with extraordinary efforts. Through books like Flourishing and coursework on corporate ethics, environmental governance and strategies for sustainable development, it became clear that, although markets feed off the exploration of resources anywhere and everywhere, it can be done in ways that do not ruin the future of all that might follow. Hence, the notion that businesses have a prominent role to play for the betterment of society, and that it can attempt to create a market setting where financial benefits and good environmental practices coexist is not complete nonsense. To put it simply, even though history has constantly otherwise, making money doesn't have to be the public enemy number one of saving the planet for eternity.

Here I chat with another inspiring advisor of this project, Arun Agrawal from SNRE, about the implications of the sustainability idea in international politics and conservation efforts, Paul Thompson from the Michigan State University's Departments of Philosophy and Community Sustainability about food systems, and Terry Nelidov, Managing Director at the U-M Erb Institute, about international sustainable development, and lastly, Claudio de Moura Castro, Director of Teaching and Innovation at EduQualis and former Senior Economist of Human Resources at the World Bank and at the Brazilian Research Institute of Applied Economics (IPEA).

Arun Agrawal's stance on environmental governance and sustainable development

V: Through my time here I never got the chance to ask you some of these questions but why don't we start from the basics? Tell me about your background and how your work led you to the fields of environmental governance and sustainable development.

A: I teach at the University of Michigan in the School of Natural Resources and Environment and most of my teaching has to do with the politics of development, conservation, sustainability, institutions, governance issues, particularly around natural resources and how poorer, marginalized groups make use of natural resources at the same time as they also conserve them and protect them. I came to this probably tracing back to the mid 1980's when I was finishing up my MBA at a business school in India, and I worked there with a professor, [Anil Gupta](), who was very interested in development, very focused in development issues, even though he was teaching at a management school. He really introduced me both to issues around agricultural development to development more broadly, and helped me find an initial placement with a NGO/funding agency in New Delhi. With the little bit of support I got from that funding agency, called the Indo German Social Service Society, which was actually affiliated with the Catholic Church in Germany, I went around looking at a lot of different NGOs in India that were in the space of sustainability, development, forestry, natural resources, common property. A friend of mine joined me there and together we went to certainly of 45 to 50 NGOs a year. That is kind of what laid the foundations, I think, for my interests in development and conservations in forests. I then came to the US to pursue a Ph. D at Duke and then to a variety of other jobs at Florida, and then at Yale, at McGill, I came to teach at the University of Michigan.

V: All things considered, between weighing in the interests of private and public actors, and the three pillars of economics, equity and the environment, what do you perceive to be the main challenges to sustainable development?

A: Yea, so this is a very large question. I think there are maybe three things I will point to as critical challenges, or major challenges, in the pursuit of sustainable development. By its very nature, sustainable development concerns very long-term horizons, you cant think of sustainable development in the context of a three-year, or five-year, or seven-year effort. However, our political systems and our economic

systems are organized to value outcomes in the short-term. Most political systems in the world today, even those where democracy is only in name, tend to have leaders that have relatively short-time horizons in democracies that is encoded in the constitution or in law that you will be empowered for four years, or five years, or six years, or seven years. Even autocracies, or more dictatorial political regimes, it is not clear that there is a security of tenure for the person in power because there is always a risk of cue, or there is a risk of the regime being overthrown. So, the calculations and decisions of people in the political system are often for very short-time horizons, which mean that the discount rate for any decision is relatively high.

The same thing is true for our economic system where we don't value returns thirty years, or twenty years, or fifteen years down the road. We look for return in relatively short term, within a year, or two years, or three years, which means if you have a discount rate of anything above six or seven percent you don't really care much about outcomes a hundred years from now. Sustainability, however, requires that you think long-term so there is a direct conflict between what sustainability stands for and the time horizons that people take into account when they make decisions regarding the use of natural resources or their own investments or how to think about the future. That is one huge challenge that I think we haven't yet figured out how to address that challenge, how to build decision-making processes that, when it comes to the environment, or sustainability, or natural resources that have a longer time horizon in play, we can link the outcomes in the short-term with potential outcomes in the long-run.

I think the second issue, which is really an issue with implications in two ways, one at the behavioral level, in terms of what people decide to do and what they do, and it has implications at the institutional level, in the way we structure our organizations and our decision-making to aggregate the effects of the large number of choices that many different people make. I think both of these are a problem. The third issue that I think confronts us is that we tend to make decisions that are primarily aimed at human welfare. Even for human welfare and human material welfare that often stands, or often figures, the most prominently in what we choose to do. However, sustainability requires recognition of the interdependence and the linkages that human beings have with the world around them, even when it is focuses almost entirely on human welfare. I don't think decision-making in the political or economic realms takes into account this human dependence on other life and life forms on the planet, and that often also leads to perverse consequences of the way we act and for the kinds of decisions we make.

V: What does 'sustainability' mean in this complex context of tradeoffs and who is to blame when alleged sustainability efforts are debunked as no different from business-as-usual?

A: I think at a general level everybody understands that sustainability is about the environment or ecological processes, it is about technological processes, it is about social relationships and processes. But, even if everybody accepts or understand that, lets say most people do, I think even those who do have very different weights on which aspects of sustainability they consider to be most important or how they value different facets of sustainability. So, yes, I think people may have a similar general sense of what sustainability means but they have really different emphasis on which aspects of sustainability they care about most. And that varies depending largest on which sector of the economy you are, or which country you are, I think it also depends of the life experiences and what specific state and lifecycle you are, things like that. And also, people have very clear ideas in their head as to who is responsible for the ills and the good. These ideas are not necessarily defensible when they color all of ones judgment about the activities of a particular kind of decision-maker or actor.

So, business can cause great harm, but so can government decisions, and so can local-level, or a community-level, or civil society-based actions, or large trends that are the results of the choses of millions of billions of people but which are not directed by a particular agent. One could say there is a cultural component to some phenomena that we don't even question. So, I think it is hard to make the argument, and there is very little evidence for an argument, that we should always, or mostly blame, corporate actors, or government. And one cannot even say that one should blame significant social trends for some environmental ill, because they are just social trends, you might as well blame the sun for rising in the East. It is less important, in my thinking, to identify who to blame and more important to understand what is going on and to think about which part of what is going on can be influenced through purposive action.

Like I said, if you don't blame somebody, or some agent, or some decision-maker, or some entity or organization, you are still left with the issue. Do you feel happy? Or do you feel comforted by the way things are happening, or what exists, or how it is changing? Or do you feel that there is something that should be different in how things are evolving? For that it is important to understand why things are happening the way they are and what they might lead to. And then, in that sense of the world, to also figure out which of the things that are changing are perhaps

amenable to being made different because you can't influence everything that the world is going to be like, you can only influence some part of it.

V: What have been some positive strategies you have studied and developed that guide government and corporate decision-making towards sustainable outcomes?

A: Let me try to answer this with respect to specific issues. Lets think of climate change: climate change is a huge threat to humans and other lives on this planet. We have many different instruments through which we can try an influence both the level of emissions that are contributing to climate change and also try to cope with the effects of emissions that are already in the air, or which will be in the air in years to come, which we cannot stop. One way to try to stop it, which Al Gore talks about in his film an Inconvenient Truth, is to persuade all the humans, persuade all creatures on this plane to produce less carbon dioxide, or to produce less greenhouse gases. You could take individual steps and make individual choices that would reduce your personal level of emissions. You could say that is through education, or awareness, or through information that you can persuade people to do things differently. You could push for things to happen differently by passing laws, or by creating regulation, which is what governments do.

If your are in Congress, or you are in the executive part of government, you pass a law, or you make a decision, then through those executive actions, or through those laws, you expect to force people to recognize the downside, or the cost, for doing something that is wrong, thereby changing their actions and behavior. And a third way that one could say you could also use to change peoples behaviors, apart form information and regulations, is by providing them some incentives. If they do something positive, or they do something good, then you pay them, or you provide them some benefit. And if they do something negative then you impose some cost in them. All of these are feasible ways of trying to address climate emissions. Whenever you think of each of these different ways you can think: "well, these can be used to reduce emissions but how likely are they to be actually used?" "What are the politics that underpin the use of information, or awareness, or different kinds of campaigns to create more familiarity with what is happening with the climate?" " What are the mechanisms through which you can impose taxes, or through which you can impose sanctions, or provide incentives to people to reduce emissions, or to increase the kind of activities that lead to lower levels of financial need?"

And you realize that the politics of it are very hard. The likelihood of imposing a tax on carbon emissions is very, very low. The likelihood of different countries agreeing to force their citizens to consume less energy is very low. The likelihood of large amounts of subsidies going to renewable energies is very low. But, there are other options as well. You could think of new technologies through which you create forms of renewable energy production that reduce emissions. You could think of developing infrastructure through which you reduce the costs of having to adapt. So, you know, I think there is a whole suite, a whole menu of different options through which address sustainability challenges. Which one would be more effective and when is not always known in advance. In the case of climate change, I think we have toyed around a lot with different kinds of behavioral, or different kinds of social, or institutional choices through which to reduce the risk of climate change and to reduce emissions.

But it may be that really the only thing that is going to work is when you have low cost, or extreme reductions in the cost, of renewable energy technology. If solar energy prices keep declining in the way that they have for the last fifteen years, it may be enough. Solar is already competitive, in terms of cost for production, with non-renewable energies, with fossil fuel-based energies. If the cost is coming down, and it might, for the next five years, or ten years, it may be half the cost of existing, conventional fossil fuel-based energy production technologies, maybe the technological solutions is what will work. But the technological solution may not work for sustainability challenges such as biodiversity. There is no reliable way of creating new genomes, or enhancing biodiversity through artificial means with the technological means that we know of.

All the talk of using ancient genomes, or ancient DNA materials to rejuvenate dinosaurs, or to create new life forms are, at present, not credible. We always have to think of a) what is the problem? b) what are the kinds of solutions that are available and c) which of them is feasible? before we can say how to address a sustainability challenge, or even begin to imagine how to address these challenges. There is no single approach, or single mechanism through which to address all sustainability challenges. And for those who say that there is, those who say: "always think about incentives, and corporations, and the private sector and capitalism", for those who say: "always think about government or technology", they are delusional. They do not know, or do not understand, either the complexity of the different problems or the complexity of which solutions would be feasible.

V: Considering the dynamics of power between governmental and corporate agents, do you see an agreement like the one in Paris, without an overseer or enforcer, having traction for positive and tangible environmental outcomes?

A: It is likely that many of the problems for which we are seeking solutions based in governance will emphasize the role of markets and the role of civil society actors in the years to come, in the extremely short to medium realm. People have less faith in government and the capacity of government to solve problems now than they did fifteen, or twenty years ago. I also see these kinds of trends moving into cycles rather than being unidirectional, or having a single slope to them. At least for the next few years, I see solutions that are premised more on the capacity of individuals and on the ability of information to change minds, the activities of the private sector and of capitalist enterprises, or corporations, to have greater prominence in decision maker's and people's minds, less regulation and less of the idea that communities can solve problems. In our lifetime the interest and fascination with growth is not going to change.

There are two issues, one is: will people start focusing more on quality of life without focusing on higher incomes and growth, and material well-being? And the second is: for how long can the planet sustain improvements in material well-being and in economic growth other than reaching some limits that would force people to focus on quality of life? For the first, people are not going to turn away from growth for a long time for the simple reason that, by far, the vast majority of the population on the planet is not developed, it is very poor. They deserve to be better off. They should have a shot at the same chances and the same benefits, or the same levels of material well-being, that people enjoy in the North and in the West. Ethically I don't see reason to say that we should stop growing. I think we could say we should stop overgrowing, or we should think about whether we need more than a couple hundred thousand dollars a year to live, to live comfortably as a family. Those are some reasonable questions but most people in the world don't make a couple hundred thousand dollars, or a hundred thousand dollars to live off of.

The second question is: is it possible for us to continue to grow economically? And, more and more, the fields in which you are seeing the greatest innovations and the greatest development are fields such as biosciences, or such as digital media, or digital technology, or health and medicine. Unlike the form of industrialization that occurred in the mid to late 19th century and continues to be with us today, the basis for increases in value, or value addition, is not more raw materials in these new

fields, in these fields of biosciences, cyber media technologies or health sciences. I personally think that there is a third thing to add that although people talk to limits to growth they often refer to a rising population. I think that is a reasonable concern but it is one that is dwarfed in many ways by the drain of resources, and that is because of increases prosperity and affluence than because of the increases in population, especially in the last forty to fifty years and certainly for the next forty to fifty years. If one could harness technological change to reduce consumption of raw materials, even as one provides higher levels of material well-being, it is possible to grow economically without consuming the base on which we stand. I think it is possible. It has to be ore carefully and reasonably done than in has been and than in was for much of the duration of early industrialization, but it is possible. It is necessary because we have no ethical grounds to condemn people who are poor to live in poverty forever.

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A conversation about food systems with Paul Thompson

V: First of all, thank you very much for taking the time to meet with me on enemy grounds (Michigan State University). I hope our conversation will be as friendly as my stroll through campus with unnoticed my maize and blue backpack. Why don't we start at what brought you to the field of food systems and sustainable agriculture?

P: I have always been a little unclear myself of whether I want to frame this broader and more systematic, more comprehensive way of looking at food as food justice, or simply as just food ethics. That is kind of where some of my struggle has been. I had a book that came out last June and the last chapter I wrote for the book was the chapter titled Social Injustice and the Food System. That is kind of like, in a sort of sense, the justice chapter, and I kind of put it off until the very end. It is a chapter that comes early in the book and I think it does important work but I don't honestly know that I have anything to say about justice as such that hasn't been said well by other people before. I came to have a fairly strong interest in the philosophical issues that were involved with technology and technological innovation, and it was an interest that was environmentally oriented. Long before I had any clear sense of

what it meant to be an environmentalist, or whatever, I was always committed to that stuff. I wound up, in the course of sorting things out, maybe not for great reasons but, going into graduate school in philosophy. I kind of gravitated towards philosophy as an undergraduate; it seemed to be a place where a lot of the big open-ended questions could get done.

I had come out of mathematics, did my graduate work in philosophy and wound up writing a dissertation on nuclear power and nuclear power risk assessment. It was not until I got my first job that I really turned my attention into food. It was basically a request from the Dean of Agriculture. He had requested that the Philosophy Department consider teaching a course on ethics and agriculture so I responded to it. Very quickly after I started teaching that course most of my interests, most of the things I was doing research and writing on started to focus in agriculture and in the food system. I think that originally my interest was in the concept of risk and the way that it is tied to technologies, and that continues until today as I still do work on that. But what shifting to agriculture did was that it gave me a set of problems. I always have believed that philosophy needs to be specific, it needs to be looking at real world problems, it cannot be just totally theoretical. About the time I started doing this work was when genetic engineering techniques started to be seriously applied in plant and animal development. There was a lot of discussion about the risk issue so that was kind of where I concentrated a lot of my issues.

Then my teaching encompassed other issues. It encompassed food justice issues early on, particularly from an international perspective, in developing countries and the [Green Revolution](#), and what are the moral imperatives that were focuses on there. And also animals would be another thing that I was doing in my teaching, you know, are there ethical issues about the way we use animals in agriculture? Killing them and eating them, things like that. Not until some time later I actually started to be quite interested in sustainable agriculture. Some other people were proposing some really different ways of thinking about agriculture and agricultural technology. I would say that those issues have kind of matured into a comprehensive look at agriculture and food. But it really kind of started with a core interest at the beginning of just how we should look at risky technologies from an ethical perspective. It was always impotent to me that the way we think about risk is properly respectful of alternative perspectives. The way people in different social situations perceive risk and understand risk.

V: Compared to how governments and businesses define the notion of sustainability, how do you approach this highly malleable and often nebulous concept?

P: I do think there is a less well-defined notion there. I teach a course here that is called the [Theoretical Foundations of Sustainability](#) and what we try to do in that course is to emphasize what sometimes we call two paradigms for sustainability. I don't think our two paradigms capture the whole sustainability landscape. This idea that we are focuses on the theoretical foundation is important in terms of how we narrow it. But in terms of the way that sustainability is theoretically conceptualized, we - I say we because I developed this with several colleagues – have come to think of it as a paradigm which is in some respects reflected in the Brundtland Commission and in the initial definitions of sustainability as sustainable development, development that meets the needs of the present without compromising the needs of the future. That approach and language really focuses on meeting peoples needs so it tends to focus on the various productive and consumptive activities that human beings are engaged in. It understands 'sustainability' in terms of the ability to continue to engage in those kinds of activities, or to transition to alternatives in the future; we call that a [Resource Sufficiency](#) approach to sustainability. Practices are sustainable if the resources that you need to carry them out are foreseeably available, or, in a little more sophisticated version, that you have some sort of exit plan, some sort of transition plan. Or else, how are you going to move to alternative energy sources, or whatever, right?

The alternative paradigm, which I thing is increasingly been associated with the word 'resilience', although it means more than resilience, is this notion that we have a system, whether it is an ecosystem, or social-ecosystem, or whatever, that is able to continue to function. I would actually say (it is one that) is robust, resilient and adaptive; I go a little farther than 'being resilient'. But 'resilience' meaning that it can continue to function in a number of different environments, in response to a number of different kinds of challenges, it can bounce back, that is kind of what 'resilience' connotes. 'Robustness' connotes that it can resists threats to start with. 'Adaptive' connotes that it can learn or change in response to threats. We call that the [Functional Integrity](#) paradigm for sustainability. It is inherently rooted in [Systems Thinking](#). You really need to be conceiving a system, whether is an ecosystem, or a socioeconomic system, as actually being able to reproduce itself, change and adapt over time to really have that conception. We actually would see a lot of this

sustainability literature, a lot of both the practical literature and theoretical literature, people often tending to work in one of those paradigms or another, and not fully appreciating the sense in which other people are working in a very different paradigm. I am going to go on and say this doesn't exhaust the space in which people talk about sustainability. I would say that if you want a third alternative is from the perspective of history. We used to use ideas of 'progress' as these kind of very vague ideals of where we need to go and, increasingly, you are starting to see the word 'sustainability' take the place of that. It is envisioned as a vague.

It is envisioned as an ideal that, in sort of an indefinite way, points us to the direction that social change needs to take. But just as with different visions of progress there is a sense and recognition that people have different visions of what sustainability would mean. So, I think, those three, if you want to say there are three paradigms - I don't know if that third thing really quite qualifies as a paradigm - it is kind of something that is kind of driving the way people talk about sustainability. That third vision doesn't have much of a foundation in environmental science or business practice, or economics, or really in any kind of theoretically oriented discipline, but it does have a cultural significance and cultural resonance. That is my rough map of the sustainability space. I guess the sense in which I do think that might even align with that third conception is that when you have these kinds of sharp paradigmatic, or comprehensive ways of thinking about something, sometimes one wins and one loses. But more often, there is a kind of dialogue that takes place and you actually get some evolution. You see some change when these concepts are put into conversation with one another. A lot of what I have written and what we teach, in terms of thinking about sustainability, is for our student to be adept to listening to people and trying to figure where they are coming from. But also not necessarily judging one paradigm as stronger or weaker than the other. As a matter of fact, I do think, from an ethics stand point, there are some significant strengths and weaknesses of the two main paradigms I talked about. What is your sense of where sustainability is?

V: Like you said, these paradigms do not fit like a glove in all scenarios, and when you bring culture into the mix, it is a whole new ball game. The way the US does things is very different from the way Brazil can do. And the way in which people behave individually is a whole other level of complexity, especially considering whatever ideals people have that is not the same as their government, or their

church affiliation, or whatever it might be. Because people use different connotations for 'sustainability', people take it to be have different meanings for the general population and don't truly know who is pushing the notion for what purpose. And more than that, I think many people do not feel like they can do anything about it, almost as if an individual has no agency that is relevant for sustainable living. People see it as if big companies and the government are the only entities with power moving the needle, as if everyone else was out of the picture. I think that is delusional. Like you said, it is not about one side being completely right and capable and the other is wrong and incapable. You need not only a dialogue, but actions that take into account both sides: the authorities put in power to govern and trade, and the individual authorities that indicate to the governors and traders what they deem valuable.

I wonder if this cultural element, as you call it the third paradigm, is instead an underlying pattern that creates and allows both to work, that really determines whether ideas and outcomes actually work. At the end of the day, people determine the outcome, and if rulers and businessmen were not pushed to come up with environmentally friendly goods and services for society there would be little to justify their efforts to bring that no fruition when exploiting the world to exhaustion is easier in the short-term. For sustainability to work people need to have a voice, no matter what opinions they might have about the way things are going, no matter the context, at the very least that dialogue is vital. On that note, have you seen some positive strides or mechanisms to help on getting them out? And how do you see those tools changing our 'sustainable' practices moving forward?

P: When I look back on my life, I do think there have been a lot of positive changes. Sometimes you can pin those down to either an event, or something that some group or individual did, and sometimes it is difficult to do that. When I came to Michigan State, which was in 2003, we had one of the other professors here, Sandra Batie. He had convened a group of senior professors in the College of Agriculture to really both think about and promote sustainability. We perceived that at that time we had good evidence for this but, particularly in the world of agriculture, there was actually hostility to the idea of sustainability. Now it is no longer the case. Now the situation is much more that people think this would be a good thing to do. They may be skeptical, just as you are saying, that they can have much agency with respect to it. But they are not hostile to the idea of sustainability, they are at least willing to work with a conversation abound sustainability that would be positive. Why did

that come about? It is very hard for me to explain that. In some respects, you would think that some of the changes that date back to the Brundtland commission, which is 1987. That is an identifiable event that brings that word into much more common use. Although, from the standpoint of people who worked in agriculture, people have been talking about sustainable agriculture for probably a decade prior to that.

I don't think that there is any single event that I can point to between 2000 and the present that would have led to this kind of a change. There are probably a good 15 or 20 percent of the faculty at Michigan State that would say that what they are doing has something to do with sustainability. We have a whole department now, my department that has the word 'sustainability' in the name. So there is a very clearly the mark of what I would call 'positive change' there, just the mere fact that we can talk about it is good. I could point to similar things in the domain of animals, I do work in animal agriculture. I first started teaching an undergraduate course in ethics in agriculture, in something like 1981 or 1982. I put ethics and animals on the syllabus of that course and there was immediate hostility, especially from the [Animal Science Department](). Today, not everybody, but almost everybody in animal science or animal production thinks of animal welfare of one of the significant issues they have to deal with. I could point to a series of events in there that mark that transition. Some of them are nebulous, in the sense that they are the rise of debates, but there was a period at which McDonald's decided that they would start incorporating animal welfare standards into the contracts they wrote with their suppliers. That got everybody's attention.

There was a ballot initiative in California where Californians voted to essentially ban a number of specific animal production activities. There have been similar subsequent types of moves by animal producer organizations and by animal protection organizations that have clearly moved that discussion on in a positive way. In general, in terms of food, I could point to two or three books that really had significant influence. The interesting thing is that, looking back since I started doing this in 1980, there is just an endless number of books, right? They haven't all had an impact but some of them have. I think probably, the first one that had an impact was "[Fast Food Nation]()", which was 2001; that was followed up by a book called "[Food Politics]()" by [Marion Nestle](), probably a little bit less influencing that Fast Food Nation. Then the one that really had the big influence was [Michael Pollen]()'s book "[The Omnivore's Dilemma]()", which was I think 2006. I think those three books, all of which were best sellers and made the New York Times Best Seller's list, things like that, had tremendous impact. They were followed up, a few years later, by films. There has been a whole series of films and some of them have had more impact than

others. But, frankly, I don't think any of them have had the impact that the books did. That has really raised consciousness around food in general. Even though Pollen didn't talk about food justice very much it has raised consciousness around food justice. Those would be some of the things I would really point to there.

There were smaller things leading up to that. Even some of which I was involved with in terms of a group of us back in the mid 80's formed an organization of scholars and researchers called the [Agriculture, Food and Human Values Society](). It was intended to promote more normative thinking about agriculture and food. That didn't have anything like the impact of any of the three books I just talked about but possibly that body of scholarship was one of the things that made the books possible. But, I have to say that overall I do not have a great deal of optimism. On the other hand, at the core I am very optimistic. Some of the comprehensive problems we face are just so overwhelming. Just like everybody else, you know, it is difficult to identify anything that you can do, anything intervention points. But I do think that we actually have made significant progress. I would not want to be put in the position to try to predict where the next little bit of progress is going to come from, that I really don't have a good sense of. But I do think that there are negative forces out there and there are a lot of positive forces that have the potential to come together. I think some of the things that are focuses on food justice, more neighborhood food systems, small efforts like that are the places I really point to potential benefits.

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A quick exchange on international development with Terry Nelidov

V: I am excited to finally get the chance to talk with you for a few minutes to get your take on sustainable development from the international business side of things. What brought you to this in particular?

T: What brought me to the field was much more experiential versus readings or research. I don't have a Ph.D., I dot have a research background at all. My interest came from the [Peace Corps](), that is where it started. I graduated in Industrial Engineering and went to work in my first job at Pacific Bell, the phone company, in California. I was there in business marketing for three years, long enough to realize I

didn't want to retire from Pacific Bell, there was no connection with the job. I actually was not one of the people whose parents were Peace Corps volunteers, or they always wanted to be a volunteer since ten years old and build wells and work on a farm. That was not me. I was looking for graduate schools overseas and in looking for schools I learned more about the Peace Corps, I didn't even know it still existed. And then when I found out that the Peace Corps has a business and development program I got interested, applied and ended up going to Paraguay.

I was in Paraguay for two years working with a really small community with thirteen farmers creating a cotton marketing cooperative. That was my introduction to sustainable development. I remember going into it exclusively to understand what socioeconomic development meant, from the grassroots and up, and I came out of it realizing it was totally different than anything I ever expected. You know, you go into it with a certain image and expectations and biases, and everything I saw in Paraguay and completely changed all of those. But I also saw that there was a big role for business and business skills that wasn't being fulfilled. Even working with farmers in a cooperative, I soon realized I reached the top of my management skills, because industrial engineering is more about processes more than the MBA. After Peace Corps I went on to get my MBA but with an interest in how to apply those skills to the situation I had just lived in, which was rural economic development.

V: So, as far as economic development going hand in hand with environmental welfare, how come, or by whom, has that aspect been brought along through businesses and within businesses?

T: On the green side, I see the development and sustainability people tend to come at it from one of different perspectives. A lot come from environmental work and environmental education, in particular, others come at it with strong human rights background, and mine was much more on the social development side. So in the cooperative we were working in Paraguay, we were just trying to promote livelihoods and create income in the community, we didn't get into environmental issues through cooperative. And there were a lot of environmental issues there from pesticide use to water, to soil, deforestation was huge, but we didn't address those. We addressed social and economic development. That was my first introduction to what the real environmental issues are at the grassroots development level because I was born and raised in the Bay Area, San Francisco. But there [in Paraguay] we went back to basics like water quality, pesticide and runoff were phenomenal there and deforestation: the members of the cooperative were actually burning down

forests as fast as they could to convert it into farmland. Each of them had 20 hectares given to them by government. Well, not given, they were financed by the Banco Agrícola to support agriculture development. They were paying off loans to expand cultivation and increase income, and deforestation wasn't even on the radar. But since then it has changed. I went back five years after I lived there and met up with the farmers, and one of them jumped and he went: 'funny, when you were here we were burning down forest for new land and then five years later the Europeans came and they paid us money to put it back. You guys are funny." That is one of the dilemmas that I learned about that hopefully development is doing it differently, I would certainly do things differently if I were a Peace Corps volunteer again in this field. It is about how to combine the environmental criterion with the business and livelihoods not as a constraint but as an enabler.

I will mention one mentor though. Later I went on to work after I got my MBA at IESE in Barcelona living in exchange. It was an amazing experience. I only applied to one school, that was the one I wanted to go to, and I got in. I actually got in right before I got into the Peace Corps and they allowed me to defer for two years. So I came out of Peace Corps, went and loved business in an international context, the first year was in English and the second was in Spanish for international students. And while I was there I created an exchange with INCAE Business School in Costa Rica. It is a really good business school, Harvard started it in 64, I think, and the same team started IESE in 57, part of Harvard's extension overseas. So I went to Costa Rica, studied there and loved it. I love business in Central America and Latin America, it is a very Central America and Latin America focused [program]. Then a job opened up to go back and work to create network for young business leaders for sustainability, funded by Stephan Schmidheiny. He I would consider a mentor.

I didn't work directly with him but I worked with his organization. Maurice Strong asked him in 1990 to prepare for the original Earth Summit and represent the private sector at the Earth Summit, which was the first time that business was invited to the party. He spent two years bringing together a network of 48 senior business leaders, CEOs of companies all over the world. They did all his out reach and they wrote a book called "Changing Course" and that became the World Business Council for Sustainable Development (WBCSD), which has an active chapter in Rio, I think. He was definitely a mentor, he was one of the first real, successful business leaders. You probably know his products, Amanco, Eternit, Masisa. What was interesting about him was that he really got the environmental and social components. He once said: 'you can't be a successful company in a failed

society'. So he was one of the first senior professional business people to understand the role of business in promoting broad-based social and environmental progress. Have you heard of AVINA? He ended up giving most of his company to a non-profit to fund AVINA. And later he got into a court battle, which should probably most of his current references, around asbestos in Germany that goes way back 20 or 30 years. But I consider him a mentor because he really tied business to social and environmental development.

V: I wish we could have a good moral compass to really assess what fueled his social and environmental interests. I find it striking that behind many donations for humanity or the preservation of natural areas by big-name funders there are almost tangible stigmas trying to be made up for. What pops into my mind is Andrew Carnegie and Henry Clay Frick contributing to the South Fork Fish and Hunting Club in Johnstown, PA, which drastically influenced a local landscape and later led to the largest disaster in American history prior to September 11, 2001. But I wouldn't want to go off on that tangent and speculate further at the time. And since our time is limited lets get back to business to wrap this up: when it comes to making sustainability a pulsating part of businesses, what organizational instruments stand out to you?

T: Coming from a business side, I'll be biased for business mechanisms since those are the ones I am more familiar with. But, for example, the WBCSD is a good mechanism; it was crated by business and among peers. And what is interesting about business people is they won't pay attention until one of their peer companies is doing something. There is this strong, subtle completion and they don't want to be left out, especially American companies compared to European or Latin American companies. The CEOs, celebrities and the brands are so important. And bringing them together to share initiatives like that made them do a lot. BSR is another great example. They are a membership network. They work and meet with companies where they are, they recognize that some of them will be leaders and some will be leveraged. But if you say you have a commitment to making impact sustainability, big or small, they will work with you.
You probably know Instituto Ethos. If you don't, don't walk, run to your Internet and look them up. It is a Brazilian organization. They are a great organization similar to BSR. BSR helped create it about five or ten years after BSR started, and they have become the voice for business sustainability for Brazil. It is also a membership network, it doesn't do as much consulting as BSR does, it does more education, outreach, training or administrating. But all the big companies from Petrobras to

Natura are engaged with them. They are in front of BSR in terms of advocacy. Also, Ethos and BSR worked together to create Foro Empresas later. Those have a common element: they are business networks, with business as their target beneficiary. After working in this many years, I think that if you just have the business network that is alright but it doesn't go fast enough or far enough. There is a missing ingredient that is the need for external pressure from activists to push them along. And you need somebody to push and work with the organizations and companies, somebody they trust like BSR, like Ethos. But even BSR looks to external activists to push companies along. BSR wont take the role of a Greenpeace, or Oxfam, or Mining Watch but they will welcome the pressure and meet the company where they are to respond to that pressure. BSR cannot be out in front and raise the alarms but they serve as a trusted advisor to implement change with.

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Corresponding with Claudio de Moura Castro on the role of education and economics in environmental issues

This last exchange in the corporate sustainability section features a thinker I have known for years, but never to the extent this conversation brought to my appreciation. By some odd confluence of chance and friendship, 'just another crazy friend of my father's' I used to think, Claudio de Moura Castro is an extremely well lived and adventurous character, and author of a piece that left me absolutely dumbfounded when I read it a weeks ago. To the individual comfortable with the Portuguese language, I highly recommend it. His article, eerily evoking some similar attitudinal shifts in relation to the environment as I in the realms of education, gathers insights from the addictively fast-paced, circular economic principles of supply and demand, and its clash with the linearity, or slower circular reality of natural processes, of the Second Law of Thermodynamics.

As he elucidates, this matter was brought to light in "The Entropy Law and the Economic Process" by Nicolas Georgescu-Roetgen, and exposes the drastic contradictions between economics and the unidirectional flux of matter in nature, as limited resources are misused and converted to endless externalities and illusory perceptions of perpetual growth. Translated to business lingo, in essence, this means that corporate sustainability, when done right, is ultimately premised by finding a balance between increasing shareholder value and appealing to non

commercial interests of consumers that give businesses their function in society. Hence, by no means is capitalism to be tossed out the window completely, but improved to serve goals and objectives that are more aligned with non-financial outcomes on a longer timespan for returns on investment.

V: Beginning with your earlier fantasies and through the many adventures I have heard about through the years, how did you come to pursue economics and education as a focus of your life's work?

C: As a youth, I had all the predictable dreams. First I wanted to be a fireman, nothing very original. Later, mechanical engineer, afterwards, an electric engineer. But, at the last moment, I realized that my passion was woodworking and mechanics, as it remains until today. I would be unhappy as an engineer. Considering the family business, I joined a Business Administration Program. However, since this course and Economics share the same initial year, I found out that I liked the latter better and took it up in the subsequent years. For practical purposes, I gave up a confortable and safe job to be a mere Economist. Later, during my Ph.D., I discovered that the analytical tools of Economics would provide and excellent preparation to understand Education. When Brazilian economists were at the heyday of their popularity, I moved to Education, not in my degree, but in my research. Again, a second move towards a less prestigious field.

Nevertheless, when I returned to Brazil, having finished my Ph.D., I started teaching at the most prestigious graduate school, the Vargas Foundation. Having been exposed to the new ideas about environment, I told my students of my concerns. The response was frigid: Environment is something only Americans are concerned with. They voiced the mind frame of the intellectual elites of the early seventies. Today, students at the same institution would never respond this way. At least, as far as an intellectual elite is concerned, environment has become a serious issue. Interestingly enough, young students are becoming also very concerned with this theme and scold their parents when they do something silly {*which I relate to, although on a different road, when thinking about growing up in Brazil and complaining to my father about the way he shaved his beard with the water running*}.

V: Throughout your career which experiences challenged your development as an academic, researcher and professional? (i.e. structuring old fashioned curricula, developing economic incentives/disincentives, adapting teaching/work principles

to different cultures, etc.) And, with that in mind, as environmental welfare becomes dire and pressures to grow economically become more bullish, how – through which adapted/novel mechanisms or catastrophes – might mankind surpass these challenges?

C: Upon becoming General Director of CAPES (the Federal Agency in charge of graduate schools and fellowships) I was deeply involved in the institutionalization of a fledgling evaluation system. Subsequently this became one of the pillars of Brazilian graduate education. In the early 2000s, I designed a new college, incorporating a solid liberal arts background, something that did not exist in Brazil, as well as drastic changes in classroom practices. A first and essential step is becoming aware of the problem. However "society" is an abstract term. Who has become aware, who is becoming and who are the skeptics? Change is progressive. And we need to be clear about the converts and the heretics. Then, we need good laws. And laws that can be enforced. Sometimes, the law aims at creating incentives and disincentives to individual behavior. When this is possible, market automatisms are better than forcing compliance.

V: Along these lines, I find it that economics appears to be sustained by not only the vicious circle of supply and demand but the notion of the *Homo economicus,* as if people consistently followed a rational model of decision-making, However, as behavioral and social psychology demonstrate, our heavily instinctive species could not be further from that ideal on a day-to-day basis. Hence, I ask: why has this subject, which seemingly is not based on reality, become so prominent? Is our species inherently something like a *Homo obsessive-consumnus*?

C: There are two ways of looking at the problem. One is to postulate that the maximization axioms of Economics do not work when environment is concerned. We need something else. The alternative is to pay closer attention to Adam Smith, who presupposed a society of concerned citizenship. This short run pursuit of individual benefit is not what the market should be about. We need to educate society, in order to have a "civilized" market. Who is right? Both can be right, depending on circumstances. Scandinavians are closer to what Smith expected. Africa is in the opposite direction. The rest is a mixed bag.

V: Following up on this educational component, our species has apparently moved away from the colonialism of other peoples but not yet from the colonialism of other living beings and our own planet's riches. How can people be awoken to and participate in the pacific colonization of the mind towards environmentally responsible behaviors?

C: I don't think there is a single answer. Overall, well-educated people are predictably more concerned, because they put a higher value on the future (time preference). But higher education cannot be a remedy for all problems, since even in the richest countries a wide share of the youth will not attend [quality colleges and universities]. Hence, higher education is an answer, but only to a certain extent.

V: Without a doubt I see that as a concern. I constantly catch myself thinking back to my days in undergraduate college, reading about Ancient Greek ethical dilemmas and the pursuit of a 'good/pleasant/virtuous' life. Looking ahead, and reflecting on the mindset in Scandinavian nations you mentioned, do you foresee a shift in what it means to be happy? Essentially, I am wondering whether or not it is possible that markets will cease to be THE driver of world affairs and take the back seat to whatever the alternative to the current 'limitless' economic system could be.

C: I would frame the issue differently, more in line with what I said before. One does not have to renounce markets. If nothing else, there is nothing to replace them. We just have to set the limits and define rules of the game that restrain abusive and predatory behavior. More advanced countries are moving along these lines and give good examples.

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Chapter Four – Environmental Citizenship

The first duty of a man is to think for himself

José Martí

This final section with interviews gets at the most complex propositions in this work, given the means introduced and ends it sets out to achieve, but which, undoubtedly in my mind, creates fertile grounds for increases in human and environmental welfare. The final set of dialogues discuss a) decision-making psychology with the last character in my trinity of advisors: Joe Arvai, Max McGraw Professor of Sustainable Enterprise and Director of the aforementioned Erb Institute, b) colonialist legacies with the distinguished Kyle Powys Whyte, Timnick Chair in the Humanities at Michigan State University and an Associate Professor of Philosophy and Community Sustainability, and c) unsustainable food consumption through a medley of couple of short exchanges with David Robinson Simon, lawyer and advocate for sustainable consumption, and Richard Oppenlander, consultant and researcher of food choices.

The concept of 'environmental citizenship' is one wired with the notion of a social contract originated in ethics and political philosophy. Many a thinker have had their criticisms and positions vociferously disseminated on social contracts, from Socrates to Hobbes, Russeau and Rawls, but it seems only reasonable to me we look at the golden ages of intellectual discovery for inspiration on how to move forward. Yet, in regards to one of the contentious aspects of social contracts, I do not ascribe to the commonly held notion of the subjugation of individual rights to an authority that currently exists. The contract I have in mind is not yet tangible and requires reevaluating individual and communal customs and desires weighed against attributes, like thoughtful energy use versus careless use of resources, that ultimately can improve the environment and society. This system is one that can be found as the basic structure and underpinning for the three fields of study visited previously. Through environmental citizenship, I envision that people are pushed to understand the world, mobilize organized units of governance and manage their riches. Hence, environmental citizenship is meant to stimulate people's awareness, knowledge, care, and intentions to carry out environmentally responsible behaviors after critically thinking about a given state of affairs, weaving the fabric of a new moral existence in society through the tortuous path of self inquiry.

Sorting through the way we make decisions with Joe Arvai

V: With our conversation we enter the crux of my project, which is beginning to move inwards in the direction of personal values, through processes and actions, and taking a step away from the outside forces of science, government and business that influence people. But lets make that move gradually and start with your own story into the realm of risk management and decision science.

J: I did my undergrad in biology and ecology, my masters in oceanography, and I think I wanted to be the next David Suzuki. I don't know if you know who that is, but in Canada David Suzuki is a TV personality who is a biology professor and he has a show called '<u>The Nature of Things</u>" – *it so happens that his show shares the same title of this project* - which educates people about risk, the environment and sustainability. David Suzuki was kind of a big deal, I had seen him around a little bit and I thought 'that is what I want to do'. So I started looking for opportunities that were government jobs and consulting jobs that would get me talking about science in a more public form since I wanted to move away from being in the field. Through my research for that, just by talking to people and interacting with people, I kind of discovered that you could tell people all kinds of stories about the environment, or give people all kinds of rich data that described a problem. But it seemed like they would ignore it, or they would take it in but would say they would react a certain way and then they didn't. So, I started to get interested in what was going on, what was the disconnect between the information coming in that clearly should pull you into a problem, and the behavior that should come in to play to address it but that never happened.

In thinking about that and just asking around, I started meeting people. Like, I would be kind of explaining this observation and people would say: 'oh, you got to go talk to so and so, go talk to this guy and that guy.' And I met a few really good people along the lines: a guy named Tim McDaniels at the University of British Columbia, a guy named Robin Gregory at Decision Research in Oregon, another guy in Oregon named Paul Slovic who I have talked about in our class. So I started talking to these people and they all started explaining to me the science of decision making, the science of cognition and I got really into that. At the time there wasn't a lot out there where you would take that field of study and apply it to the environment. Most people were doing technological risk, or they were doing finance or money. No one

was really doing biology, and endangered species and fish, so I started looking at it and that kind of became my shtick. It was sort of an accident but sort of a happy accident.

V: As you were diving into it and applying it, what were some cases you looked at and thought 'this is really complex and people should look at it even more?' Something like the process of deciding to build a wind farm or a nuclear power plant next to a pristine stream of fresh water.

J: The first thing that I really got into in a major way really early, though I'll give two examples, was in the 90's when I was a student still, and thanks to Tim and Robin, was this big project in British Columbia on hydroelectric power. It was all about these dams all over British Columbia. British Columbia is known as a relatively carbon neutral energy province because of all the hydroelectric activity. But when I got into I was like: 'well, you got all this really great carbon neutral power but you got major blockages of fish spawning runs. You got these dams up that really affect salmon, and because they affect salmon, as salmon is a keystone species, the affect all these other species in the system. On top of that, you are changing the hydrology, which is affecting other species and it is affecting erosion. And on top of that you've got all these cultural variables with First Nations bands on the river that use salmon for different reasons and they are getting affected. And then you got all these recreationists, anglers, canoers and kayakers who are all freaking about power and changes in the rivers.' And it became clear to me that there were no free lunches.

There is real complexity and there would have to be tradeoffs in how to manage a system to produce things that we want, like fish, cultural value, recreational value, and electricity. It wasn't just a matter of having carbon neutral power, wiping our ands clean and we are all good. So that was one, and another example, much later in my career was in 2010. I was working at Michigan State and got a phone call from someone, an Endowed Chair, Joan Rose was her name and she does water stuff, and she was like: 'hey, great news: we got this money from a philanthropist donor who wants to end poverty and illness in Africa.' And I was like: 'wow! that is totally doable, great. I'll get right on that.' But we started looking at it at a very micro level and we started working with these villagers in Tanzania - mostly women, really poor women with low levels of education, but really passionate about health in the environment - on helping them make decisions about water treatment and

developing water treatment systems that not only would lead to better sanitation and better health but that would be sustainable. It was not so much from the environmental standpoint but a from a welfare standpoint, and that also included sustained use of the systems. We didn't want to invest a bunch of energy in giving someone something that a) didn't ascribe to their cultural values, b) didn't treat the water, c) had other kinds of impacts and d) even if it worked, it would be too complex people would never use it. It was one of those kinds of things, we worked on that for about six months and that was just fantastic, highlight of my career, easily.

V: In your experience then, what does it mean to 'assess risks accurately' and make a 'good decision'?

J: In the most basic sense, a good decision is one that addresses the decision-maker's most deeply held values and objectives. If you can make decisions that, at any given time, do the best job possible under certain circumstances when it comes to getting you, individually or as a group, what is wanted out of that decision, that is really the key. But to get there it means really understanding the decision you have to make, understanding what your objectives are and how you know if you have achieved them. It means looking at alternatives in a way that is unusual. Most people look at one alternative and give it an up or down vote, or look at a couple and pick one of two. This [a good decision] requires looking at a bunch of alternatives and then it requires really being careful about tradeoffs, really understanding what is at stake and what you give up to get something else. Interacting at that level, a lot of people find tradeoffs uncomfortable, understandably, and as a result they kind of avoid them. So any decision that gets into those tradeoffs is really important and leads to good quality choices.

And lastly, understanding that decision-making isn't something that you do once and then forget about. Even if you make a decision about water treatment in Africa, or hydroelectric dams, or what to have for lunch, there are opportunities to learn and learn about whether or not your objectives are real, or did you miss something to learn about whether or not the alternatives performed as you expected them to, and then to adapt and to say "yeah, I made an error and I've been corrected at this point in this way". As far as risk is concerned, this is a tough one because I really believe that risk isn't just an objective measure. It is not just probability and consequence, it is a human construct, it is at the whim of our emotions and our

cognitions. It is a matter of taking this comprehensive approach to try and piece together a picture of how we think about hazard and risk. I don't think it is right to say that risk is this purely objective, mathematical thing and everything else is outside the picture. I think if people really believe strongly that something is violating norms or posing risks or a threat to something they really hold emotionally that should be something that we take seriously even at the policy level. I don't think fear is irrational, I think that it is rational and, as part of risk, it should be addressed accordingly.

V: Can you pick out important moments or individual figures and publications that have brought the field to where it is at today?

J: This is interesting. There are legends in my field, people who won Nobel prizes. I think of Paul Slovic, who is coming here soon [to give a lecture]. This is a very humble, thoughtful guy who started off looking at minutia and trying to understand details, and has scaled his work up, now he is almost 80 years old, into what the impact of that is for society. So I think of his work on judgmental heuristics and how we understand risk form a technical and non-technical, social perspective, and the work that I talked about on psychic numbing, how we ignore numbers when we probably shouldn't. I think that is really important stuff on the one hand. A guy like Daniel Kahneman who did all the work with Paul and Amos Tversky on heuristics and biases to really begin to chip away at this notion that decision-making was all about rationality, computation and utility, and to demonstrate that the human mind didn't work that way and that there were implications of that, good and bad, that we needed to account for. That was really big. I look at people like Herbert Simon, again very much like Paul and Danny, on his work. I never met Herb Simon but his work on bounded rationality, obviously, is pretty key.

I look at contemporary figures now, people who I think are really doing interesting stuff, like - there are so many cool young people working on this field now- Robyn Wilson, is a woman out of Ohio State who is doing really fantastic stuff on decision-making on the environment, there is guy at MIT – I think it is at MIT now {read: Yale School of Managment} – Shane Frederick, who is understanding how people process information. There are so many cool things, but if I had to pick seminal moments I think Paul, Danny and Amos were probably it. There are some really fantastic books out there now, like Danny Kahneman's book 'Thinking, Fast and Slow'', which is

super popular, a lot of people have read it, it is a best seller. It is really good, a fantastic book that has made a really complicated field tangible and within reach. Out of that, there has been this explosion of books that have come out. I look at Dan Ariely, who has written a book called 'Predictably Irrational' and a bunch of sequels, 'Freakonomics' [by Stephen J. Dubner and Steven Levitt] gets at this kind of stuff, Dick Thaler and Cass Sunstein wrote a book called 'Nudge', which is really cool. Those are good, I would characterize those books as giving the nature of the problem and the nature of challenge that we face. And there are other books, there is a book called 'Smart Choices' by John Hammond, Ralph Keeney and Howard Raiffa that is all about how you can do better, if you know what your obstacles are how you can overcome them. The pity is that there isn't a song written about this, there is no movie, you got to read a book. I wish there was something that was an easier lift but not yet.

V: You mentioned the knowledge-behavior gap and I would like to have you talk more about personal deliberations. What about our brains and social structures make us inept to act in the face of instigating knowledge and stimulus? For example, how can an expert in GHG emissions at SNRE drive a hummer, how can a dietician/personal trainer eat at Big Macs every week with his friends. How can people devote their lives to a particular grand mission and go against it with everyday behaviors?

J: There are a couple of answers to that question. One is we temporally discount, we have what we call a 'hot-cold empathy gap'. In other words, there are things that we really desire in the near-term that are so emotionally powerful, where we value the benefits of doing that in the immediate term as being so large that we heavily discount the impact, or the negative impacts they will have, or the value they will have to us in the future. So the desire of eating that piece of chocolate or that big mac, or driving that big SUV, or smoking the cigarette, drinking that drink, whatever it is, or living in that giant house, those are al really powerful urges and the positive impact of those urges weighed against individual incremental negatives is no context. The immediate urge wins out right away. We don't really aggregate impact over time, so we don't really see the overall impact when we make those choices. Our inner angels and demons come into play when we do this kind of stuff. That is one explanation.

Another explanation, and I see this a lot with people who work in our field - I probably do this too, I mean, it is really hard to police this – is what is called the 'boomerang effect' or 'compensatory behavior'. I am a really good person when it comes to sustainability, I do this: I compost, I have LED bulbs in my house, we have one car instead of two cars. But that one car is an SUV. That one car could be a Toyota Corolla, or a Tesla, or something but it is not, it is something else. There is this [notion] 'I will reward myself for all the good I do with some big negatives' and you see these boomerang effects, this bounce-back of our good behaviors. We give ourselves a break, we give ourselves a free pass for doing good. And that is actually a very rational computational strategy, if I am doing good in all these areas I can afford myself some bad behavior elsewhere. You know, we go on holidays, we fly in planes and we don't buy offsets, we do all this stuff.

V: Based on this hypocritical complexity we allow ourselves to have, do you think international agreements like the recent one in Paris can do anything to significantly impact the way people make their choices, in particular in a United States so divided in political ideology and interests?

J: That is a really good question and a hard one to answer. I feel good that the agreement was made and I feel like that was the right thing. I am a huge fan of the Obama administration, obviously, for their work on climate change, for making that part of the national dialogue, even in the face of big opposition from the Republicans, to really do it in such a way that they began to have a dialogue about the implications of this for people who are building their lives on a very traditional, fossil fuel-based economy. There is no way to talk about climate change, green power, and the clean power plan, and not talk about coal miners in Virginia. It was hard for them to do it and I commend them for doing it. On the one hand, how does it affect the country? I think it affects it in a positive way because it signals to the rest of the world and to a big segment to the US population that we are serious about this and we are willing to, if not make tough decisions, have hard conversations. That is all good.

But I am pessimistic at the same time for a couple of reasons. One is I worry about what future political parties will do, future governments will do, future presidents. I worry about the Supreme Court. Because of the three branches of government: the executive, the legislative and the judicial branch there is always opportunities to

turn stuff over. That makes me frown a little bit. It is like 'well, you do all this hard work and it is still almost impossible to get where you want to go'. And there is something else that even goes beyond politics. That is that, when it comes to climate change and all the things they were talking about at the COP 21, the train has left the station. There is no going back. There is no turning off the carbon dioxide tap and going back to 1985, '95 or even 2005. The changes that we are seeing, there is this massive environmental inertia that is taking over. The polar ice caps are going to melt, the Antarctic ice cap is going to be disrupted, ocean acidification is going to happen, major droughts are going to happen, people in poverty are going to get poorer, people who are hungry are going to get hungrier. There is no going back.

As much as we can pad ourselves in the back and say that we did a great job, all we have done is to commit to try to not make it worse, or to not make it worse beyond what we think is going to be one hundred years from now because that is when the real impact is going to be measured. That to me is disheartening, and a little bit depressing. That then brings up for me a conversation I am waiting for, which is starting to happen a little bit with the UN sustainable development goals, which is when we think about sustainability it has got to be more than the environment. It has got to be people, it's got to be poverty and health, it's got to be human rights and equity. If you can begin to look at sustainability from that broad-based perspective then, as the environment changes around us, hopefully we are taking actions to promote resiliency and mitigate risk that isn't just environmental but that is directed at people. If we can get the conversation moving in that direction I think that would be really good thing.

Maybe there is a place to bring diverse political actors together, which is to say 'we know this is going to be disruptive to people whose income is dependent on coal mining, or whatever; and we are now going to start talking about the things that we have to do to make sure that when these disruptions happen in the system, whether it is because we are not going to do as much coal mining, or whether it is because someone's village fell into the ocean, we are going to take care of these people so that they are not left behind.' Which is, I think, why Bernie Sanders is such a popular guy right now, amongst young people, which gets to my third point. Change will happen because I think young people are becoming more sophisticated, they are becoming more altruistic, they are becoming more concerned, their concern is becoming more sophisticated. I think there is going to be a slow shift, but it is a slow shift. You have to bring that together with the other pieces that I was just talking about to really kind of knit together a safety net that will actually work.

V: Do you see that same momentum happening in Canada?

J: Now I do. I mean, it has only been a short while. The previous Prime Minister in Canada was, in my view, a disaster, both in an environmental standpoint and an economic standpoint too. On a social standpoint, I think he was a very selfish, right-wing, anti-environment guy. I was appalled that he was in power for as long as he was. The [new Prime Minister](#) has really made it a hallmark of his office with environment and climate change, social considerations, religious freedom, everything that the previous Prime Minister kind of wasn't, or at least wasn't publically, this new guy is. So I see hope but the hole they got to climb out of up there is so big that I think when it comes to what the US is doing, they are light years ahead of Canada right now in terms of the variety of initiatives that are in place or are being put in place. And I think the US is light years behind some parts of Europe like the Netherlands and Switzerland. The good news there is everyone has got someone to learn from, that is at least, maybe, a positive a way to think about it.

V: With pessimism and hope weighed on both hands, will people crumble into the Donald Trump mindset and follow their System 1 (*the more primitive, emotional and instinctive part of the brain that fulfills similar functions in lower-order animals*) urges regardless of others? Or will people try to weigh in their alternatives and create some wholesomely rational, System 2 (*the more cogent and logical part of the human brain*) international utopia? Or somewhere in between where keep struggling with our anomalous brains and inconsistent decision-making habits for the foreseeable future?

J: That is a really interesting question. I think on the later point, we are making incremental strides to get there where people are thinking more broadly. They are considering bigger tradeoffs, they are thinking more about future generations. I think that is happening but really slowly. I think system 1 is so powerful for so many people that it is going to be really hard to turn that around. If we can do it in North America that would be great, and I think there is a template for that in Europe in countries like the Netherlands, in Latin America in places like Costa Rica. I see it when I travel to places like Vietnam. I mean, there is this way of living that isn't as materialistic and as 'I need it now'-driven as it is here. So that is positive that we can move in those directions. What concerns me is, in a world where we have so much

connectivity now, if you are a kid growing up in India, or in China, or whatever, what is going to happen there is that there is going to be this realization that 'oh wow, look at what America has done and we can do things differently.

We can come in at that level of deeper thinking or altruistic thinking' OR 'I want two cars in the garage, and a three bedroom house with two bathrooms', the US after World War II. That is a tough one and that remains to be seen, and I don't know that I am seeing that shift happening. I'll be honest, it is hard to detect but I am worried that that is going to be a problem. We will have to see. I think the good news is we are an adaptive species so I don't think it is going to be Armageddon, I think we are going to be able to adapt. Like with any equilibrium, some people who had a lot are going to have less, some people who had a lot are going to get more, some people who had nothing are going to get more, some people who had nothing are going to get even less than nothing. I think there is going to be a great recalibration of what welfare or wellbeing means, and I think we will survive as a species until we are wiped out by a pandemic or some natural disaster. So I don't think we are in the midst of an existential threat, but I think we are in the midst of a threat to what it traditionally means to be happy, what it traditionally means to be well off. I think those will be the questions that we will have to grapple with.

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Kyle Powys Whyte and a powerful exchange on environmental justice

V: I would like to start by saying when we met back in 2014 I was immediately taken aback by your story. Can we start there and talk about what inspired you to work on environmental justice issues?

K: I was most inspired by my own tribal community. Specially over the last two hundred years, we have gone through every possible form of environmental problem. Watching different tribal leaders over time, in my lifetime and historically, step up to those challenges and for really what I have a lot of respect for. What I realized was that, for my tribe at least, it wasn't just that we have gone through environmental problems but that we had a different way, a different philosophy of

the environment. There were ideas that were associated with practices that were very different from the United States, or Europe, or other societies. Part of the reason why we were targeted for so much environmental injustice was because of that different philosophy, that different way of life. That is why theoretical work interested me because, like at my tribe, and related tribes, we always talk about our philosophies and our theories of how humans, and animals and plants are related, how entire tribal economies can be built around kinship relations, and a number of other topics. We compare and contrast those views with those of capitalism, or those of colonialism, and a number of other political, social, cultural structures that oppose and oppress us. Even today though, a lot of tribes, and my tribe today, in a lot of ways our economy and way of life resembles quite a bit the dominant economy and way of life but we nonetheless do things differently. Whether it's having more sustainable sources of energy on average than settler communities, whether it's having programs within the tribe to try to reestablish human-nonhuman relationships, whether it's setting higher environmental standards within our jurisdiction. If you look, we are taking much more leadership than the average community, and I think that comes out of our unique environmental philosophy.

Now, I didn't have, in academia, any mentors that had my same interests, or who worked at my area. For example, in my field, I am the only member of a federally recognized tribe with a job in a philosophy department. There are two other native persons who have jobs in philosophy departments and the others, maybe up to ten native people with Ph. D.s in philosophy. The rest are either working at another department like Native American studies, or they are unemployed. I am the only one who is in a doctoral granting philosophy program, so there was not anybody out there who could serve sort of like a role model. I did get a chance to receive mentorship, especially at my job here at Michigan State, from other faculty like Paul Thomson, for example, which I think had an understanding of what I wanted to do and supported me in that way. I had a lot of mentors like that but I had to do the translation of how is it that what this person is pushing me to do going to relate to my own goals. I had to make my own road basically.

It is also a fact too that, as a philosopher, I have another appointment in the department of community sustainability. I do both the theoretical work and quite a bit of qualitative, empirical work. Also that is quite unusual in philosophy so I also had to then figure out how to create an identity for myself doing this practical work, which for me is one of the things that come out of indigenous philosophy. In Western philosophy, I mean not all of Western philosophy, but a good part of it,

there is this idea that there is theory and practice. But I think that for a lot of native, indigenous people if you are philosophizing it is always going to be related to practice in some way, there is not that distinction. That is why I do philosophy the way I do, it is just the form that is natural to me. I think especially for people of color, in my opinion my values and my desire to contribute to my comminute that kept me in academia. Some people feel that that is a source for them burning out. They feel their academic work is not satisfying their standards for contribution to the community. But I kind of had the opposite thing, well I wouldn't say it is the opposite, but for me, I actually broke a lot of rules in academia.

I have almost broken every one of them and I have actually been fine. It actually has not hurt me in an academic, reputational sense; it has actually helped me move pretty quickly though my career. So it has been interesting just for me because I have stayed true to what my values were and it didn't create any blockages. Now I have had many challenges to deal with, including lack of mentorship, and obviously a lot of people of color or native people we don't have families with lots of professors or anything like that. I am not necessary the first generation college graduate in my family, almost, as close as you can get to that. We didn't have anybody who was a professor and I didn't know anything about this stuff. The University of Michigan is a good example of this. [Bunyan Bryant](#) and [Dorceta Taylor](#), and some other people I might not be thinking of, they are tremendous. Almost like entrepreneurs within the University. I think Dorceta was what, like one of the first or the first black woman to finish a degree at Yale's School of Forestry. I mean, to be able to do that is just incredible, especially during the years she was doing that in the 80's or the 90's something like that. I am glad you are doing this and bringing out stories and agencies. This is an awesome project that I think will help a lot of people that are wondering about whether they should be in academia or in organizations or whatever.

V: Something that grabbed me from your work and other materials I have read on the philosophical and theological side of my education was the role divided worldviews play in creating environmental and human justice issues. How do you see that from a tribal perspective?

K: The way that I understand it is that in most tribes today you have internal debates about what the best course of action is. There are some people that think

that Western, settler-like tactics, and strategies, and programs, and businesses, and so on are correct. Then you have people who are more on my side that are trying to oppose that and actually suggest that if we look into our own traditions, even some of our own behaviors that differentiate us from the settler population, that is a source of how to do things in more sustainable ways, in ways that will increase the resilience of our society to a number of future changes. For me, I admit that there are many people in my community who were not raised with an awareness of their traditions. But that does not mean that they can't draw on those traditions as a source of how to do things differently. Often times we talk about finding the space that is decolonized, or that separate from the areas that the settler society has dominated. But there is actually not a lot of spaces that are like that.

V: I assume there is not much "pristineness" left alive.

K: That's right. That is the idea of settler colonialism. As differentiated from different forms of colonialism, for settler societies their goal is to make the indigenous society completely disappear, to literally erase that society as if it never existed before. In the United States, where we are a very small percentage of the population, I mean just a fraction of the more dominant groups, that settlement is total. There is very little intellectual, geographical, physical space that you can call colonized.

V: To bring that ideological divide into something more easily perceivable, how have approaches to and definitions of sovereignty and justice defined tribal life, and interactions between settler communities and indigenous peoples?

K: That is a good question. That is a struggle and a debate within a lot of indigenous communities. 'Sovereignty' refers to a lot of different things. Sovereignty can refer to the historic fact that native communities exercised self-determination before European invasion and the establishment of the US or Canada. They never consented to that so they still exercise self-determination whether anybody else says that they are sovereign or not. Sovereignty can also be referred to linguistic, cultural, lifestyle sovereignty, the idea that you have these collective systems that are the sources of your own identity, your own way of life. That itself is a sense of independency or sovereignty. You've got 'recognition sovereignty' which his the

idea that your neighbors, other parties in the diplomatic sense, they recognize you as a sovereign authority and that three are some things about your ability to exercise self-determination that they cant interfere with. What really becomes difficult is that with all of these different notions of sovereignty it is very hard to exercise them today. For example: cultural sovereignty. Now tribes who are all-different embody so many different cultures.

Tribes are very cosmopolitan now. You have people of different religions within the tribe, people that have adopted different aspects of western culture, people that have adopted pan-Indian culture, people that are trying to hold on to the particular culture of their particular community. And people are spread out, really. There are people in the cities, there are people in the reservations, and for most tribes the majority of their population does not live on the reservation. Even when we talk about this historical notion of sovereignty there aren't that many tribes that still have sort of a group that is intact. People are everywhere. There are people who are tribal members and they do not even know they are a member of the tribe, or they know they are a member but they don't vote because they do not live in the reservation and think they are cut off from the politics. You also get kind of that loss of feeling that one is part of an active, self-determining collective that never consented to the U.S. But then, like you are saying in your question, these forms of 'recognition sovereignty' are very problematic because in the United States at least, and it is also the same in Canada, they do not recognize the first two kinds of sovereignty I was talking about. They only recognize a thin form of sovereignty that the US itself designed for us in order to facilitate the Unites States plans for completely conquering North America.

Because some tribal governments operate within western structures and do things that are not traditional, and were designed to facilitate essentially extractive industries in indigenous territories, we debate them quite heavily. On the one hand it is true that they are not the best forms of government but because they are recognized by the US we can use them to make laws and policies that often times the US has to respect and enforce. If you want to interact with the US at a meaningful level, maybe not meaningful level but a level that has some teeth to it, it is through those kinds of governments that you have to do it. Take the problem with the increased incidence of unpunished rapes of Native American women on reservations. It is real that the tribal government, the tribal police force and the tribal courts can play a big role in improving that situation. If you rejected those forms of government altogether and those governmental institutions altogether you would be starting from scratch and you might be making that problem even worse.

But then, on the other hand, it really is true that those government structures are precisely why there is the rape problem. It is a very tough debate. Many of those tribal governments are the ones that are responsible for promoting a number of kinds of environmental injustice. Look at the Navajo Nation and its coal power plant, right? The Navajo Nation government has signed of on a number of different businesses, that are not just the coal, which are bad for the environment, bad for tribal members' health, and so on.

V: What are some entities or methodologies that attempt to bridge the gaps between settlers and natives in a progressive and respectful manner, given that history is replete with the one-sided exploitation of that relationship by colonial powers?

K: I really believe that one of the powerful things that indigenous people can do is create networks that then serve to bridge barriers between Native and settler populations. That is not the only thing that needs to happen but it is one particular kind of strategy in conjunction to others that is very effective. So, for example, one group that I am part of is called the Climate and Traditional Knowledge Work Group. It is a network of Native people that try to change practices where scientists exploit holders of traditional knowledge with respect of climate change. There are a lot of risks that tribes face when they share traditional knowledge that scientists sometimes don't know about or don't care about. Many of the tribes we work with would like to engage more with climate scientists because they see the tools of climate sciences as valuable to what they want to do. But, they don't want to be exploited by them. So we brought together people from all different tribal perspectives and over time developed a set of guidelines, presentations about the guidelines, documents and educational programs, and so on, to improve how scientists understand their moral responsibility for tribes.

Our group meets regularly, we meet at different events and we have a number of different groups of scientists and tribes that we work with. And the key part of that is that we don't pull any punches. We don't try to make the problem look less severe than it is, and I think scientists actually appreciate that kind of honesty. We have also used the network to improve tribal peoples rules within different federal committees. So, for example, I am on an advisory committee called the Advisory Committee for Climate Change and Natural Resource Science, which is under the Department of Interior. Part of the reason why I was selected to be on that

committee was because of the political work that this Climate and Traditional Knowledge Work Group had done. That is one of the things that network can do, actually, is to increase the social capital of people to be in these federal or other positions.

Another issue is that, I was in a conversation once with Winona LaDuke about whether tribes should have to persuade scientists to believe what tribes say is problematic about certain kinds of environmental risks. I was talking about a lot of different ways in which tribes understand risk that are different from how scientists do, and she said we have to convince them or they are just going to do what they want to do anyways. It was interesting, when she said that I actually realized that I don't actually try to convince anybody. What I think is important about tribal methodology, as for understanding risk and environmental harm, and so on, is to unify the tribal voice. A lot of times in environmental justice situations tribes themselves are divided. They disagree of activists that have one voice but the actual tribe doesn't support them because they are divided. So another great example of an organization is the Sustainable Development Institute at the College of Menominee Nation, I do a lot of work with them.

What they do is work directly with tribes to create that more unified voice across the tribe about climate change. They work with people in tribal government to create a democratic process through which the tribe can then make a climate change plan that would eventually become part of the tribal code. They are internally working with tribes so that their own governments are accountable to them. That improves the relationships between tribes and the US federal government because as tribes get better organized to deal with climate change the federal government sees them as better partners than they did before for working together in being coordinated on climate change. It also makes it so the tribes unify their voices more, knowing when to say no about things and knowing when to put their foot down. So I really respect what the Sustainability Institute is doing in that area. Again, it is a form of networking. It is not networking tribes and settlers. It is more networking internally to tribes and I think that is a really powerful model of how to address some of the issues that you are talking about.

V: Taking a look at the role the international community plays in tribal politics, how do you see the Paris agreement at COP 21 impacting Native Americans and First Nations?

K: There is a lot that can be said about that. Just within the North American context, if you are looking at the division between the US and Canada, there are many exceptions to this but the general idea is that Canada fragmented indigenous people and the US consolidated them. One of the first differences is that when you are thinking of First Nations they often times have much smaller governments, much smaller land bases, again with some exceptions. And in the US you have much larger land bases, much larger tribal populations, much larger governments. That initially poses a difference in how both of those groups address climate change. The United States has much more adaptation funding for climate change than Canada does, so you see a lot more tribes in the Unites States with climate change plans than you see First Nations in Canada. I am actually aware of very few Canadian First Nations that have even tried to do planning for climate change. But you can see that in Canada a lot of bands are like 200-300 people while in the United States there are very few tribes with that small of a population.

At a minimum most tribes have several thousand members, most are somewhere between 5,000 and 20,000 or 5,000 and 30,000, but some tribes are bigger than anything that they have in Canada, like well over 100,000 for some of the Oklahoma tribes. You first have those distinctions. Within the United States where you see a lot more climate change activity, with the exception obviously of the tar sands in Alberta because that is where you see a lot of visible indigenous peoples resisting the tar sands and the corresponding pipelines, different tribes are in different political situations that affect how they deal with climate change or their capacity to do so. For example, in the Pacific Northwest you have the Steven's Treaties, which a number of the tribes there are a party to. They have developed large organizations like the Northwest Indian Fish Commission, and so on, that actually are significant economic players in the states of Washington and Oregon. They address climate change very politically. They have got a lot of scientific support for it and they have a pretty strong voice because they have that strong treaty. You have treaties like that in the Great Lakes but the economics of those treaties are not as significant for the economy in Michigan, or Wisconsin, and Minnesota as they are in Washington and Oregon, but nonetheless you have a similar structure.

Now, tribes in the Southwest, for example, they have treaty rights that are not necessarily harvesting rights of the kind that have huge economic implications but they are having to deal heavily with how to prepare for drought. So what a lot of them are doing is trying to create innovations. I think it is the Pyramid Lake Paiute,

they are worried about a traditional fish that is going away so they are developing separate ponds to be able to maintain those fish. They are trying to work within the reservations to figure out how to deal with what is going to be probably some pretty severe droughts. In the case of the Navajos, for example, who are heavily invested in the fossil fuel industry, they are trying to figure out how to plan for the future. Are they going to continue to depend on a Navajo generation station? Tribes in the South and Southeast deal with the problem that they don't have a lot of jurisdiction, they don't have a lot of land base. So when they think of climate change they are trying to figure out "well, given our small base of land that is scattered, what can we do?" And it is similar to the Northeast as well.

With differences like these you see obviously how some tribes are more active in climate justice than others. First Nations around the tar sands, tribes around the Powder River Basin, and around the buck and shale, you see a lot of activism. A lot of indigenous organizations like the Indigenous Environmental Network and Idle No More trying to address those issues. Even a lot of the Pacific Northwest tribes have been very active in blocking the shipments from the tar sands that are suppose to go out of I think Seattle or Vancouver. A lot of those either go through tribal lands or tribes just don't want them so they try to block those things. There it raises the issue that adaptation and mitigation are one in the same thing for tribes. Some of the treaty tribes in the Pacific Northwest they put out a document called Treaty Rights at Risk, which is talking about how climate change and other things are making it so that when the fish habitat becomes so degraded that they can fish those fish anymore that is actually the US failing to fulfill its treaty obligation. So the US has to find a way for them to continue to fish as they say that they wanted to in their treaty.

Those are the same tribes that are actually resisting the tar sand shipments. So it is both adaptation: how do we adapt, and mitigation: how do we stop the drivers of climate change. But then you look at all these other connections with respect to environmental justice. In Detroit, 48217, one of the big issues they have been dealing with in the recent years is the expansion of the Marathon refinery. Why are they expanding the Marathon refinery? Well, it is the process of stuff coming from the tar sands. 48217 is the most polluted zip code in Michigan. Is like 88 percent African American, huge chunks like 30 percent of the population below the poverty level and it is home to thirty or forty industrial facilities. Those African American communities then are resisting the same system, right? If you look too, I can't remember the figure but some scientist published a figure about it, if the tar sands are not stopped it will lead to one or two-degree additional increase in global average temperature.

If you are looking at other groups, like Tuvalu and islands in the Pacific, or in Alaska, they are going to face sea level rise that affects them as well. So the tar sands is something that brings together all sorts different indigenous people of color and other groups to fight this global system base on the fossil fuel economy. There, I think, what you actually see is not just that different approaches form different groups of indigenous peoples, and so on, but it is people that are facing different dimensions of this very large global system. The more they can be coordinated the better. But the problem is, going back to the issue of tribal governments, you have some tribal governments like Navajo Nation that doesn't see it that way. They are interested in short-term jobs and they actually fight with people in the Indigenous Environmental Network. Instead of having a unified approach they have an adversarial one.

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Another conversation about food systems – unsustainable food systems – with David Robinson Simon and Richard Oppenlander

Similarly to the earlier dialogue with Elaine Dorward-King, my interactions with Dave and Richard were brief and I will try to do justice to our few minutes of conversation through notes and anecdotes from their brilliant works: Meatonomics by Dave, Food Choice and Sustainability, and Comfortably Unaware by Rich. Both of these fine books yell out, loudly and clearly, about the reality of inefficient, violent, unsustainable and unethical food systems that nonchalantly advocate the slaughter and savage treatment of other animals for unnecessary human consumption.

Some claim humans are like any other animal and have the right to kill to survive like any other. However, that is such an barbaric proposition that I barely feel incentivized to spend time writing out its dismissal. In any case, this issue is a basic one: unlike any other species that is hardwired to eat according to their evolutionary trends, us humans violate every law in the books of nature when it comes to survival and are going against any claim of sort of ethical behavior with the consumption of animal products. We are distinct in that we have the capacity to choose otherwise, if not for the care for other lives that communicate, interact with their kin and others, and feel pain and joy like we do, then for the inefficient

expenditure of resources that is required to please the human habit and palate for dead creatures in contrast with diets based on fruit and vegetable crops.

Our species has also deviated from a natural right to be predators given that, apart from non-Westernized and formal societies, the focus of our habits are no longer aimed at survival, but comfort. The vast majority of people in the world today do not compete with other apex predators for their foods. The vast majority of people instead have decimated every potential rival in sight with modern weaponry, sold their fur or caged them for amusement. We do not play by the rules of nature. Moreover, it is perfectly possible to live decade upon decade, healthier and longer on a diet free of animal products. The restraint from doing so, and helping environmental degradation along the way, is almost exclusively attributable to the cultural and social habits of eating other beings whose treatments and killing is conveniently forgotten because they taste good after they are dead.

For Dave, it took a transformative experience back in 2008 for the vegan blessing to befall on him. Although he was never much of an animals person, one movie, "An Unnecessary Fuss", changed him. The diabolically gruesome video shows laughing scientists at the University of Pennsylvania delivering sledgehammer-like blows to the heads of shackled baboons, paralyzing them, mutilating them, damaging their brains and killing them as they 'squirmed and wiggled in futile attempts to get free'. To draw from Joe Arvai's course on decision-making, through tears and disgust, Dave went on to watch "I Am An Animal", "Meet Your Meat" and "Glass Walls", all in one night, and realized he was, like most people in the world, cognitively dissonant in front of the fact that his meat eating habit caused suffering and death to other animals.

And if ethics miraculously ceased to be an issue, as Rich would say: the ideal of 'sustainable meat consumption' would still be an impossibility, not only for our health but for our planet, and as I would say: as idiotic as affirming animal farmers care for the animals they ultimately will slaughter. An excerpt from another recent interview with Rich sums it up pretty well: 'The grass-fed beef operations in California alone use 1-2 million gallons of water on one acre of pasture land they call 'sustainable'. This is true self-deception - grass-fed operations will drastically increase resource depletion! Only 400-480 pounds of meat can be produced by one acre of land, compared to 20,000 pounds of plant foods that could be grown on the same slot" - and not a word more needs to be said.

Yet, Dave's point is one in the same: "In *Meatonomics,* I look to fairly conventional economics usage and define it as a "the animal food system's capacity to endure

without diminishing future generations' wealth, welfare, or utility derived from environmental resources." That is to say, in asking whether something is sustainable, we ask whether it can be continued without long-term damage to the environment and without forcing those who come after us to incur greater costs related to it than we have. Clearly, the production of animal food is not sustainable under this definition."

Worldwide, at multiple scales, corporations, governments, media and many academics focus almost solely on the Carbon Dioxide side of GHG emissions and apparently turn a blind eye to Methane gas from animal agriculture, which although funny for little children should be taken seriously by intelligent adults. According to the EPA Overview of Greenhouse Gases, "Pound for pound, the comparative impact of Methane (CH_4) on climate change is more than 25 times greater than Carbon Dioxide (CO_2) over a 100-year period." However, estimates by the International Panel on Climate Change, which have been dismissed by the American Geophysical Union for a longer-term conversion factor, have concluded the global warming potential over 100 years (GWP_{100}) is 34 times more potent than CO_2, and over the played down GWP_{20} it is 86 times more potent.

Furthermore – *pay close attention, and read this a few times if you think wildlife and natural processes are to blame* – "Globally, over 60% of total CH_4 emissions come from human activities "(EPA, 2010). Methane is emitted from industry, agriculture, and waste management activities." And even further more, not only Methane on its own causes havoc to the planet's atmosphere, the appropriation and management of lands for feed and pasture for animal agriculture directly contributes to rampant contamination and deforestation of the world's most biodiverse habitats, potentiating species' extinction and GHG emissions effects forward in an endless cycle, according to several peer-reviewed articles (Soares-Filho et. al, 2006)(Gerber et. al, 2006)(Koneswaran and Nierenberg, 2008) (Malhi et. al, 2008)(Goodland and Anhang, 2009)(Davidson, 2012)(Gerber et. al, 2013)(Bailey et. al, 2014)(Bajželj et. al, 2014)(Hedenus et. al, 2014)(Ripple et. al, 2014).

So to get a better idea about where mankind will be in about thirty years I asked Dave to take a quick time travel to 2050 and tell me what it looks like. The description he gave me was a fusion of Ray Kurzweil's "The Singularity is Near" and vindications for animal and human ethics, and I quote his response:

> "He [Kurzweil] posits that as computer processor speeds continue to increase, and other technology continues to advance, we are headed to a time in the very near future when three forces will converge: machines will

become smarter than humans, and advances in nanotechnology and bionics will permit tremendous changes in the way the human body works and in the way humans live (and for how long).

Combined with a trend toward increasing advances in social justice movements across the board, including animal rights, I think that by 2050, we'll see:

- Widespread recognition that plant-based diets are the only sustainable way for humans to eat, and with an increasing recognition of the ethical issues involved in factory farming, a concomitant rise in the percentage of people on a plant-based diet. I expect that, conservatively, at least in the West, the portion of the population on a plant-based diet will rise to at least 10% by 2050 (i.e. roughly doubling from its level today).

- Machines will handle many tasks currently performed by humans, thereby contributing to a better of standard of living for humans across the planet.

- Improved technology will support more sustainable agriculture processes, which will drive a shift away from factory farming toward organic, local, rotational, and plant-based farming.

- As Martin Luther King, Jr. said (paraphrasing an earlier Quaker activist), "The arc of the moral universe is long, but it bends towards justice." I believe that by 2050, particularly as the Internet continues to provide a global sense of community, we will see greater harmony on the planet, greater tolerance for others, less warring, and less killing of animals and other humans. It will still be there to some extent, because humans are ego-driven animals who like to kill, but I do think we are gradually getting better at understanding ourselves and controlling the worst of our behavior. "

Whether this scenario will come to pass or not is obviously up in the air, but if its principles hold water as they seem to indicate currently, I will be happy to say that, within my lifetime, mankind will witness the most positive changes in its history. In the words of one of Lucretius' contemporaties Cicero, hopefully in the future: "if you have a garden and a library, you [will] have everything you need."

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Chapter Five - The Power of One

If one should guide his life by true principles, man's greatest wealth is to live on a little with contented mind; for a little is never lacking

Lucretius

Over and over again, across the world and history, a pre-existing and long-established society is either abruptly or gradually ripped off its underpinnings, explored and exploited by a new wave of thinkers. Outcomes, both positive and negative, are promoted and observed exclusively and completely due to the influence and at the pleasure of the empowered conqueror. Were our existence and survival needs no different from evolutionary impulsive and preemptive mechanisms of organization, there would be no problem with the aspiration of men to be like the misnamed 'kings of the jungle'. However, as core lecture and reading material on basic philosophy, and Natural Resources and Environment coursework present, there is something grand in the scrutiny of well-established narratives.

Evolutionary psychology teaches that *Homo sapiens* is a social species that craves and dreads not fitting in. One of the biggest fears in the human mind is to be shun, and isolated, and unaccepted, and persecuted. In post-WWII America neighborhood leaders, city planners and politicians designed whole systems of living and welfare to segregate people, to expurgate the 'worthy' classes from the filth of the 'dirty'. Contracts, covenants, ordinances, policies, laws, all sorts of official and unofficial documents and units of community organization were framed against a certain kind of people (Taylor 2015). Imagine if, instead of perpetuating tribal impetus that governs the mind, assaulting and violating peoples rights to survival, and developing economic and political systems of corruption, exclusion and oppression, the same effort, the same articulation, the same desire and dedication was pushed by an 'universally kind and green' society? What stands in the way of that?

As world-renowned decision-making researcher Paul Slovic shows on his notion of '[The Arithmetic of Compassion](#)'', we are utterly and horrifyingly incapable of empathizing with large-scale atrocities and with those who stand apart from 'our group', however that is constituted. Called psychic numbing, this primitive psychological tendency leads people to intervene only in minor evils and let evil of greater scales run rampant for others to tackle. One of his experiments shows that

the difference between a personable story of a famine child generates far more donations than the amalgamated stories of multiple children, making us essentially dazed and desensitized to increases in suffering. In total synchrony and beyond research, "[A Problem From Hell]" written by [Samantha Power], UN Ambassador for the United States, exposes the frigid lack of reaction by the United States to several atrocities worldwide. She probes the wound of a nation that is vociferously righteous but entirely hesitant to intervene in genocides of the worst magnitudes when economic and political interests are not on the table.

Hence, I too probe: is this not enough? Has our species not caused and seen enough evil unpunished and enough goodness being forsaken? Is this hypocritical clan of thoughtless beings one we want to belong to? The age of enlightenment has come and gone, and mankind seems to be in deeper darkness than ever before. So, in case it is not obvious up to here, we must evolve, at least intellectually. As utopian as that and other things I have written throughput this work might sound, unlike the past circumstances when Native Americans, black people, and eastern European people, Asian and pacific islanders couldn't, and shouldn't, try to change themselves and succumb to the pressure of their so claimed white 'superiors', our present is one where people can indeed to something different to be 'better', to be enlightened and not just flick on the lights. Not because some persons are themselves better than others, but because the cognitive capabilities of our species are far superior from any other creature and our purpose ought to be as well.

To keep this conversation away from the criticism of religious doctrines and moral values, which also need reformulation and I wish I had the time to delve into now, I will keep the following example as a parallel I see between the behaviors of men and the behaviors of the most revered of felines. When a new lion encounters a new pride it does everything it can to overthrow the opposing male and its family, subsequently eradicates their young and mates with all the traumatized females that refuse to fight or leave to establish its dominance over the territory and future generations. We humans are, or at the very least, have been for the large majority of your history, no different. The colonial past and industrial/ economic present execute the same ruthless methodology as a lion restructuring a pride at will.

Great emperors, generals, and leaders of all sorts hoisted varied symbols of authority as entitlement and empowerment to emulate courage, pride, might and strength. And with our distinctive brains, we humans are undoubtedly at the top of the finest creatures of this planet. We have redefined what it means to be at the top of the food chain, and we have in fact redefined the logistics of food chains

altogether. However, our species has to eradicate the warlord leniency, push back on the delusional claims of endless growth and prowess. We no longer inhabit a world where the tyrant mindset inspired by divine right and reverence for the slick and wrathful is acceptable, unless not in my conception a just society.

We humans are not the same as our feline counterparts, regardless of our lust for displaying control and superiority over all that is living and non-living. What is fair for them, what is 'fair' as the natural law of the best fit by the ordinary standards of nature, is not fair to us. Our concept of 'fairness', our very existence for that matter, is very much extra-ordinary, an oddity, an abomination in times we look to behave as if we were not that which we are. With the burden of our unique endowment of cognitions and volitions, we stand proportionately different and in isolation from any other living species on this planet. For that reason, others such as Pete Singer and I will argue, we ought to hold ourselves to a different category of fairness towards other living creatures altogether. Moreover, the same is true for our treatment of other human beings (and commentary on that is so extensive I cannot encompass all of its advocates in a few sentences).

After all, who, in their sanity and in a modern context, would advocate for the pillaging of already established civilizations, be it physically, militarily, politically, economically, ideologically or otherwise, without even a brief stint of recognizance, or conversation, or negotiation, or evaluation, or argumentation? This is the technique of the starving lion, the technique of generational and genetic need to survive, but in the context of men, this is the technique so often employed throughout history to justify the greatest evils our race has ever thoroughly and surely carried out. Be it [Adolf Hitler](#) and [Nazism](#), or [Hernán Cortés](#) and [the violent journey of Catholicism into Latin America](#), be it [J.P. Morgan](#) and [ruthless capitalism](#) or [Donald Trump](#) and [sheer insanity](#), the justification of the conquest of other people through unjustifiable means of ideological savagery is suitable to any species but our own.

Our reality, unlike the pressures of natural selection in the Serengeti, has often, and unfortunately so, been based on extremely flawed and, for the lack of a better word, ridiculously sacred and financially valued paradigms that dictate the lives of an uncountable amount of creatures around the world. A vivid analogy for this comes through Wangari Maathai for her work in Kenya. She, a woman in an extremely patriarchal and oppressive military regime, introduced the Wrong Bus Syndrome to illustrate this point to her followers during civil and environmental education workshops. In essence, this allegory depicts each person as a passenger aboard the

bus of the status quo. When the status quo seems to deviate from the route passengers intend to go on, they nevertheless tend to remain seated to not challenge the authority of its driver (be it government, businesses, etc.). Yet, we should not be diminished by customary paradigms, we should be united by universal goals, and stop that bus.

I grant that is our human nature to not only comprehend the world from the perspectives of our tribes and try to behave accordingly, desperately seeking acceptance of a group to fit in, and that comes to be so due to multiple pressures, especially resource constraints. As our world is indeed finite, despite of how hard it might be to compute and ration and estimate an inventory of what it contains and how hard past and current authoritative entities claim otherwise, it is so, regardless of what economics or digital tech developers or religious fundamentalists will admit to. Some might have a problem with this type of thinking if the 'growth addiction' looms in their insides, or if the cultural patriarchal roots of society keep them captive from 'too much' curiosity, but I would heavily suggest not that they seek urgent counseling, but education, mentors and reflection, and, from there, action, regardless of the wave that blows against them.

This is to say that we cannot simply follow the will of the powerful or follow the wave of majority without questioning. We must, as the only creature capable of doing so, stand in front of our inert character and characteristics and dig hard through what is worth inquiring about. Wangari Maathai's legacy highlights the dangers of ignorance, naivety, fear, pride, pack-mentality, absent-mindedness and indecisiveness, all of which allow the bus to move along to the edges of a cliff. Can we truly go on developing endlessly without any restraint or consideration for biophysical limits? Can we truly be stewards of nature, by divine commandment or intellectual realization, by enjoying the carnivorous diets of our predecessors and driving luxurious fossil fueled vehicles? Can we be good people without ever stopping to think what 'being', 'good' and 'people' means? We need to deeply reconsider all the answers we think we have to these questions to drive the bus where we want it to go.

This age in need of widespread environmentalism, as all evidence points to, does not come with eugenic ideology, or racism, or homophobia, it does not threat someone's rights or safety. What it does challenge is divisive identities. This is about belief, it is about habit, it is about culture, it is about preference, is about what we 'truly know', all of which are well within our control as evolutionarily distinct choosers. I urge people to ponder the creation of a neighborhood contract that requires people to

own nothing but electric vehicles, petition schools to have more locally grown products in their cafeterias, choose to buy a synthetic purse over the expensive leather, use the mason jar a friend makes in exchange of lawn-mowing, refuse to pay taxes to corrupt governments. These aren't life-threatening choices. This isn't against anyone's human rights; these are very much moral statements in favor of them.

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The Parable of the Water Bottle

Let me paint you a picture to address this this long reflection [and if mine fails to portray the power of one I encourage you to look up Wangari Maasai's struggle in Uhuru Park, Kenya]: you recently purchased a solar powered bottle developed by Fontus that uses the electric power gathered to capture humidity from the air and fill its receptacle. You walk past the same cashier at the local market almost everyday and after a while he notices it and gets the urge to ask you what the hell that thing in your bag is. You explain who developed it, how much it costs, what it is like to maintain, how it helps against the littering of plastic bottles, etc. and he is convinced to consider it. After reading an article or too and seeing the water scarcity issues in the news he decides to save up and buy one as well.

A few months later he is finally able to make an order online and within a week the bottle is in his possession (at some point, he would also be able to look up and act on the purchase offsets in the delivery systems, the packaging process, etc.). Now the cashier and you make two in this community that have said bottle, quite small in comparison with the whole neighborhood and county of plastic-bottle buyers. But, one day the owner of the store walks in, looks at the amounts of plastic bottles that have been left in the shelves and asks the cashier, what is happening here? Why isn't the selling as usual? And by the way, what is this thing on the counter? The cashier explains that he got this solar powered bottle after a few months of thinking and saving money based on your initial conversation, and since that purchase he is talking to everyone at the market about it.

The cashier gets chewed out, the owner questions why in the world he would try to dissuade people from buying their products and even threatens to lay him off. The

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cashier takes a second to process his employer's words and gestures before crying or hitting him/her across the face and chooses to quit. From there he calls up the small start up company that developed the bottle and makes an effort to apply for an opening in their staff. Initially he gets rejected and feels discouraged, questions his decisions and reevaluates what he has been up to. He might buy a couple of bottles here and there if he forgets his solar one at home and thinks of running back to his boss and begging for another chance. But something in him has changed. From that first meeting you had with him, from the countless days of telling everyone checking out at the store about the benefits of this wonder bottle, and running a quick calculation of how much money and trash he has saved because of his choice he realizes: he can't go back. He struggles a little while longer and gets a job at another store that sells mason jars.

You bump into each other again and have a great chat about what has been going on and how he switched jobs. You decide to switch where to you do buy some of your products based on that owner's policy and spread the word about the cashier's story. With some word-of-mouth traveling here, and some tweets traveling there, money spent here and money not being spent over there, your neighbor and a couple co-workers reduce the frequency in which they enter the cashier's previous market to attend the weekly farmers market instead. A little while later, you community's attention around the recent successes of the farmers market increases and the mason jar store increasingly gets more customers because of the cashier and his story-telling about the bottle.

At this point, now a year or so removed from the cashier's firing, the owner realizes the traction the farmers market has gotten, and how he is losing clients. He is slowly realizing he needs to do something different to attract the portion of the community that is buying fresh produce, organic products and, ironically enough (in the owner's mind), buying less bottled water because of the mason jar store and one petulant wonder-bottle owning cashier. His is pushed to tell his family how frustrated he is, what this greening community has done to his business and his little boy walks in the room for dinner. He heard in school about the way the state is struggling with its fresh water sources and makes the father hold his temper a tad bit.

The owner's wife chats with the boy and decides to call the school the next day to figure out what this is all about and what they have been telling her kid, while her husband goes back to the store to tend to fewer clients he had the previous year and look for yet another cashier since his staff has been constantly less receptive of his policies and go elsewhere for opportunities. The school principal has a chat with the

owner's wife and she realizes the fuss in the news wasn't as distant as she initially thought. On her way out she spots a pamphlet about fresh streams outdoor education for kids and brings it home to their boy. Although he isn't the most adventurous of children he seems keen to join a couple sessions and his mom signs him up.

A few months later, storeowner comes back home, a little more stressed and his wife tells him about the great time their son is having at the outdoor program. She explains her chat with the principal, a couple facts their boy has told her, and some research of water scarcity she has been doing on the side after hours from the office, all of which raise his eye brows higher and higher. Is it possible that he was indeed completely and comfortably unaware of how much water was a part of his community? Was he totally and willingly blind to the notion that his provision of goods and services created more problems than delivered solutions? He vividly recollects the petulant [Dr. Ian Malcolm](#) from Jurassic Park and begins to see himself as the scientists that he so criticized. The owner felt he was so preoccupied with whether or not he could sell bottled water that he didn't stop to think if he should.

He goes back to the store the next day, with chaotic and confusing thoughts and impulses going through his head and bumps into a customer. They apologize for the mishap and the owner notices this young girl is buying a different kind of ice cream he once signed up for by mistake. She was buying a coconut milk brand, and they struck up a quick conversation. She mentioned that she loves these new items since they have no trace of dairy in them and helps her health restriction. He nods and asks about how that is and she goes on to post that her restriction actually spurred her to look elsewhere in the diet. She has a degree in nutrition sciences and became drawn to a vegan diet after reading book after book about the environmental effect of certain types of diet, and since then she has turned the restriction into liberation.

She tells the owner that despite the difficulty of finding vegan restaurants to eat at the farmers market and a few items at the store give her a hue legs up on the food choices she is devoted to. The owner, now dumbfounded and completely caught without a thought, asks the young lady for a suggestion for the store and she mentions the distribution of items isn't really helping people's health. The most processed foods are the main attractions and the healthier options are either at the outskirts of the store or at the lower shelves, out of sight, because of how bigger corporations pay for shelf space. He thanks her, understanding the limitations he has within his own store and tells her he will do what he can to set things up a different way.

The owner calls up a few suppliers and after a couple 'no's' and a few visits he finds a better layout, the owner is, after all, starting to conceive that the community is not only buying more and more at the farmers market but there seems to be a serious health factor associated with it. He recalls one of his favorite aunts had passed away a few years earlier with several dietary restrictions, and diabetes seemed to always worry people in his wife's family. From there and on, after seeing the new wave of healthy and environmentally aware feeling oozing out of his community, he decides to try his best to tweak and adapt his store to what everyone seems to be lenient towards: more quality than quantity, less meat, if any, with more vegetables and fruits, water filters over endless plastic bottles, and so on.

Five years have now passed and you walk by his store again after a quick visit to the ex-cashier, now manager of the mason jar place. Immediately you notice a new vibe in the air, this place has changed since your last visit a few years back. Well, the community has had a few more electric vehicles, the farmers market has been booming with gorgeous produce and artisanal products, and happy families of clients, but this place seemed to be the long-lasting rock that never changed. You walk aisle by aisle, seeing some shifts in the product alignment and advertising, and see the young nutritionist picking up her coconut milk ice cream for her three year-old. She tells you the remarkable work the owner, that same water bottle-endorsing and well-intentioned cashier-firing owner, has done to the store.

This was a chain after all and you saw little hope for it. However, she mentions the previous two years were the battlefield for much action in the store. The owner had made a few friends in the farmers market and consulted with them for some improvements at the store, talked to other stores nearby to see what they were up to and molded his business to give out what people were looking for lately. She then spots him walking by and calls him over. He has little time and she has got to take off but he gives you a quick spiel. He says he needed a change. He once had a cashier, now manager of the Mason jar shop, and he didn't get what he was trying to do with some water-filtering gismo he brought in one day (oops, you actually hit a nerve with your novelty).

He then heard about the water issues around the state and met the nutritionist, and realized he wasn't so sure his business was caring to the needs of the people in his community. From his own boy's interests, his wife's searches, to his late aunt and wife's family, to the nutritionist and the farmers market loyal crowd, he saw that his business was standing in the way somehow, didn't feel right. You ask about how much of a change it was given the new products and placement you're being and he

replies with a laugh that it sure wasn't easy. So many suppliers didn't like his new ideas for distribution or the questions about their products ingredients, but the more he looked into what he had in his shelves, the more he had to dig in to fix.

It took a few years but he did. Not all business partners remained but the local community stepped up when possible. Nearby shops exchanged some of information and connections, some old suppliers had embraced this new notion of 'sustainable brands' and everyone seemed to want more of the 'greener' products in town. The owner found his footing with a new tribe, and he wanted to still belong since so much had changed. With time he comprehended what types of goods he was really selling, what was good for people, what was good for the environment, what was good for his pockets, what was good for everyone else's well being, and his decisions became easier. The only burden he carried was his consciousness, the consciousness to do the right thing.

After that quick, yet ridiculously deep chat, you parted ways and came across a sudden new blimp of mindfulness in your head: 'did I do this?' Remembering your water bottle chat with the cashier you start to realize that for you, at that moment, that 'small' talk ended up having a not so small outcome. Could it really be that one minute instance like that can do anything, ever? It only took opening your eyes to see, your ears to listen, your mouth to speak, your body to move, your mind to reflect, and your being to produce. Your decision created a ripple, the ripple caused others to open themselves to change, even if mindlessly. That ripple reverberated, from you and from others and on, and that ripple moved 'bigger' particles (the store owner) to embrace the swerve of wellbeing.

It took a small effort from you, a larger effort from another, a larger effort by many (whether in complete synchrony or timing or not), but cumulatively and with a bit of help form luck, they had a larger effect. From your decision to buy the bottle, to talking to the cashier, to his talking to clients, then his boss and to the mason jar store customers, to the customers choices, the education of the owner's boy and the inquiry of his wife, the emotional baggage of his aunt's passing and his wife's family health history, to the exchanges with the nutritionist, and the knowledge of the local peoples and their needs, the balance of economic values and ethical values, old partners and new ones, the ripple of change went through that community and indeed had an effect you never perceived possible. It started with you. The 'insignificant' you.

As perhaps Epicurus himself would encourage: place yourself in front of the many swerves of change, the swerves of awareness, knowledge, care, intention, and action,

if you have the ambition to be relevant. Then your movement will cause a ripple, the ripple that will lead others to break away from the modern shackles of thoughtless reverence for environmentally psychopathic comfort. Along the way, larger groups of people will be convinced, or persuaded, or pushed to move along through the void of consciousness, and in this chain reaction the world will be in a new state of motion. Even if what you do goes unseen, it does not go unfelt, and a future that starts without you is not your future. It takes courage, it takes effort, but, most importantly, it takes initiative. In the words of the enlightened Mahatma Gandhi: 'be the change you want to see in the world", and in the words of the flamboyant Michael Jackson: 'if you want to make the world a better place, take a look at yourself and make a change.'

If you are not willing to observe how you and others think, or evaluate what you think and are contrasted with others; if you are not willing to take a breath of composure before making a decision, if you are not willing to embody the change that is needed than don't bother voicing your concern or your knowledge or your awareness about change. Words can be loud, but if they do not encompass examples that entice one to hear, they matter little. Environmental education research shows this clearly, inasmuch as children become inclined to carry out environmentally friendly behavior almost exclusively if exposed to the outdoors through long periods of time with the guidance of an enthusiastic and knowledgeable mentor (Chawla and Cushing, 2007)(Sobel 1995). In other words, leadership in this context might start small, almost minuscule, but never insignificantly small. Remember the atomic bomb that starts at a scale the naked eye can't observe, that instruments have to be extremely fine-tuned to pick up. The most awe striking of reactions occurs at the most 'insignificant' and imperceptible of minutia.

Think of the paradigm that can be broken if a billion people adopt the righteousness of the vegan minority in this world. The challenges to do that and other feats are cultural, economic, political, social, but they are not ethical. Apart from the need to survive in extreme cases, we humans no longer need to wander in the wild and take lives to be sustained. Far to the contrary, we have learned the art of sustenance so 'well' we slaughter, our food and our environment, without discretion. That is unacceptable if society cares about future generations. As a less gruesome, yet true example in sports, think of the difference a Leicester City Football Club makes at the top flight of English Football. Through the hardships of developing and scouting players and acquiring them for a fraction of giant competitor's expenditures and polishing a diamond-in-the-rough squad to championship glory. It does not matter to some because they are too entrenched in the 'usual' big picture, the reality that

comforts them. But as science has shown us, our planet is round, there is nowhere to run, and at some point, even our madness to consume all the eye can see will be forced to stop and reevaluate itself, or be eradicated.

The issue of embracing change is that people forget that the macrocosm of cultural, environmental, political, economic, and social realities, however intimidating and swaying, is heavily dependent of the order in the microcosm of things. The tradeoff between riding a bike versus a driving a car matters, buying a Testa Model 3 over a VW Passat really matters. Much like a small cancer can metastasize and take over a system, so can admirable actions spread its beauty in the face of horror, and in the same likelihood of a murderous psychopath following the law so is -*with a more worthy ethical purpose*- the chance that a well-intentioned and passionate person will submit him/herself to the vices of our society. Do what you can, as best as you can, as often as you can, until it bothers or inspires someone else enough to do the same or better. Your efforts of 'seeing', and 'speaking', and 'teaching' and 'preaching' are not the same without 'being', and no one besides you can do it for you. Both the agony of defeat and the glory of victory <u>are</u> in your hands, regardless of how powerless you feel. It is up to you to choose your fate: embrace reality and cause a righteous ripple or remain blinded by the illusions of your perceptions and stay stagnant in the waters of injustice; that is what it comes down to.

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Conclusions

'From a very young age' - my mom used to say - 'you questioned the purpose of going to school and complained that you did not feel that what you were taught in the classroom prepared you for life'. This recurring memory, originated in my youth and still driving thoughts today, has led me away from dissatisfaction with the mediocre and short-cited private education system in Brazil, to places that have challenged my emotional and intellectual competence and maturity, which include the University of Michigan School of Natural Resources and Environment. That shift inspired me to take a step into the realms of philosophy, the soft and hard sciences to both educate and inspire people - myself included - to comprehend and pursue a 'good' life: one that is aligned with environmental stewardship and human compassion.

I encountered this particular proposition upon personal misadventure and much time reflecting on my own perspective on the way things are. This project was initially supposed to be a personal work, one that I might venture into many years later in my career, after I had lived through enough in order to be able to share something of value. Yet, I was reminded that unlike anyone else, I am the only one who can share my story. I am the only one who can put down the words of what I experience and take away from my encounters, and at the end of the day, my point of view and my voice matter as much as the next if I have done the heavy lifting to back it up.

To some this work is but a cumbersome review of information they already know about the way mankind has treated the natural world and itself, for others it will be speaking of blessings and woes to a land foreign to their own and in a manner far too pompous for their appreciation and comprehension. Yet, for the third group of people that come across this piece and were willing to read it until this point it will bring them a degree - even if minuscule - of awareness, knowledge and, ideally, care for the way in which the world works and the said 'good' and 'sustainable' life is pursued. I have discussed this matter of 'good/sustainable' lives and reality in a rather passionate manner because of the infinite dilemmas our human condition and well being are made up of, in particular when reflecting upon our relationship with the one and only planet that houses us and its phenomenal attributes that sustain us.

By interviewing academic experts from diverse fields of study, and professionals in business and government, I wanted to share stories and paint pictures that make the complex realities of environmental challenges and solutions worldwide tangible to the reader. The format with loosely formal interviews came to me as an approachable instrument to share a privilege I struggled with through my journey in higher education. Few have doors within reach that open to outrageously bright minds I had the pleasure to chat with, minds that hand out a direct line of access to knowledge about the way things were, are, could have been and still could be. Being mindful of that, it felt correct that I shared my experience with whoever that could not find or open such door were it not for the composition of this work.

Much like the journey of the Argonauts, I looked to seek the better parts that could match my expertise on the fields I studied with many of the champions here featured. Despite the broadness of the environmental issues, and the hardship of delivering a neutral message on its intricacies, I pursued the most competent and inspiring people I could find to create an informative and inflammatory piece. I expect this project will set the foundations for a longer work in the future, perhaps a dissertation and/ or a book on social experiments and human psychology, but as far as this project is concerned, this final piece is a source of insights, advices, grievances, fear and encouragement in the realm of human behavior and our relationship with the environment.

The exchange in "Flourishing" led me to seek some relief from the burdensome privileges of wisdom that escapes, or that is plain out of touch and sight of, for the vast majority of people in the world today. Hence, this is not only an academic pursuit but a personal pursuit, one that is fueled by my Promethean desire to contribute to the distribution of the privileges I have enjoyed, not out of a desire to cause mischief and a sly use of wit, but to rightfully enlighten minds that lurk in the darkness of our times. I want this work to serve anyone as an accessible and reliable guide to comprehend, embrace and, hopefully, improve the ways they make decisions that impact the environment, following advices and observations from the long-lived, well-instructed and well-intentioned people I have encountered and learned from.

Surely the intricate web of empowered decision-makers worldwide makes all problems harder to solve, but I would like to reiterate that there is plenty of hope to be found when one sees the invaluable beauty in the environment we live in and beings we share it with. Such hope can be found in things that are quite simple, things that are found deep within each person and anything else in living nature:

affection, consciousness, effort, empathy, pain, patience and a little luck to be alive. We need to move far beyond nonsensical ideological stalemates and address the ills that plague all, regardless of background or inclination. As I final thought I encourage you to fathom that change, of whatever kind, must come from within. It is utterly pointless to hold the burden the world powers with fixing the planet without first criticizing national powers themselves, which can only, in turn, be criticized once regional powers have been thoroughly inquired. That, in advance, cannot be reached without the scrutiny of local artifices and, at the very root, personal values and philosophies of life are the primordial place that needs questioning and reconstructing. It starts with you: the individual, thoughtful person.

Hence, do not wait for a miracle, or a nudge, or a shove by other actors, large or small. The incompetence to make the right choice might be a challenge we all face but it is not the whole of our being. If one cares about the animal welfare, human welfare, environmental welfare, one needs to seek out the means to find and assess information, fight psychological biases and comforts, and make the change that is right to make in the light of oppressing circumstances. The repudiation of our endless struggle for universal respect and peace will never come unless we are ready to brace ourselves and embrace ourselves and the 'other' on our quests inward, only afterwards to reach outward. The war we face against environmental degradation is the same war we fight against socio-economic inequality, which is the same war against religious extremism; it is all a stalemate against the self, 'us vs. us'. The only forces that chain our freedom to choose to do the right thing are our own freedoms to choose to do something else. So think, deeply, for a good while, then act, with consciousness, conviction and righteousness by your side.

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