The Population Bomb, 50 Years Later: A Conversation with Paul Ehrlich

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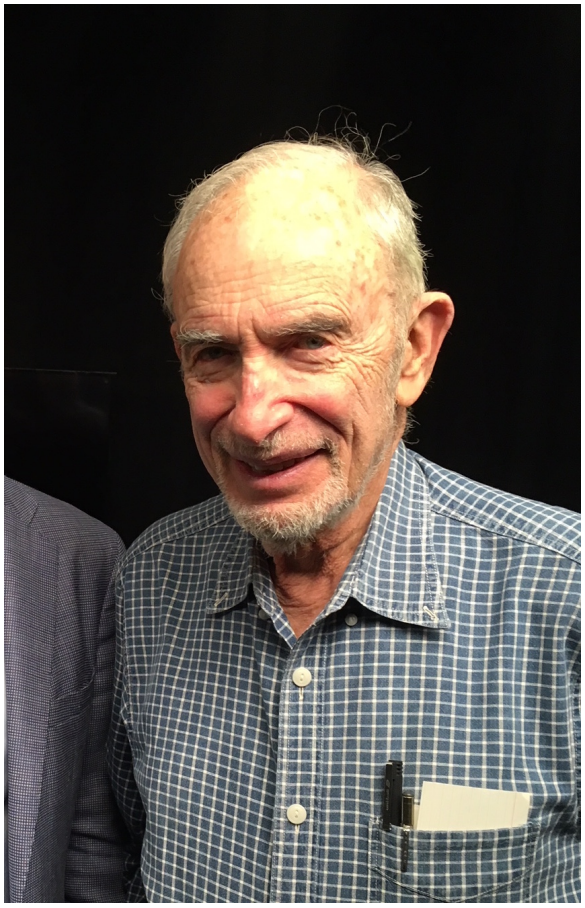

Announcer: This is Climate One, changing the conversation about energy, economy and the environment.

In 1968, Paul Ehrlich's book "The Population Bomb" warned that the number of people on earth was spiraling out of control.

Paul Ehrlich: We were worried then about the problems of feeding human society when there was three and a half billion people on the planet. Now we've got way over seven billion people.

Announcer: The problem isn't that there's not enough to go around, says Ehrlich – the problem is that it's not going around to everyone.

Paul Ehrlich: Many people like us consume too much and then there is several billion who don't get to consume enough and that's one of the huge problems that's not normally discussed in those terms.

Announcer: The Population Bomb. Up next on Climate One.

Announcer: The world's population is on the rise. How much is too much?

Welcome to Climate One.

This year marks the 50th anniversary of Paul and Anne Ehrlich's seminal best-seller, The Population Bomb. The book warned of the dangers of overpopulation, including mass starvation, societal upheaval and environmental ruin. While not all of the Ehrlich's dire predictions have come to pass, the world's population has more than doubled since then, straining the planet's resources and heating up our climate.

Paul Ehrlich is now a professor of Population Studies at Stanford University. On today's program, Greg Dalton talks with Ehrlich about how we're coping with our ever-more crowded world, and what we could be doing better.

Greg Dalton: You had a impactful, traumatic ride in a taxi in Delhi that was somewhat of the inspiration for the writing The Population Bomb. Tell us about that taxi ride.

Paul Ehrlich: Well we wanted something dramatic to start the book. And Anne and I had, I can't remember where we were going, but was back to the hotel when I was doing fieldwork in India. And we got into a car that had one function, a taxi that had one functioning gear and the seats jumping with lice and went through streets where people were living in the streets as you can still find them in many parts of the world, cooking over little open fires, relieving themselves in the streets and it was a jam. And so we described that. It was probably a mistake because people said, ah you're just racists. Well of course to a biologist who's worked in genetics and evolution the whole idea of racial differences that are important is just nonsense. But even more so, of course the Indians under the classic definitions of race that the ones that are wrong are the same race as we are. So that's quite typical; when you get out in the public, you gotta be ready to have people totally misinterpret what you do. If we wrote the book again, I'd probably describe some real hellhole like Miami for illustrating what's wrong with the world.

Greg Dalton: And you wrote it with your wife Anne, but the publisher insisted on a single author. Tell us why, and do you regret that.

Paul Ehrlich: Well Ian Valentine, who was then the inventor of Pocketbooks, the first person to put out the little mass-market paperbacks and Dave Brower, who everybody in the Bay Area knows is one of the great original environmentalists came to me and said, "Look, if you and Anne can write this down quickly, we'll publish it." This was in early, it would have been 68. "We'll publish it and maybe we can influence the election." Which shows, of course, how naïve they were just like me. But then when the book was finished. They said, "Look, for publicity purposes for getting it around for getting the word out. It should only have one author." And I'm ashamed to admit that I folded on it and said "Go ahead. Don't worry about it and I still worry about it because I was a good example of male chauvinism back in those days, which I collaborated with as you may know, my latest book has a senior author who's a woman. And Anne has been had her name on many books that she's written or done all of the brainwork on. So it was a big mistake but I made it.

Greg Dalton: Some people criticized the book for applying an insect model to humans who are conscious beings. Is that fair to think that you –

Paul Ehrlich: It's not fair at all because of course the mathematics is the same, insects or people basically. Insects are very important to us. They are our major competitors for food. But the basic facts given have not in any way been disputed by the scientific community. In other words, last year a paper was published by a guy named Bill Ripple and over 15,000 co-authors backing exactly what I've been saying for a long time. It's the second notice in 1993, about 1500 scientists signed a thing

called the world scientists warning the humanity saying and other things if we don't do something about population growth we're out of luck. And the same year, all the academies of science in the world basically said the same thing. I've had nothing but support from the scientific community, which has been a real pleasure I must say.

Greg Dalton: And one of the critiques of the book is often that it is overly dark it's doomsday and what would you say that today?

Paul Ehrlich: It's much darker today. And you can prove it. In other words, there's no -- after all, we were worried then about the problems of feeding human society when there was 3 1/2 billion people on the planet. Since then, something on the order of 200 to 500 million people have starve to death or died of nutrition related illness. Now we've got way over 7 billion people. We have something on the order of 800 million that's more than double the population of United States, hungry and starving and another billion or two who are micronutrient malnourished. And people will say well, we don't have any food problem. Well, the people saying that, of course, usually don't. I don't have a food problem. I wish I had a little bit more of a food problem. But if you've ever traveled in poor countries, you can't miss the undernourished kids. And the fact that people are micronutrient malnourished means they can't function well in society. So when we try and get society to take action on our existential problems we have trouble doing it.

Greg Dalton: Some organizations, Oxfam included, say that the world produces enough calories. It's a matter of distribution, getting them to the right place. Is that your view?

Paul Ehrlich: At the moment that's probably true. That is if we did everything right and distributed things fairly, then everybody can have a decent diet. Of course, what do we distribute fairly? In places where there's a lot of hunger the food isn't distributed fairly because the father has to get more than the kids or everybody starves. If you look at the problems of humanity and that's one of the reasons that I and my colleagues have put too much time into it, equity is a huge issue. Money isn't distributed fairly in the United States or anywhere else. Human beings don't distribute stuff fairly. So one of our challenges is to find a government that will arrange things so that even the people who are at the short end of the stick get more than enough to have a decent life. We don't do that, even in the United States.

Greg Dalton: So you're talking about wealth redistribution?

Paul Ehrlich: Well if you use the term redistribution, of course you get into trouble. I use it all the time to get into trouble because the economists think that growth is the only thing that counts and efficiency is the only thing that counts. Whereas, I know as every scientist knows perpetual growth is the creed of the cancer cell it can't occur. And that equity is going to require redistribution. You cannot get say 8 billion people, which is where we're going to be very soon, all living like the Koch brothers. It just can't be done. So we obviously need redistribution –

Greg Dalton: Or 8 billion people even living like you and me. That would be the problem.

Paul Ehrlich: Oh yeah, by the way, when I say rich versus poor, which I may sometime in the program. I'm counting us in the rich. And the problem of overconsumption of course is the other side of the coin. Other words the big problem for our life support systems is the aggregate consumption. The stuff that we extract from nature to use and that's clearly the product of the number of people and the average per capita consumption. Saying it's only consumption is like saying well the area of a rectangle is only the width. It turns out when you multiply two things together they both are equally important. And in this case population and per capita consumption are what really important. And one of the huge things is people, many people like us consume too

much and then there is several billion who don't get to consume enough and that's one of the huge problems that's not normally discussed in those terms.

Greg Dalton: Some people talk about voluntary restraint or virtuous restraint. You know consuming less, not buying things on impulse, driving smaller cars, smaller houses. Do you think that kind of virtuous restraint is going to make a meaningful difference, that humans will really do that?

Paul Ehrlich: It may make a little difference but it's not going to make a lot. We need joint social action. For example, just to give you an idea of the magnitude of things. People, when I was involved in one environmental organization they were crazy about recycling. And recycling can be good. It can be bad also; it depends on where you are and what you're recycling. But the claim would be made if we push recycling then people will get more involved in the environment and I would say true. It's also true that they could wheel their recycling bins pass the three Humvees in the garage to the curb and feel that they're being very environmentally sound. And the answer is we need huge changes.

To give you an example from the demographic side from population. Having one less child is the equivalent if you have one less child of you giving up driving entirely 20 times. In other words giving up driving only saves the environment and climate area this is in climate _____

at all that if you give up having a child, you save 20 times as much greenhouse gas not going into the atmosphere as you would if you gave up driving entirely.

Greg Dalton: For your whole life?

Paul Ehrlich: For your whole life.

Greg Dalton: So let's talk about climate. How has climate affected your projections looking into the future? Because you were pretty dark in 1968 and you say it's darker now. How has climate figured into that?

Paul Ehrlich: Well in 1968 we did discuss in The Population Bomb the fact is crystal clear to anybody who's thought about it. If you put crap into the atmosphere, you're gonna change the climate. There was a lot of debate back then about whether it was going to be largely cooling or largely heating which was coming. That's because in 1968 various people hadn't done the research to show that carbon dioxide, the main greenhouse gas, was accompanied by another bunch of gases that almost accounted for another half of the warming and that's what shifted things in the direction of warming.

Sadly, of course, then we thought that climate was going to be a big problem may be around 2100, of course it's a big problem today and it's getting worse and worse. And again the morons in Washington are pulling out of the inadequate climate arrangement that went on in Paris. This is the trouble with having people who are totally ignorant and greedy running a country and that's our caucustocracy and other countries are almost as bad, but the U.S. is the most powerful nation in the world and it is winning its war on the environment with the present administration.

Greg Dalton: You say impacts today. How is climate affecting food production, you know, it's often thought of as a future concern. How is it an immediate concern?

Paul Ehrlich: Well, a lot of the emphasis given in the mass media is on sea level rise, even here at Stanford campus in Palo Alto, California we'll be able to out walk sea level rise. It's a relatively gradual process unless we're extraordinarily unlucky with the dynamics of the glaciers in Antarctica,

but my guess is we won't be. What we know for sure is places like Miami are going bye-bye in the relatively near future, going right now. In other words, they can't keep the water out coming up through the rocks.

Greg Dalton: Sunny day flooding, right?

Paul Ehrlich: Yeah, right. But much more critical is the impact of climate disruption on agricultural systems. We're already seeing we were doing very well increasing the yields on basic crops. Humanity's feeding base for non-protein is largely wheat, maize, corn and rice and they are affected by higher temperatures. We're already seeing reductions in the rate of improvement there. They may even going further, a lot of people at Stanford like David Lobell are working on this huge problem. Agriculture is utterly dependent upon climate. We do irrigate a lot and that's very important, but the water for irrigation has to come somewhere. You may in California for example, the snowpack is getting in more and more trouble in Sierra. That's the water storage for our summer agriculture. If it comes down as rain in the winter, doesn't do any good for the farmers at all. So we're seeing impacts around the world on agriculture already from the amount of climate change we've seen from a relatively small influx of greenhouse gases into the atmosphere. And it's gonna get worse and worse because we're not taking the steps to do it. We're reversing it; we have again a government that's trying to destroy the environment because it has no clue that the environment is what supports them.

Greg Dalton: But isn't it possible also that the grain belt, the corn belt could reach up into Canada, that Russia could have arable land; new land comes into agricultural production because of the warming climate.

Paul Ehrlich: In some areas you may get more production because the climate change. If the corn belt moves into Canada, the corn plants are going to have a lot of trouble growing on the Canadian Shield. You got to develop the soil first before a belt of good agricultural land will actually shift. Developing the soils only take 10 or 20,000 years and so after that, maybe we'll be able to grow a lot of corn in Hudson Bay or on the Canadian Shield, but basically I wouldn't wait around for it.

And of course as it gets warmer in places like the United States we're moving more and more to tropical agriculture. Tropical agriculture is traditionally less productive than temperate zone agriculture. Among other things, the pests go all year round in the tropics, whereas in the temperate zones we have the benefit of a pest controlled period called the winter which allows us that a lot of stuff grown better than we can in the tropics. The prospects for doing better with food in terms of production are I would say very shaky. And in terms of distribution, I see things going in the wrong direction. We're caring less and less; we're putting less into redistribution of food even though we've improved the systems for doing it, but there's less interest particularly in our government in helping other people.

Greg Dalton: And there's estimates of about 50% of food in this country ends up as waste. Both from the farm to the store to the plate.

Paul Ehrlich: Yeah, we get – it's interesting. People say oh well we can do it. We can distribute food better. We can stop wasting food. Well, I hate to tell you, you're a young man, but in the 1950s and 60s we were saying, you know, we could feed a lot more people if we didn't waste so much food. We're wasting more now than we did then. In other words, when you look at the trends in how we're behaving, we're wrapping more -- after all, in 1960 we didn't have Texas size chunks of plastic debris floating around in the oceans. With now within the next few years we'll have more plastic in the oceans than we have weight of fish, weight of plastic. The plastic gets ground into tiny little fragments on the surface they're collected persistent organic pollutants, POPs, and they are now

small enough, those fragments, to go through the blood brain barrier. Our seafood is loaded with them. We are one of the things that's not recognize at all is the toxification of our entire planet.

You know, if you do individual studies, you find if you look at the IQs of kids raised upwind of the lead smelter versus downwind the upwind kids had two or three more IQ points than the downwind kids. If you look at the same the ones raised upwind of the farm fields that are being treated with pesticides versus downwind, the smarter kids are always upwind. So a lot of scientists think we're actually dumbing down humanity. Now, I didn't think there was any empirical evidence of this until I watch the 2016 Republican debates then you could see we are dumbing down humanity.

Announcer: You're listening to a Climate One conversation with Paul Ehrlich, professor of population studies at Stanford University. Coming up, did China's one-child policy go too far?

Paul Ehrlich: The Chinese policy was not as coercive as it was painted over here.

Announcer: That's up next, when Climate One continues.

Announcer: We continue now with Climate One. Greg Dalton is talking about solutions for an overcrowded planet, with Paul Ehrlich. He co-authored the 1968 best-seller, "The Population Bomb" with his wife, Anne Ehrlich. In the book, the Ehrlichs advocated for a "green revolution" as a way to avoid world-wide famine.

Greg Dalton: Professor Ehrlich, you talked about the capacity to grow more food but that was the main critique of The Population Bomb is you underestimated the productivity gains, the green revolution. Isn't that fair to say that you underestimated the world's capacity to feed to generate a lot more food with new technology?

Paul Ehrlich: It's fair and unfair because first of all the estimates we took and cited were from agricultural economists. And I think the general mistake which I certainly shared because I didn't know anything about it. I was talking to people that we cited that knew, I'm no agricultural economist I'm more of one now than I used to be. But the technology was clear what we were worried about more than anything else was how rapidly it could spread and what was underestimated was the brilliance of many subsistence farmers who knew a lot more about what they could do on their land than a lot of the people at industrial agriculture. But it certainly there are a bunch of mistakes in The Population Bomb. Any scientist who is asked about his work 50 years before who still and particularly one it's a broad thing, who still thinks exactly the same thing he thought 50 years before is a pretty weak scientist.

Greg Dalton: Lot of people who are critical of the green revolution the industrial scale agriculture cite organics as organic food as a hopeful prospect. Yet, can organic food scale and feed the world? Because there are some concern that it would actually it can't happen with organics.

Paul Ehrlich: It's complicated. There's some wonderful work by Claire Kremen and others at Berkeley that certainly suggests that you can scale up organic agriculture, but you might not be able to scale up the profits that go with it. Remember for the last couple hundred years we have adopted something brand-new in the society of Homo Sapiens. And I mean all the way back through the hunter gatherers and so on, and that is money has become the standard of everything. And so what we managed to do depends on who's getting rich at it. And that's a, you know, perpetual growth of the GDP is still in the minds of many ignorant politicians and economists a really important thing that's possible and it isn't.

So yes, I think organic farming has huge potential, but there's also huge dangers there are huge dangers in what we're doing with our soils which where is a resource we're getting rid of at too rapid a rate. The whole situation leads me and I think all of my close colleagues to believe that we're headed for some form of a collapse in the next few decades. We can't keep going the direction we're going and not have shall we say the lifestyles of the people listening to this program dramatically altered in a way they don't want to have them altered.

Greg Dalton: Steven Pinker at Harvard has a new book called Enlightenment Now. And he's written a previous book saying that life is safer, longer, healthier, more prosperous, people are better educated, societies and cultures are more tolerant, more fulfilling, that there's more progress in humanity than you give it credit for.

Paul Ehrlich: It's true that a relatively small group of people in Western societies with science and certain form of progress, but with science with the idea of democracy which was usually democracy for white men but let's skip that and so on, did make a lot of "progress" in various areas. And what's not usually mentioned by the Pinkers is for instance one of the main things that allowed that was slavery to start out with. If you know your history the role of slavery in the development of the West absolutely gigantic. So slavery is in there.

Then we adopted other people's energy slaves. In other words, it was made possible by using up the sun's energy stored and fossil fuels at a horrendously rapid rate and taking it from other people in the world. You know the old-line about the Middle East. How did our oil get under their sand? And they're suffering to this day over our wars to get oil, which is the main thing that the West has fought over for many years. That science, it's still not clear whether it was a smart move. It came from agriculture. We moved into agriculture that allowed specialization, specialization allowed industrialization. Industrialization allowed a moron an absolute moron narcissist to have the power to blow up civilization and destroy humanity and most of the animals on the planet. One single person. Is that advantage? You know, I have my, there are questions. I live a very good life but I spent a lot of time with people who don't have that opportunity.

Greg Dalton: But there are hundreds of millions of people in India and China, who've moved out of poverty, into the middle class. Now you could say that China and India are paying a big environmental price for that material wealth. I lived in China in the late 80s. I go back now and the people are better fed, better clothed, better off. So can't you give some recognize that there are have a lot of people, hundreds of millions of people have moved out of poverty better life, better health.

Paul Ehrlich: You can recognize that it's certainly true. There are still 600 million people in India who have to defecate outside because they don't have toilets. And the issue is the violence that we have committed against those people and all future generations by working so hard to destroy our life support systems and to use up the energy slaves often for ridiculous reasons that we took from them and that we inherited. It's a complex thing but just saying everything is better is fine, if you're not too bright, a faculty member at Harvard. But if you're an Indian villager or a member of a Chinese minority or are living up in the mountains and so on, the world doesn't look quite so bright.

Greg Dalton: Humans are very adaptive species. That's why we're here. What are the prospects that we can adapt to a warmer world with more turbulent agriculture? We've adapted to some pretty big challenges in the past. Can we basically ride this out?

Paul Ehrlich: Well, I'd like to hope we'll be able to. And in fact, our research is aimed primarily now at figuring how to avoid the same mistakes after the collapse. In other words, we're hoping the collapse won't be caused by a large-scale nuclear war which will basically for instance people say, oh don't worry we won't need currency, we'll use bitcoin. Use bitcoin without electricity?

Greg Dalton: Bitcoin uses a lot of energy.

Paul Ehrlich: Yeah. I mean, we're approaching energy limits which we may get around with quantum computing and so on and so forth. But we're not gonna get around the basic distribution and political problems. My view has been for a long time that I'm very pessimistic about the future but very optimistic about what we could do. I have to say that over the last decade or so, I've become less optimistic about what we could do for among other things, of course, because we're not trying any of it. Whereas right now we have deteriorating infrastructure in the United States. Our water handling infrastructure is going downhill fast. Water is absolutely essential. We should be not only rebuilding the infrastructure, but designing it for flexibility because we don't know where the water is going to be needed as the climate change. We're not doing a thing.

Greg Dalton: Right. The system we built is not adequate for today. But just a few years ago a lot of people were running around, peak oil, peak oil, peak oil, that there would be peak supply. And then fracking comes along, a technological innovation supported in part by the U.S. government and forecast this year 2018 U.S. oil production could surpass Saudi Arabia. That was not foreseen five or 10 years ago. And now the peak oil people are pretty much quiet or they're talking about, peak demand, but peak supply, this resource we were gonna run out of is suddenly abundant.

Paul Ehrlich: This is absolutely typical thinking, not yours I mean. Sure, what about 10 years from now. In other words, the people look at timescales that evolutionary biologists and ecologists look at very, very differently. And we're also fracking is moving us towards peak environmental destruction. What they're doing in Canada with the oil sands and so on destroying a huge portion of the country for the temporary use of oil. Now if they were moving –

Greg Dalton: For one species and one generation.

Paul Ehrlich: Exactly. And of course I don't even want to get into the rights of the biodiversity that were destroying people. I recently saw an article saying there is no ethical reason not to destroy biodiversity. Well ethics are entirely invented by human beings. And there's a huge portion of our population that thinks it's unethical. They wipe out the songbirds and so on and so forth. Besides the fact that it's killing us at the same time. So it's a complex issue, but they're always going to be people who say oh well we're going to come up with some magic; we'll pull the technological rabbit out of the hat to save us. And they forget when you look at the last past technological rabbits. They've often had very nasty droppings.

Greg Dalton: There's one to talk about human cognition and climate. You're an evolutionary biologist, you've written about how humans are sight-based animals. Our brains are not wired to recognize and respond to this visible threat of climate change. If there's a man with a gun or a tiger in the woods, we know what to do. But this abstract gas, how are we challenged to respond to climate change?

Paul Ehrlich: We're challenged because we have to train to do it. You know scientists always find that people can't read graphs that people peering in the microscopes are carefully drawing their own eyes, which are reflected back. People have to be trained to perceive certain things because we evolved as you indicated to dodge the car. That's easy; when the lion jumps at you, you duck. But with climate change, if the climate was changing on Australopithecus, our ancestor, all they could do was mutate or migrate. There was nothing they could really do in response. And they weren't causing it. Now we're causing it and we can't perceive it.

Greg Dalton: '68, was The Population Bomb came out then it's almost around couple years later was Earth Day. We're coming up on the 50th anniversary of Earth Day. Does Earth Day have much

of an impact this annual gathering is it kind of a, I think sometimes it's narrowing like every day should be Earth Day, but it still has a lot of resonance.

Paul Ehrlich: It had resonance originally but of course you gotta remember the political situation at the time. We were bogged down in Vietnam and it was a general movement. There was the sexual revolution so it was a revolutionary time. And Earth Day got a lot of people concerned. One of the things that has pleased me though as our government is going down the drain, more and more people are becoming active. And I think if you're counting on the politicians saving you, take a closer look at them. Just watch the evening news. So political activism on the part of people is really necessary. And I think groups at least I see a cheery upsurge in that kind of activity. It may not be enough but as my view, the route we've got to take.

Greg Dalton: You talk about foregoing population. Are we headed toward what nine or 10 billion people?

Paul Ehrlich: More likely 11.

Greg Dalton: Eleven.

Paul Ehrlich: More likely if we avoid the huge die off. There's almost no way even with billions of people dying prematurely that you're going to have fewer than 7 billion people on the planet at the turn of the next century unless we have a large-scale nuclear war or absolutely vast plagues or famines and I mean losing 15 billion people or something over the period. But not likely to have a very small thing. What we need to do obviously and should've started 40 years ago is give women absolutely equal rights and opportunities. Make sure everybody has access to modern contraception and backup abortion. Teach everybody that you can have lots of fun with sex without having lots of children and change our entire society.

Greg Dalton: And do you have some regrets for unintended, perhaps, or how the population bomb was used to justify things some oppressive one child policy in China, sterilization.

Paul Ehrlich: Tell me anything social that you try and get done in a country like just the United States that will not be taken over by racists and used or by crazy economically give me more money people for their own purposes. On the other hand, what we did say and I've always said is that the last thing you want to try is coercion and I've never supported coercive policies.

The Chinese policy was not as coercive as it was painted over here. There was an incident actually that involve somebody at Stanford saying that the Chinese were abusing the one child family thing and giving stories of forced abortions and things like that. Well it turned out the reason we know about those were the Chinese themselves, labeled them abuses and struggled to correct them. And one of my colleagues at Stanford was very close to the person who invented the one child family thing; perfectly acceptable to most Chinese. Anne and I met with a group of Chinese women to find out about that and secret meeting it was about 20 years ago and there are maybe 35 women. And in the first two minutes they said we had to do that it's a smart policy they're doing it right. And then one of the women said but I'm the best neurosurgeon in China and I'll never be head of my service she said because I'm a woman. And the rest of the meeting was discussion of the glass ceiling for Chinese women, which shows you a government can do one thing very intelligently and yet miss another really critical part of the issue.

Greg Dalton: If you're just joining us my guest at Climate One is Paul Ehrlich, Professor of Population Studies at Stanford University. I'm Greg Dalton. Professor Ehrlich, tell us what is the sixth great extinction and why should a person care if some funny looking insect in Costa Rica goes

away?

Paul Ehrlich: Well the sixth great extinction, the history of life has not been uniform. There have been five times when over 75% of the kinds of animals and plants the species have disappeared. We know the cause of the last one 66 million years ago was almost certainly a collision with an asteroid on the Yucatán Peninsula, which wiped out the dinosaurs, except for the birds. So why should anybody care? Well, we're in the middle or at the very start, but maybe almost in the middle of the sixth great extinction episode caused entirely by human activities. Why should you care about the disappearance of little insect? Well, let me give you an example. Most of the focus has been on loss of species which from the point of view of a human lifespan is going on very slowly; we lose a few each year. Let's suppose -- but what we're losing in huge numbers is the populations of species. Let's suppose that you wiped out a little single bee species in North America called Apis Mellifera which is the honeybee. Now if you wiped them out entirely in North America, there would be no loss of biodiversity by the species count standard, but we lose somewhere between $15 and $20 billion worth of agricultural production and our diet will become much less nutritious. The point is, all those other organisms are working parts of our life support system and when you just have a few of them left that doesn't count in the extinction, the number of species extinction counters, but it counts a great deal in our very lives. And what we're doing from the sea and from the land is wiping out population after population members of our life support systems. What we're busily doing is sawing off the limb that we're sitting on.

Greg Dalton: I once heard it described as rivets in an airplane. You can lose one rivet, two rivets, five rivets, but at some point that rivet in the airplane –

Paul Ehrlich: The wing comes off. Spoil your whole day.

Greg Dalton: Right. E.O. Wilson has this idea of setting aside half of the world's land as nature preserve. Is that realistic and what would that accomplish?

Paul Ehrlich: Well, what Ed is saying is basically correct. Namely if we could set aside half of the world then our life support systems would be secure or at least relatively secure. I don't have to tell you the practical difficulties of doing it; it's like the practical difficulties of giving women rights, equal rights around the world. There are lots of things we know desperately need to be done. The thing that makes me such a pessimist is I see the politicians going mostly in the opposite direction; doing things to make things worse rather than better.

Announcer: You're listening to a conversation about our exploding population, with Stanford professor Paul Ehrlich. Coming up – can humans overcome their instinct to crowd the planet?

Paul Ehrlich: What do we know is absolutely programmed into us genetically from the theory of evolution? Namely out reproduce your buddies, maximize your reproduction.

Announcer: That's up next, when Climate One continues.

Announcer: You're listening to Climate One. Greg Dalton is talking with Paul Ehrlich about his 1968 book, "The Population Bomb."

Let's continue with their conversation.

Greg Dalton: You talked about the problem of inexorable growth. Our retirement plans are tied to mutual funds, the stock market; when the stock market goes down contributions to the Commonwealth Club and KQED and Stanford go down. We're all locked into the system of growth.

But is there really a steady-state economy, something that has less growth or no growth?

Paul Ehrlich: I've been working hard with the economist pushing more work on that. It was pioneered by Herman Daly, who basically has written books on a no growth economy. The trouble is, first of all few politicians and many economists can't read and they certainly can't think. You don't have to be a rocket scientist to realize that when you have a finite planet you can't grow on it forever. You also if you look at the history of economics and the history of humanity. This whole, everything you mentioned is where is the money going. That's the ultimate value. And we've got to find a new system and that's what we should be working on. I don't have the answers to these things but every economist should have as their first job seeing to it that people understand you cannot have perpetual growth on a finite planet.

Greg Dalton: For some people they look to what's called biomimicry. They look to nature for solutions and there is no waste in nature. So that waste is always someone else's food or input. So this idea of circular economies where things are consumed and then rebuilt, reused made into something.

Paul Ehrlich: Unfortunately, the second law of thermodynamics tells you there's limits to that. One of the few laws of nature that nobody saying thinks we're going to get rid of. But that is a direction we should be moving. We shouldn't be thinking in terms of perpetual we should be thinking among other things, of not stealing from our children and grandchildren saving as much of the resources that are necessary for human life, including the living resources and hoping that they will be able to find ways to continue. If not for a million years may be for another thousand years. That would be sustainable enough for me and let the Martians take over after that.

Greg Dalton: Climate is often framed as a moral issue. What did you think of Laudato si' or "Our Common Home" from Pope Francis?

Paul Ehrlich: I wrote an article with John Hart at Berkeley, whose title was changed by nature, which published it. They change the title to something like the Pope doesn't do enough for women but our title was Two Cheers for Pope Francis. I think he is a more flexible individual than this majority of people who have been in that position. He's well educated. You have to understand that the Roman Catholic Church has a social science and a natural science academy. They're interested in hearing what's going on in the world. And I think they're changing gradually in the right direction but they have the same problems we have in the United States, politics, stuffy idiots who don't understand the world. I am personally a fan of the Pope and that will get him in trouble.

Greg Dalton: One of your former students Stewart Brand, I saw a video of him looking back at your work and saying that there are some countries where there are too few people. There's Canada, wants to import people because the graying of the population. So how about the idea still that Japan, Canada, certain countries their population gets to a certain age, they need younger people to work and support that graying population. So there is such a thing as –

Paul Ehrlich: No they don't. First of all when you look at the dependency ratio, which is what's usually considered. They worry about there being too many older people for the society to support. But of course there's fewer, it is easier to make somebody over 70 productive economically than it is to make somebody under seven be productive economically. And the number of people under 15, the proportion shrinks dramatically, as the number of older people over 60, which is what the usual statistic is grows. But of course you gotta stop population growth. You cannot continue to grow, be it by importing people, be it by increasing birth rates. No way, cannot continue. It's math. No trick around it

Greg Dalton: You know climate is thought of as this collective action problem that no one person, no one country, no one governor can solve it together. It's the ultimate collective action problem we have to do it together. And yet we seem to be with Brexit and our politics devolving into more of a fractional fragmented tribal. And you said something really interesting, I love watching you on the Johnny Carson show about how we evolved in small groups. You were talking about race. And it seems like we're going back to that tribal history where at a time when we need to come together to solve this massive climate collective problem.

Paul Ehrlich: If you look at people in our society, giant society and then you look at their Christmas lists or their closest colleagues. The numbers usually are in the vicinity of hundred or 150 people. It's called the Dunbar number. And what the estimate is for the size of our hunter-gatherer groups way back when. Hunter-gatherers had several advantages over us. They were much more equitable. Their leadership was not one leader. There would be a leader for hunting, there would be a leader for medicine. There would be a leader for settling disputes and so on. Since they had to carry everything with them you couldn't have Koch brothers collecting 5 million times as much as somebody as somebody else. They all spoke the same language. They were all genetically related. So if your wife was cheating on you she was probably cheating on you with somebody who had very much your genes so there wasn't the same problem there. So in many ways, hunting gathering was a very good stage of our existence. We didn't have TV and we didn't have many of the diseases we have today either. But of course we died young. So take your choice.

Greg Dalton: You wrote in The Dominant Animal about cultural evolution as well as genetic evolution. So can we evolve pass these primal tribal instincts?

Paul Ehrlich: Well we have. I mean for instance, what do we know is absolutely programmed into us genetically from the theory of evolution, namely out reproduce your buddies, maximize your reproduction. Now, I've done surveys now on dozens of audiences of thousands of people. I've yet to run into a woman who either has or claims she wants 25 children, which is quite possible biologically. But we've overridden the great genetic code things with contraception and social choice and so on. So there's no question. We can change. We have the ability to change.

Greg Dalton: You also write about a lot of motivations being driven by hierarchy within social groups. Whether it's money or fertility, or that sort of thing. So how is that really driving our human behavior it's our peer group that's maybe amplified by social media now?

Paul Ehrlich: Well yeah. There's no question that our satisfaction if you do surveys and the way our culture has evolved depends on how you do in relation to people you know well. That is if I was living in an obscure Indian village, I'd be an extraordinarily rich person. If I were living in Palo Alto, California, I'm almost poor, can't hardly afford to live there. So it depends on relative situations and that's among other things, builds hierarchies. All these things are changeable if we get together and try and change them. And there are people moving in that direction. There are degrowth movements in Europe. There are people who are actually working hard to change the economic system. So the potential is there. What we don't have enough of I'm afraid is time.

Greg Dalton: And there's also the human development index things. These idea to try to come up with alternative measures to GDP or income, gross national happiness that sort of thing. Those things get a lot of attention but do they really get any tracks?

Paul Ehrlich: They're not taking over.

Greg Dalton: They're not taking off are they?

Paul Ehrlich: All we can do is keep working.

Greg Dalton: Artificial intelligence, very exciting right now. Silicon Valley's all over this. As an evolutionary biologist, how do you view the creation, the development of artificial intelligence?

Paul Ehrlich: Well, originally it was big at Stanford. And we always said artificial intelligence and natural stupidity, and that really summarizes the situation with artificial intelligence. And that is of course the people who are going to be dealing with it are going to be naturally stupid. And I worry about what they're going to do. But as a general problem –

Greg Dalton: Especially if there are downwind from those coal plants we're talking about.

Paul Ehrlich: Yeah, well it's a general problem with technology. Technological change can be excellent or it can be bad and you've got to watch it closely and you've got to be what we call adaptive managers. That is, if it ain't working, you have a way and a backout so you can get rid of it. For example, wouldn't it be wonderful if we had developed a way to simply destroy and remove from Earth all nuclear weapons and fix it so they can't be rebuilt. Technologies are not all good or they may be temporarily good. There was a time when a car was a wonderful thing. Now if you try and drive in the Bay Area, I don't think the impression you'll get is a car is a wonderful thing.

Greg Dalton: Right. And there's a number of people here at Stanford who spent their careers building up nuclear weapons who then later said we should get rid of all of them, right. The cold warriors who then changed their tune.

Looking back, since the 50 years of The Population Bomb. What positive things have happened that surprised you?

Paul Ehrlich: Well I was very pleasantly surprised by the success of the racial integration movement by the fact that I've now I was trained as a pilot, by a woman pilot. And I've flown in many airliners that are piloted by women. That was an unthinkable thing in the 1930s. My first girlfriend in the late 30s had for opportunity she could be a teacher in a lower grade, she could be a nurse or she could be a secretary that was damn near it. Now we haven't gotten where we need to be in gender equity, but we've surely moved or maybe the most surprising thing is the speed with which people understood that it's nobody else's damn business how you enjoy sex as long as you're not hurting somebody. And that took place with us almost blinding speed and of course some of the real dopes don't get it yet but they will.

Greg Dalton: You have this reputation as Doctor, you know, the prophet of doom. Do people kind of avoid you at cocktail parties or picnics? They think oh it's gonna be that you're a downer?

Paul Ehrlich: I don't talk about these things at cocktail parties. I just drink.

Greg Dalton: Fair enough. And looking forward, knowing what you know about population and climate. How do you keep hopeful when it looks the odds are so long, the hour is late, the time is --

Paul Ehrlich: Drink a lot of good wine. You'll keep your internal environment in good shape while your external goes down the drain. All of us who share the same concerns also share like being in a band of brothers and being social animals. And the most pleasant thing in my life is my social contacts and most of them all of them agree with basically what I've said here today and we don't talk about it we just drink.

Greg Dalton: I've heard you like wine and chocolate. You spent every summer since the 1959 I think in the Rockies. And I think you may have spent your last one there, perhaps recently.

Paul Ehrlich: Yes.

Greg Dalton: And one of your academic, the person who describes herself as your academic daughter said it might be upsetting to have one's life coming to a close here now in history. You've talked about some of the threats. How do you feel about kind of coming to a close, your career coming to a close in this time?

Paul Ehrlich: Well it's an interesting philosophical thing put forth by a philosopher named Scheffler who asked the question, if you knew when you died the world would end, that would be the end of the universe. Would that change your behavior? And my view is it would. That you get a certain amount of pleasure while you're alive thinking about what might happen in a good way to people you love, to people, very often you become very loving of the children and grandchildren of your friends. And I think that's enormously important even though I agree completely with Vladimir Nabokov, who said if I recall it correctly, "Life is a brief crack of light between two eternities of darkness." And so you just keep going.

Announcer: Greg Dalton has been talking with Paul Ehrlich, Professor of Population Studies at Stanford University, marking the 50th anniversary of the seminal book "The Population Bomb," which he co-authored with his wife, Anne Ehrlich.

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