

The Great Simplification

Nate Hagens (00:00:02):

You are listening to the Great Simplification with Nate Hagens, that's me. On this show, we try to explore and simplify what's happening with energy, the economy, the environment, and our society. Together with scientists, experts, and leaders, this show is about understanding the bird's eye view of how everything fits together, where we go from here and what we can do about it as a society and as individuals.

(00:00:33):

For most people paying attention to ecology, planetary limits, and sustainability, this week's guest needs no introduction. Paul Ehrlich is a retired conservation biologist from Stanford University who famously, or infamously, depending on the reader, wrote the book, *The Population Bomb* in 1968. In this episode, I talked to Paul about what has happened both to human population situation as well as awareness and mitigation of it since he wrote his book 50 years ago. Our discussion ranges from his appearances on Johnny Carson to why humanity has not responded to our long-term sustainability challenges. As usual, Paul, approaching 90, offers colorful and interesting commentary on the human predicament. I hope you enjoy the conversation and perhaps gain some insights.

(00:01:39):

I have lots of questions for you, lots of thoughts on the issue of population, but let me just give a bit of context. So you were born in 1932 when the world population was approximately 2 billion people. You wrote your book *The Population Bomb* in 1968 when we were roughly three and a half billion people. And now at the current growth rate of around 81 million humans per year, we will cross 8 billion humans sometime near the end of 2023. So do you have any reflections on the enormity of that statement just to start us off?

Paul Ehrlich (00:02:25):

Well, I think it is the single largest change that any mammal has ever created on this planet. So it's a stunning set of numbers. It's a sad set of numbers. I would love to see many, many billions of human beings live. But one of the things we know very well is that there's a limit to how many can live at one time and still maintain a reasonable life for themselves or a reasonable planet for people to live on.

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Nate Hagens (00:03:03):

I wasn't able to find all of them, but it's my understanding you were on Johnny Carson over 20 times, and that was a line that you said often on Johnny Carson, "We can have billions of humans on this planet, just not at one time." To my knowledge, you've been on Johnny Carson more than any other scientist. Can you just expand on that and what that was like? That was a long time ago.

Paul Ehrlich (00:03:27):

What it was like was wonderful because I'm a born loud mouth and I learned early on that I actually started talking about population issues in a class I taught at Evolution at Stanford University. It was a 10-week course. The first nine weeks I explained how human beings evolved, and the last week I talked about where our evolution was taking us. And the last week's lectures became very popular. Students told their parents about them. I got invited to give a talk at the Commonwealth Club in San Francisco, which is a organization still going today, which has people discuss various issues. And what I didn't know was that the Commonwealth Club had my talk broadcast on a series of radio stations, and suddenly, I got asked to talk on other radio stations, do some TV and so on. And I was in those days as I am today, a propagandist, that is I'm interested in changing the world. And it struck me that being able to talk to thousands of people at one time was a great advantage compared to just talking to say 30 in my evolution course.

(00:04:51):

So I did a fair amount of that and eventually I got asked through Arthur Godfrey, a celebrity of those days, a celebrity pilot, to do the Tonight Show with Johnny Carson. And it turned out, John and I just hit it off. We talked for a few minutes before the first show, but after that we just did it off the top each time. In the first show there was Julius La Roza was the other guest. After we had talked about population and contraception, he jumped up during one of the breaks and ran in front of John and said, "Johnny, you guys can't talk about this on TV." And John said, "Yeah, we just did." And I said, "Yeah, we just did."

Nate Hagens (00:05:38):

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So was Johnny Carson aware of and concerned about the environment? I mean, there's so many things that happened in the early '70s. We went off the gold standard, the genuine progress indicator peaked. We had the first Earth Day, Nixon had the Water Act. There was seemingly an awareness of this. It's like we had this cultural awakening and then Reagan was elected and we went to debt and globalization and the superorganism kind of took over. Was Johnny Carson an environmentalist and other people back then?

Paul Ehrlich (00:06:16):

Johnny Carson was an extremely bright, quite shy person who was very much up on what was going on in the world in virtually every dimension. He got me on the show. That is the idea of having a scientist on the show was not popular with many people or people who were running companies and buying ads on the show, that sort of thing. But John got what he wanted because he was the most powerful person in some sense in Hollywood.

Nate Hagens (00:06:49):

Let's dive into this. I know you are an ecological polymath and have knowledge and opinions on lots of different topics, but I would like to really dive into the issue of population, not only your work from *The Population Bomb* onwards, but also what we face today and maybe how to put it in context with some of our potential solutions. So along with John Holdren, you were the creator of the famous IPAT equation where I is impact on the environment, P is population A is affluence or wealth, and T is technology. So that was around 50 years ago. So can you reflect on how the IPAT equation has held up with respect to environmental impact? Or do you have any other updates on that?

Paul Ehrlich (00:07:38):

I think all scientists simply know that's correct, and in fact social scientists have picked it up and tried to expand on it and so on. But the reason we did it was several fold. One was back in the 1960s, there was concern about overpopulation and about population growth, but it had a racist element in it. It was too many of the wrong kind of people if you read, and it was not universal, but in some of the things it was clear

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that people thought that there were too many people of the wrong color, too many people who were poor and so on, and that we should somehow keep them from breeding.

(00:08:23):

One of the points we wanted to make, which we made with the IPAT equation, was that you can't disregard people's behavior, that a poor person does much less damage to the planet than a multimillionaire inevitably, and therefore you have to consider how much people consume. That's one of the things the IPAT equation was designed to do. It was also taking into consideration the kind of technology that's used by your population because that has an important thing in the impact too. If you have a population of bicyclists, they do much less damage than a similar number of Mercedes drivers.

(00:09:10):

And so there was one notorious idiot at the time who used to say that the number of people doesn't make any difference at all. It's all technology. And we use the IPAT equation to tie the three things together, how many people they are, how they want to behave, and the technologies that they select and the systems they select to service their behavior. Well, it's ridiculous to say it's held up. It's like saying one plus one equals two is held up two. It just is simply true on the face of it, as true as anything gets in science.

Nate Hagens (00:09:49):

Well, what I teach my class, which you have so graciously guest lectured numerous times, I say that we have two population problems. One is the number of humans and one is the population of refrigerators, cars, microwaves, airplanes, et cetera. And as you point out, I forget the exact details, but something like 80 to 90% of the carbon emissions in the world are by the top 10 to 15%.

Paul Ehrlich (00:10:18):

Yeah, it depends on who takes the measurements and so on. But the general pattern is clear, that is it is the rich people that do most of the damage, but of course you can't ignore, for example, the overpopulation in poor countries does less damage say at the climate level, but does more damage sometimes at the destruction of biodiversity, at

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the impacts on individual people who, for example, want to have many children because their level of development is such that the children are necessary as farm labor or to walk long distances to get water and so on. So you got to watch the whole equation. There aren't any simple answers. It isn't all rich people. It isn't all poor people. Skin color has nothing to do with it, except because some idiots think that since skin color is a sign of quality, which of course it isn't. Your skin color is pretty largely determined by the amount of solar radiation your ancestors underwent.

(00:11:39):

One of the things that I had to work very hard at was we had a faculty member at Stanford who claimed that people were color coded for quality. He had gotten a Nobel Prize because his laboratory group had invented the transistor. And I started getting all kinds of crap about how shouldn't we stop those bad people, those dark skinned people from breeding and so on. I was often asked that in public lectures. One of the things that I did was write a book with a colleague, a sociologist colleague, psychologist colleague, Shirley Feldman, on race and racism. But also when somebody asked about who should be stopped from breeding or implying that or saying, it should be people with darker skins. I always said that when people ask me who should be stopped from breeding, it's the people who ask questions about stopping dark skinned people from breeding.

Nate Hagens (00:12:42):

Yeah, it's a horribly complex and emotionally charged topic. So you are famous for talking about population, but at the core, you're a conservation biologist. Can you define the ecologic concept of overshoot and opine on whether recognition that overshoot as a core explainer of many of our current challenges, including population, is finally starting to happen?

Paul Ehrlich (00:13:10):

An overshoot is not a complicated idea. It is if you have a population of animals that gets large enough so that it is able to consume all of its food supply and then starts dying off, that population is an overshoot. And the human population is an overshoot by a very basic standard that we use more of the planet's stuff that we need than can be replaced each year.

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Nate Hagens (00:13:39):

And that's even without including fossil fuels, right?

Paul Ehrlich (00:13:42):

Yeah. What we're doing is we're living on our capital rather than on our interest. And that's not a smart thing to do.

Nate Hagens (00:13:52):

So a colleague of yours at Stanford, Tony Barnosky, has written papers showing that the addition of high hydrocarbons to the human economy has boosted the food supply to the extent that today we have 700% more animal biomass on the planet than we did 10,000 years ago. So the composition of that has changed massively. Humans used to be a tiny percentage of that, and now we're 98% of the mammalian biomass is humans and our livestock. So a lot of this is because of the nitrogen, ammonia fertilizers that come from natural gas. Over 50% of the nitrogen in our bodies comes from the Haber-Bosch process. Why don't more people recognize that energy from this carbon pulse is a core driver not only of our affluence and consumption, but also our population? There's a direct link between the amount of food that comes from energy and our population. Why doesn't more people talk about that? And how do you look at your work from the '60s, '70s and '80s reflecting on the energy side of things?

Paul Ehrlich (00:15:06):

Well, Tony's done great stuff there. Also great stuff, he's one of the central figures in showing that we are destroying biodiversity at a rate way, way beyond the normal extinction rate that went on between mass extinction events. He's one of the people who has demonstrated we're in a mass extinction event. But the reason that most people don't understand what's going on is we have a broken educational system. In other words, how many people... I mean, you gave some interesting numbers, 96 or so percent of the mammalian biomass on the planet is us and our cattle and a few other and sheep and so on. But somewhere in the vicinity of a third of the greenhouse gas that we put into the atmosphere that are changing the climate and desperately threatening our agriculture itself come from the food system. So that in fact

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increasing the number of people by increasing the food supply has also increased the chances of destroying the food supply.

(00:16:16):

It's really important that the connections always be kept in mind. I teach at a little university here in Palo Alto, and even there you can get all the way through it without having a clue about how the world really works. We have an economics department like most universities where the economists are daydream believers, they think you can grow forever.

Nate Hagens (00:16:43):

They're energy blind among other things.

Paul Ehrlich (00:16:45):

Well, they're blind in so many dimensions, it's really pathetic.

Nate Hagens (00:16:49):

So on the topic of species, when you wrote *The Population Bomb*, did you remotely anticipate that concurrent with the explosion of the human population, there would be an implosion of populations of other species? Plastic now outweighs all animals on land and in the ocean. Since you wrote the book, we've had a decline in animal fish and bird populations by 50%. You didn't really write about that, you implied it. But looking back, what do you think about that?

Paul Ehrlich (00:17:19):

Well, if I look back at *The Population Bomb*, there are a whole series of things that I would've done differently. On the other hand, if you're a scientist and you would do exactly the same thing 50 years after you wrote something else, then you're in a pretty dead science. And I clearly was not up enough on the extinction crisis. We did not have the data. It wasn't clear. There wasn't really a literature even to look at. It became clear, a number of things became clearer after *The Population Bomb*. Sherry Rowland discovered the ozone depletion issue. Several other scientists, atmospheric scientists, discovered that carbon dioxide wasn't the only greenhouse gas. When I wrote *The Population Bomb*, there was some debate about whether we knew that if you added

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crap to the atmosphere, you were going to change the climate. You knew if you changed the climate, you were going to screw up agriculture. But it wasn't clear what direction the changes would be, whether it would be heating or cooling. And after The Population Bomb, a number of people showed clearly that it was going to be heating, which it has been.

Nate Hagens (00:18:29):

The prediction that you specifically made in The Population Bomb didn't come to pass yet. And yet we had a population implosion in other species, which has been tragic and epic and is ongoing. And I just wondered if you had any thoughts on that.

Paul Ehrlich (00:18:48):

Oh, yeah. We, Anne and I, relatively quickly became more and more aware of that. We wrote a book on extinction a couple decade or so after the one on The Population Bomb, about the same time that Norman Myers wrote his classic book on extinction. I think it's a gigantic problem tightly tied to the climate disruption problem. There are several sides of the same die which we are throwing repeatedly and getting bad, getting snake eyes. But it's an extremely important problem. It's been my pleasure to work with Tony Barnosky on it quite extensively.

Nate Hagens (00:19:35):

Gerardo Ceballos and you and I were in a panel talking about our ghastly future that connects all these species.

Paul Ehrlich (00:19:42):

Yeah, the connections are really critical.

Nate Hagens (00:19:45):

Yeah, so tough question, Paul. In the first edition of The Population Bomb, the first sentence was, "The battle to feed all of humanity is over. In the 1970s, hundreds of millions of people will starve to death in spite of any crash programs embarked upon now. At this late day, nothing could prevent a substantial increase in the world death rate." So with the retrospectroscope, do you ever think that you fell into a trap when

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you made dire short-term predictions or when you made that bet with Julian Simon in the '80s? Did the fact you lost the bet embolden those neoliberal economists that are using their theory to predict what will happen in the physical world were vindicated? Did this high profile conversation with Simon and what happened subsequently derail any serious policy conversation about overpopulation for those decades? What are your thoughts on that?

Paul Ehrlich (00:20:40):

Well, my thoughts are that I've made mistakes in the... Actually you just illustrated one of them because in *The Population Bomb*, I made the mistake of putting in scenarios. I carefully said ahead of them that these are not things that are going to come true. They're just aids to help you think about the future. But of course the press turned them into predictions and they live on today as predictions. But the statement at the very start, which you quoted I think accurately, the first part is obviously true. "The battle to feed all of humanity is over." Right in Palo Alto we have people that are hungry right now. And the estimates vary as how many people are dying annually of hunger related issues. But the numbers for being fed improperly, it's roughly 2 billion is the usual estimate for those that are at least micronutrient, malnourished.

(00:21:43):

We've lost many, many, many millions of people, mostly children, probably have been in the vicinity of 3 to 5 million a year to hunger and hunger related disease ever since *The Population Bomb* was written. But we did not have, and what I missed... I should say I missed because I was reading the wrong agricultural economists, most of whom thought that it would be a very slow change when we shipped the so-called Green Revolution in which high-yield tech technologies from the developed world were transferred to the poor world and the agricultural economists I read, and me too, underestimated the speed with which farmers in poor countries would adopt the new techniques and actually increased the food supply rather dramatically.

Nate Hagens (00:22:40):

Here's how I see all this stuff. You've read my paper about the superorganism. Let me give a little overview here and then you can give me your criticism or further thoughts. Energy is a currency of life. The ratio of energy surplus in nature has an evolutionary

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driver of life. Humans also are part of this process. Our global system has a metabolism much like an animal does. In nature, in biology, there's something called Kleiber's law, which is that the energy use, the metabolism is the animal's size to the three-quarter power. Human economies are also roughly all the global economy, our energy use is around our size to the three-quarter power. So we are a problem solving species. We're a can kicking species.

(00:23:37):

When Thomas Malthus did his arithmetic versus exponential curve and made his predictions, he didn't know about fossil fuels. When you wrote *The Population Bomb*, you didn't know about debt and globalization and maybe some of the Haber-Bosch Green Revolution things. But right now we have outsourced our decisions and planning to the market, which disallows any alternative paths of wisdom or constraint. And so with this backdrop, in my opinion, climate change and population are downstream of the amount of energy surplus humans have and is imperative to grow. In other words, I'm not sure that even if we were to have humane, logical scientific strategies to gradually reduce human population because we're in overshoot, it couldn't happen because of the imperative to grow monetary claims on physical resources, which what our system is based on.

(00:24:44):

So two part question. Can there ever be a reasonable discussion about the benefits of population limits or decline, A, in a democracy, and B, as long as we have GDP as our cultural goal?

Paul Ehrlich (00:24:59):

I would say no. One of the things that when a whole group of scientists, as you know, is discussing the reset, that is after the collapse, if the collapse is not caused by a large scale nuclear war, which of course is always possible and getting actually more likely, what do you do and what do you avoid to try and avoid another big growth of human population, the survivors presumably being able to generate another burst and then another collapse? And of course the survivors are going to have a tough time in any case because the fossil fuel bonanza doesn't seem to have anything that will follow it up so that even if we manage through the collapse to retain the knowledge of how to do high technology, the shortages, the much lower availability of both energy

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and materials will probably stop it. But one of the things you got to avoid is the financialization of Homo sapiens, which is what something that really has taken place big time in the last few hundred years or a thousand or so.

(00:26:24):

Everything is valued as money. And as you have indicated, that leads to a series of conclusions that are wonderful from the point of view of economists who don't have any idea what energy is, what the biosphere is, what human population size means and so on because they have their nice circular diagram, which is energetically impossible, but they don't know it. So I think one of the main things that if we can leave any messages to the people who survive the collapse, it's find other ways of valuing human beings and their time and their activities that aren't measured in terms of a monetary exchange.

Nate Hagens (00:27:13):

Well, I agree with that and I think inherently we know that, that after our basic needs are met, the best things in life are free and that our self-worth really should be our net worth. But there's this downward causation that the market imposes on us as individuals, and we were born into this system. And the market is... I mean, I've worked with leaders around the world and over a couple beers they will agree with many of the things you're saying, but in their public position it's very difficult to say those things. So as long as GDP is our cultural goal, I think we do have this problem.

Paul Ehrlich (00:27:55):

Well, but one of the big problems is we got smart. That's why we picked the low hanging fruit first. But it's almost impossible to imagine a human society at the level of modern Homo sapiens not developing markets so that you have to have some way of poisoning. In other words, markets are sort of automatic. Markets occurred in the hunter-gatherers. There were exchange routes that went hundreds to thousands of miles. People were trading things and so on. So it's one of the natural things about us. We've got to somehow dumb us down.

Nate Hagens (00:28:37):

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Well, in the 19th century, there was an economist Thorstein Veblen, who distinguished human markets between business and industry. And industry is what provides our shoes and our food and our heat. And business was speculation and real estate and things like that, but I agree with you that we have financialized the human experience. And somehow inevitably, and that's why this podcast is called The Great Simplification, our financial system is now an overshoot relative to our biophysical balance sheet. So there is a recalibration coming there.

Paul Ehrlich (00:29:16):

Well, Veblen said something else, he talked about a conspicuous consumption.

Nate Hagens (00:29:21):

Right.

Paul Ehrlich (00:29:21):

And that was basically in my view, the result of millions of years of sexual selection. Males, in all circumstances, want to compete for females. And one of the ways they do it is show how strong, skilled, et cetera, et cetera they are. And after the industrial revolution, you could do it by piling up crap and we're busily at it. It would be better if more people understood that. Maybe that would be one way to start getting rid of the overconsumption that the rich now afflict us with.

Nate Hagens (00:29:56):

Because Teslas and shopping centers are the current equivalent of peacock tails in nature.

Paul Ehrlich (00:30:03):

Exactly.

Nate Hagens (00:30:04):

So getting back to the book, did you have any idea, I can't imagine you did, that the same year your book came out that the human growth rate per year peaked, and has been in 50 year decline? So in 1968 we peaked at 2.1% growth per year, and now we're

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down to 1%. Countries like South Korea are down to 0.8%. What are your thoughts on declining fertility? And at some point, if that continues to decline, everything else being equal, will that create some sort of an economic crash because we need babies to buy diapers and toys and go to school and principals and college education and cars, et cetera?

Paul Ehrlich (00:30:49):

Well, first of all, I think it was pure coincidence that I was the 2 billionth person born on this planet and pure coincidence that the growth rate peaked when *The Population Bomb* was published. My thought is very simple. There's a lot of panic today in various places about declining birth rates, changing age structure in the population. You hear the problem of there going to be too many of old people, which in my view is impossible, I mean. But too many old people to be supported by the working people and so on. Well, first thing you have to know is if the population isn't going to grow forever, the ratio of old people to put to young people is going to change with there being relatively more old people if you slow the population growth and then stop it. It's just mathematics. So the only way you can avoid the problem of a shift towards an older population is to keep the population growing forever, which is impossible.

(00:31:57):

What is needed, we just were talking about our limits and so on. Something I've written about a lot in human natures for example, the human beings have trouble doing long-term planning, and it's because of their evolutionary history. We brought our hunter-gatherer genomes into the Facebook world. The 10,000 years roughly that we have gone from hunting and gathering to agriculture and industry just weren't enough to evolve genetically to be able to deal with it. And in the past, our genetic evolution trained us to keep the background steady while we looked for rapid change in front of it. You're designed to do that.

(00:32:47):

For example, if you whip your head back and forth like this, the room stays still and your head moves. But if you take out your phone, put it on video... I won't do this, but here's the phone. Put it on video and do that. Just move it like you moved your head and then look at the video, and you'll get sick. The reason is that your nervous system evolved to give you things called proprioceptors that tell you where your head is and

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how it's moving. And so it artificially, in a sense, holds the room steady for you. And that's very good because when I do this, if a leopard came into my room, I would see it and I'd react to it. But if I was doing this and a leopard came into the room, I wouldn't be able to see it on the thing. So keeping the background steady is a survival thing that happened through natural selection.

(00:33:43):

Unfortunately, the things that now threaten this are changes in the background and we're designed not to see them, not to react to them. So it takes a lot of effort to realize that the changes in numbers in a machine on a mountain in Hawaii that tells us how much carbon dioxide there is in the atmosphere is much more threatening to your family than any leopard because we've pretty well taken care of the leopards.

Nate Hagens (00:34:09):

The problem is on the macro level, we are in overshoot. And then in the micro level, our brains are incapable of recognizing and responding to overshoot.

Paul Ehrlich (00:34:20):

Well, at least their tendency is to go in the wrong direction. It's interesting. For example, you can see something of our hunter-gatherer past in the phenomenon that I call pseudo kin and some people call fictive kin. That is we can't help getting attached to people with whom we have no genetic relationship, maybe not even another relationship, just if we see them all the time or hear about them all the time. We tend to form attachments.

Nate Hagens (00:34:54):

Because in our ancestral environment, everyone around us was related to us, so we just-

Paul Ehrlich (00:35:00):

Exactly. But otherwise, how do you explain our fascination with soap operas? The fact that millions of people went to Lady Diana's funeral? That people form... Or that when you read a good novel, you feel for the characters. If the hero is killed at the end, you're depressed and so on. So we are, as you have pointed out, animals, and we have

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lots of things that have been built into us by evolution. We have to both learn about them and consider the ones that we ought to change. For example, there's an evolutionary explanation for why men have often tried to and often succeeded in dominating over women. But one of the things that we clearly have to do if we're going to solve anything about the population problem or the world's problems is give women equal rights everywhere, an equal opportunities, even though that may go against our biological background.

Nate Hagens (00:36:02):

So would you agree with the notion that some combination of universal women's rights, universally available contraception, including abortion and a global information awareness campaign that promotes small families and eliminates unwanted pregnancies could reverse population growth?

Paul Ehrlich (00:36:22):

No. What I was going to say is that sure as hell what I would try first. There's no reason to talk about coercive measures and so on when you can do a whole series of things that would not be coercive, that would be beneficial in their own right. I mean, after all, giving women full rights, yes, we know that would change their reproduction, but it also is just from my point of view, a good thing. Women should have full rights.

Nate Hagens (00:36:50):

I mean, there's lots of outstanding projects and efforts in this space that promote women's rights, information, interventions, awareness. Other than the GDP and the market compulsion to grow, what are the barriers to those sorts of things being normalized in our behaviors and how we live as a civilization?

Paul Ehrlich (00:37:09):

No, I think the barriers are a combination of genetic and cultural evolution. Things change relatively slowly. It's not stupid that we have over time become very conservative. After all, the things... First of all, most people think of history I think as going back to the Sargon or the Chinese original empires or Egypt and so on, back say 4,000, 5,000 years. Our real history as modern human beings, that is physically

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modern human beings, goes back 300,000 years. For most of that time, we were a small group animal living in relatively egalitarian groups.

(00:38:00):

There's a lot of debate about, particularly in the mesolithic, how equitable hunter-gatherer groups were, but more equitable than today for sure. And during that time, we learned a lot of lessons and they were stored in our culture. If you look for example at modern people who did not have writing like the Australian Aborigines, they stored their culture in wonderful paintings and their legends and so on. What did they learn? They learn things like where the best fish spawnings were, where during the dry, if it was very dry, where the pools would last. And all that, you want to be conservative about. That's knowledge you want to pass on. Things are not changing all that rapidly.

(00:38:55):

And so we learned to do things and we became conservative at doing them. And then all of a sudden... And again, all of a sudden's 10,000 years maybe, but all of a sudden we accelerated everything. You got to keep remembering that 10,000 years isn't a lot of 300,000. And that, in fact, if you consider human beings going back to tool modifying primates, we go back millions of years. So the people just have to come to realize how abnormal our lives are now. Human lives today are just abnormal.

Nate Hagens (00:39:35):

We're living an anomaly.

Paul Ehrlich (00:39:36):

Right, exactly.

Nate Hagens (00:39:39):

The other thing that I learned teaching my students, we have a problem understanding words that end in illions. Millions, billions, trillions are all just huge numbers. I mean, our hunter-gatherer ancestors knew 1, 2, 3, and many. So when you talk about The Population Bomb, it's amazing to me how many young people don't have any idea how many people are on the planet or in the United States. And this gets back to your point about education.

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Paul Ehrlich (00:40:07):

Yeah. And also if you were an Australopithecus, what use did you have for the number a trillion?

Nate Hagens (00:40:14):

Right. So I have a lot of disparate questions that I'm still curious about your opinions on. Why do you think that ecology got squeezed out of the environmental movement? And is ecology possibly making a renaissance? Any thoughts on that?

Paul Ehrlich (00:40:33):

Well, I guess my problem is I don't separate the two of them. Ecology-

Nate Hagens (00:40:37):

You don't and I don't, but the environmental movement today is kind of merged with the corporate greenwashing in a lot of ways.

Paul Ehrlich (00:40:46):

Yeah, it's sad because of course I think ecologists don't spend enough time with marketing and financial things and so on, because after all, ecology is the science that looks at the relationship between organisms and their environment basically and their environments. Debt is a big part of my environment. I wish I understood it better. I know you understand it better than I do. But the point is that ecologists have not paid enough attention to the social science side. And God knows the social science side, particularly the economists, have not paid enough attention to ecology. And the environment is still treated now in my view, too much like the economy, the occupation, the rates of joblessness and so on and so forth.

(00:41:45):

One more issue to be discussed politically low on the totem pole, the idea that human beings are animals, that they are part of biodiversity, that they are utterly dependent on the ecological systems of the planet for the very existence and so on are just not clear. So the fact that ecology has moved out of the picture as such is just a shame. It's, again, partly a problem of ecologists themselves, but it's also a problem of a university system that is of... I'm at a university that is firmly stuck in the 19th century.

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In other words, distribution of teaching is over a set of departments that could have been invented by Aristotle. There isn't a single department at Stanford that could solve any one of the big human problems that we're now facing.

Nate Hagens (00:42:54):

And why is that? Because the funding comes from-

Paul Ehrlich (00:42:56):

Funding comes from government and business. Government and business is run by the people trained at places like Stanford. Places like Stanford don't tell people, all people that you can find out. Stanford's got brilliant faculty in many departments and so on, but there is no requirement that a student who goes through even to a PhD, for example, ever learned what the second law of thermodynamics says, I mean, to go into your area. I would imagine that 95% of the faculty and students at Stanford couldn't give you a coherent description of the second law.

Nate Hagens (00:43:35):

How could that change? How could the education system change? Are universities miniature superorganisms that are first and foremost concerned with their own existence and growth. But ecology and telling the truth on these things, there's no profit in that. So is there an inherent contradiction?

Paul Ehrlich (00:43:58):

Yeah, that's part of it. I mean, Stanford still has the thing called the Hoover Institution, which has people on it that posted on their website nonsense about how to deal with the pandemic actually killing people off. But actually, I had a discussion with Dick Lyman who was president of Stanford. I've been through about seven or eight presidents, all of whom with one single exception were I thought good people trying to do good things and so on, but they're constrained. I said, "We should shut the university down for a year, keep the students here and the students and faculty should get together and try and design a university for the 21st century." And Dick liked the idea, but he said it'll never fly because the trustees feel that they're bound fiscally to keep the flow of money in. Stanford's an expensive place to run, and the issue of

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funding overwhelms virtually everything else. If you can't get funding, you can't do it basically.

(00:45:06):

The last big discussion of funding issues actually goes back to the time of Fred Terman at Stanford in the '50s when the issue came up of whether or not the university should get money from the government, particularly because at the time the Cold War was starting and they wanted universities to become mechanisms for helping fight the Cold War as they had become mechanisms for fighting the Second World War. It was a big topic for a while.

Nate Hagens (00:45:38):

Getting back to your topic, why do you think so many people in the environmental movement appear back then and today apprehensive about promoting attention to human population as an issue? What's the core reason?

Paul Ehrlich (00:45:53):

I think it's because they live in racist societies. And if they're really smart, they understand that racism is nonsensical, that the very idea of distinct races is nonsensical. And so they are nervous that saying something about population will get them accused or that they will actually be helping out racism. And it's not a ridiculous fear. If you look at some of the people in our Congress today, it's really scary. I'm worried that the right wing in the United States may begin to deal with the population issue in a way, which I think will be very bad.

Nate Hagens (00:46:38):

Well, let's expand on that. I share that worry. Tucker Carlson on Fox News just had a program this week surprisingly using population as a wedge issue. He used a lot of talking points, Paul, about our unsustainable trajectory that we would normally hear from the left. And in some ways, this is exactly I think what the left feared and why they made these population discussions taboo. But putting their heads in the sand and letting the right use this issue is pretty dangerous because without a system science showing how this all fits together, it could lead to fear, divide people further, and war. So my question to you given that is, given how people are converging around the core

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drivers of our dilemma and ignoring the past communication on the population issue, given your 60 years of working on this issue, how might you try to frame discussions about population today?

Paul Ehrlich (00:47:42):

The population issue is, at least in the medium term, desperate. The racism issue is even today desperate. You're not going to manage to get the huge changes that you and I think are necessary to have a sustainable civilization done with the thing wrapped by racism, sexism, and so on. People have got to learn to value each other much, much better than they do today. Again, not doing it traces back to our evolutionary history, and that's what we've got to change. So my view is discuss population. But when you discuss population, make it very clear that the idea that it's a problem of poor people or people of a different color from you and so on is just nonsensical.

(00:48:36):

For example, when the tough issues of immigration come up and they're going to be much, much tougher as the world moves down its current trajectory, people have often said to me, "Shouldn't we stop immigration in order to keep the United States at a more reasonable and more sustainable population?" And my answer is, "It's a complex issue, but if it were my choice, I would lower our birth rate further so we can be humane in helping people in desperate situations to move into the United States." And that's not a very popular issue, but there's a major issue that just isn't discussed at all: are borders ethical? The resources of the planet are distributed very randomly. The joke line is, how did our oil get under their sand? We really do need to get together as a species, as a civilization and solve a lot of the problems that our forefathers, our founding fathers actually tackled in a slightly different context. How do you take 13 disparate colonies and solve their problems without destroying their individuality?

(00:49:54):

Now we have close to 200 countries with the same issue. You can't solve the climate dilemma in one country. You can't solve the feeding humanity dilemma in one country. And yet we are trying to do it as nation states. The time has really come to get rid of that, but I don't see any way to do it. So I wish I could be optimistic, but I have trouble being optimistic.

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Nate Hagens (00:50:20):

I mean, the way it could happen is if we were being invaded by an armada of outer space aliens, then we would voluntarily adhere to curfews and sacrifice and it would be our tribe, humans. All right, so getting back to the immigration. So rich countries rely on immigration to boost their population because we need workers, consumers adding to economic growth. So if the world's main problem is ecological overshoot caused by an excess of high consuming people, doesn't anything that encourages or enables more people to move from low consumption societies to high consumption societies make matters worse?

Paul Ehrlich (00:51:03):

Yes, indeed, it does make matters worse. And so what's the obvious solution to that part of the problem? It's what got John Holder and me in a lot of trouble. And John delayed in his appointment as Obama's science advisor, that is redistribution. We wrote about de-development of taking the rich countries and changing their behavior and making it easier not keep looting the poor countries, which was our style for a very long time and still to a large degree is. But redistribution is like abortion, one of the things that is a hot button issue.

Nate Hagens (00:51:46):

All right. So building on that, much of the misery and starvation in the Niger Delta is caused by having the highest birth rate in the world in Central Africa, which clearly reduces this slice of the pie of resources per person. But reporters today never mention this connection because it's not politically correct. Why is it taboo to mention the link between poverty and population?

Paul Ehrlich (00:52:15):

Again, I think it's based in fear of racism, but just a thing that has become sort of standard in our society. First of all, a lot of religions think that they need more people to compete with other religions. And this is so that anybody who says there's too many people is hurting their religion, hurting their group, hurting their nation. It's been a puzzle to me for so long, I can't give you a good answer. For instance, people who talk about how valuable it is to have huge populations so you can fight wars don't seem to

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understand why Israel is able to hold off all its Arab neighbors despite the fact that it's outnumbered, I don't know, depending on what numbers you pick, but it's outnumbered many, many times. And numbers do not represent strength, but many people think it does. This partly, again, goes back to the broken education system.

(00:53:24):

Similarly, at Stanford, you would not learn the issue does not come up as far as I know in our curricula is: What is standard behavior for human beings? Every freshman ought to have that question. How did we behave for our 300,000 year history or our 2 million year history? Why do we have wars? Why do we have sexism, et cetera, et cetera? Those are all big issues, but it isn't, as far as I know, when I may be behind this eight-ball there, taught to every freshman in the university.

Nate Hagens (00:54:04):

Well, I'm creating a course, Reality 101, that's going to be my attempt at giving a snapshot of the things that every 19 year old needs to know about our world. It'll be out later this year.

(00:54:16):

So another thing I'm working on, Paul, I think I've talked to you before about this, is I'm working on a project with politicians, mostly former politicians in Washington, DC called Advance Policy, which is looking two or three steps ahead at the macro interventions that our society's going to need in the coming decade, but that are currently socially and politically unacceptable. And it's based on the logic that truth and science rank way lower in the human brainstem than status, public standing, and identity, which you've brought up several times in this call.

(00:54:48):

So what are your thoughts about the battle between truth and status, especially given what happened with The Population Bomb? And what if we were to have a conference of the world's best interdisciplinary scientist and nothing they said or did could be attributed to them, but that they could say things without fear of retribution? How different would what they talk about in their prescriptions for our situation be than what we hear now? In other words, if we remove the threat of losing your status and

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funding and resources and being able to say the truth, how different would that conversation be? And have you thought about this?

Paul Ehrlich (00:55:28):

I hadn't thought about that specifically, although I think it'd be a wonderful experiment. I certainly have a mini experiment of that in the sense that there's a gang of us that have been working together for a very long time. And interestingly, the trend there has been to be much more frank. The first paper that came out on the ghastly future is now hopefully going to be followed up by another one on the ghastly future. There is certainly, among my colleagues, a strong feeling that we've got to get out there and tell the truth. The unhappy background truth is that we were a small group animal for most of our history. Fitting in has become much more important to us than doing what's absolutely right. In other words, rather than being optimal foragers, we forage so that we don't piss off other foragers in our group.

Nate Hagens (00:56:36):

That's well said.

Paul Ehrlich (00:56:38):

So we've got to get people to understand that, that their urge is to be with the group and to not offend others. And that has been very important and still is in our... After all, as Ed Wilson and others have emphasized cooperation, ultra-sociality is the key to human dominance of Earth. Dominance of Earth may or may not be a good thing. We don't quite know yet, for sure. I'm beginning to think probably not. But the fact that we are social in many more ways than other social mammals, we're more like the bees and the termites in that respect. People have got to understand that. And you've got to counter some of the things that it makes us... There's a whole issue of how we interpret things and so on. Psychologists like Kahneman, Tversky, and so on look that at and made very famous. We've got to face the things that our evolutionary history has given us and then design education, not necessarily education systems, education for kids in the family and so on, that emphasize...

(00:57:55):

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For example, I'll give you just one example and then stop raving. I often hear about self-made millionaires. Henry Ford was a self-made millionaire. That's just bullshit. No millionaire has ever been self-made. Henry Ford couldn't have even begun if people hadn't invented machine tools, if people hadn't developed the fossil fuel system, if people didn't still build roads and so on, if they hadn't put together an education system...The American education system was explicitly built to make sure that there were workers who could do arithmetic to work in the new modern world of industrialization. If the education system hadn't gone into place, Henry Ford couldn't have gotten his cars built. So the idea that any person is self-made and does not have to cooperate to achieve things, yeah, there may be the occasional ape man living out in Idaho, but the Henry Fords and the people who brag about being self-made are just showing they're idiots down deep.

Nate Hagens (00:59:10):

Well, two things there. First of all, people don't realize that in the last 20 years, the last 50 years, the last 100 years since the dawn of time, the United States has used more hydrocarbons as a boost to our labor force than any other country on earth. And secondly, Garrett Hardin used to say, we are numerate, we are literate, but we're rarely ecolate, which is ecologically literate, which gets back to your point again about the education system.

(00:59:36):

So a few more questions. Of course, I've saved some of the hardest ones to last. What do you believe is a sustainable human population at a reasonably comfortable lifestyle, eating decently every day, available clean water, shelter, airable land? And in addition to your answer, what is the current broadly accepted scientific range for that answer?

Paul Ehrlich (00:59:58):

My answer would be somewhere around one to one and a half billion people, but that's because I think you might be able to do three. That's the best estimate that the best economist in the world, Partha Dasgupta, came up with recently, three or three and a half. But I would like to have some room for error. In other words, if you're at one and a half, you would have enough people so that you could have big cities and

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opera and high technology and so on, but also enough wilderness that people could live if they wanted to, a very different kind of life in a small town or isolated. What I generally say when asked that question is nobody knows because of course that that answer is based on pretty much like the technologies we have today.

Nate Hagens (01:00:52):

Well, and the huge bolus of fossil carbon that we are treating as interest, but it's really a bank account we're drawing down.

Paul Ehrlich (01:01:00):

Right. So what I say is, in my mind, there's not the slightest question that 8 billion is too many. So what we should be thinking about is ways of humanely reducing that number, and that's going to take a long time. And during that time, a major topic of conversation ought to be, "How are we doing? Where should we stop? What is the size population we want? Under what circumstances?"

Nate Hagens (01:01:26):

How can we avoid gigafamine this century? What are some humane, even if unlikely, recommendations for gradually reducing the population, assuming away the imperative to grow? I mean, my prediction is, barring a nuclear war, we're going to have 9 billion and maybe 10 billion people in the next 20 or 30 years, but we're going to be a lot poorer. But like you said, there's a lot of different possibilities under that curve. But what are some humane recommendations? You've devoted your entire life to this issue. Do you have any suggestions?

Paul Ehrlich (01:02:01):

Well, you really gave the humane recommendations already, make women fully equal to men in every respect, opportunities, honor, whatever. Therefore, have a general worldwide discussion of why it's good to stop at one, and the importance of considering the world the children are going to live in, not just the number of children you have. What kind of future do you want the child to have? Why are you having a child? Access to modern contraception and backup abortion for everybody who's sexually active. Those are humane things we could do that would, I think, for sure

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start... And you can add other things in like putting high taxes on baby goods and so on, making it very expensive to have children. But the problem is there, you got to be certain that you don't hurt the children in the process of doing that. So lots of things we could do, none of which I think we will do, and that is the bind.

Nate Hagens (01:03:09):

Yeah, I hear you on that. I actually think just like all the other issues in society, we're going to have increasing polarization on this issue where one camp is going to increase, which is our camp that recognizes the ecology and we're an overshoot. We need to reduce consumption and/or population. But then there's going to be a polar opposite camp that champions more babies to add to the labor force and economic demand. I don't know if that there's a middle ground. I read your book 30 years ago. And it wasn't just your book, Paul. I read and learned a ton of things, and I chose not to have children, and instead I have dogs. So I'm happy about that and my cultural children are my students. But I was a little, I don't know, upset isn't the right word, but the Pope last week said that it's selfish to adopt a pet instead of having a child, but at least there's a papal recognition of the physical needs of the environment and the future.

Paul Ehrlich (01:04:11):

Yeah. He, at least obviously, is more relaxed on abortion and issues like that. So vast improvement over past people in his position. And he's gutty because I'm afraid he'll be killed. The very conservative branches of the church hate him, and it's a sad situation. One thing we know we can change rapidly and effectively if we have the right incentive, and that's consumption. We can't rapidly change the population size humanely, but we can rapidly change consumption humanely as we, the French, the British, and so on, Japanese, all learned at the time of the Second World War. Remember December 7th, '41, we had produced almost 4 million passenger cars in the United States that year. The next few years we produced tanks and trucks and airplanes and bombs and bombers, and we rationed fuel, we rationed meat and so on. We changed consumption very dramatically when we had the incentive. So one issue is how do you find the incentives?

Nate Hagens (01:05:24):

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And the answer to that, I think, is ultimately changing the prices because we've underpaid for the main input to our economies for a century, and that has given us perverse behavior and incentives. So if we did have higher prices on non-renewable inputs and subsidized humans, I think that might be one angle. But let me ask a hard question there. Why do most first world environmentalists and even ecologists, and I include you and me in this and most of our peers, not live one earth lifestyles consistent with what we believe is going to be necessary in the future, in effect, 50 to 80% less energy and material consumption to be sustainable?

Paul Ehrlich (01:06:10):

I wish I knew the answer, except we're all creatures of our culture. And you do what you can. You have dogs. I have one child, but I certainly live a style that uses probably 10 times more energy than I would have to live a reasonable life. But one of the problems is that it's not easy to lead a reasonable life, particularly when you're older. In other words, if you're young and you're a survivalist and you have a place where you can go out and hide out, in some sense, maybe you can lead a more reasonable life. But actually, if you think about all the things that need to be done to give somebody reasonable healthcare, reasonable shelter, reasonable diet, and so on, it's a social thing. It's almost impossible to do individually.

Nate Hagens (01:07:01):

No, I agree. Well, the United States has four and half percent of the world's population, and we have 50% of the world's medical prescriptions. So either we're sicker or we're babies, or our doctors are over-prescribing or some combination of the three. But my view in the future is we're going to have get 80% of the medical benefits with 20 or 30% of the resources, and a lot of that's going to have to be preventative.

Paul Ehrlich (01:07:26):

It can be done. We have a miserable medical system, and the doctors are suffering, but they're not in control. So again, it's an issue of governance. And I'd like to go back to the good old days when Tim Wirth and Jack Heinz, a Republican and a Democrat, were working hard together on environmental issues, and now that's all gone. We need

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to have a constitutional convention to design a constitution for a democracy in this century.

Nate Hagens (01:08:01):

Yeah, I mean, you tried to do that in the '70s, didn't you?

Paul Ehrlich (01:08:05):

I was in a group with one of Franklin Roosevelt's Brain Trusters, Rex Tugwell, discussing a constitution for this century. We saw that so many changes would have to be made that you had to have a convention. You couldn't do it just with a series of amendments. And then we realized that if you had a convention, it would go only to the hot button issues, women's rights, race, abortion and so on. And it's even worse today, so we were stuck. Other countries have designed and gotten new constitutions. We could do it, but it might bring on the Civil War so many people are talking about now.

Nate Hagens (01:08:47):

Well, I mean it's not only education, it's not only understanding our predicament, but it's caring and having a wider boundary empathy. So more broadly, could you talk about the importance of fostering some sort of common ground ethic, not only among all humans with each other, but between all humans and other forms of life? Is that possible? Or is the environmental ethic that you and I feel and work on, is that just a product of the carbon pulse that only in a rich society could people be this and environmentally focused, but how do we have this akin to a new religion where we look at the 10 million other species we share this planet with as sacred and we will miss them when they're gone? Is that possible in your experience?

Paul Ehrlich (01:09:40):

I don't know if it's possible in my experience, but it's possible in what we know about our full history. That is, we know that, for example, the indigenous people of North America who were not industrialized, looked at the Europeans who were invading and made ethical decisions and discussed them as ethically they couldn't understand how Frenchmen, for example, were so busy, first of all, obeying other people and working

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like hell all day long and so on. We know that there have been other cultures where the rentier capitalism didn't occur, where people were proud of their autonomy. They considered the Europeans with their captains and their kings and so on who had to be obeyed to be disgusting. And of course they got wiped out largely because the Europeans had microorganisms as allies.

(01:10:48):

But there's enough known to know that other big cultures with fairly large populations, in other words, there were a lot of people in the Western Hemisphere when it was invaded by the Europeans. And they managed in societies where there was at least less hierarchy, less obedience, more autonomy. And there were certainly, and lots of records of this from missionaries, who were appalled by the fact that Native Americans, North Americans were critical of the European lifestyle and social system. So it's possible, but I'm not holding my breath.

Nate Hagens (01:11:32):

Yeah. Personally, I think it's absolutely possible, which is why I do this work. I'm just hopeful that something like that, the seeds are planted before some sort of a economic recalibration rather than in response to it. Because I would like such a response to scale and be a movement.

(01:11:52):

So two final questions, Paul. I'm over 30 years younger than you and I personally find it difficult to spend full-time learning about this ominous stuff that you and I discuss and all the aspects of ecological overshoot and the risk we face in the future. How have you remained so energetic, healthy, and graceful in a full lifetime of work and research on these tough issues?

Paul Ehrlich (01:12:18):

Well, first of all, I would say I don't waste time in the sense that I'm not a workaholic. For example, I, never when I was in college, ditched a date or a dinner party in order to study. And as an adult, I may have worked 15 hours a day a lot of the time because I enjoyed it, I picked the work that I loved. But the main thing is do something you love and leave plenty of time for yourself and avoid wasted time.

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(01:12:52):

You see that I'm wearing earphones. I wear earphones when I walk for an hour every day and I listened to a great novel or really interesting book on the situation when I found that I could... It's one of the technologies I love. When I go to the doctors, it's amazing. But sometimes they don't take you exactly when your appointment is and you have to sit there for 15 or 20 minutes. And it used to be I'd get enraged at the wasted time until I learned to take a book or papers with me. And now I always have my cell phone and listen to a book. So don't waste time. Do something you love and have a wonderful sex life.

Nate Hagens (01:13:34):

On top of that, is there any wisdom from your almost 90 years on this blue-green planet that you could share with younger listeners, especially college age students who want to learn live good lives, but they want to play a role in these meta challenges facing our culture, facing our species? Any advice?

Paul Ehrlich (01:13:56):

Yeah. My advice is get involved as soon as you know what you want to do. One of my proudest accomplishments was when John Holdren, who many of you don't know, but he ended up as Obama's science advisor and one of the great distinguished scientists. But when he was a graduate student, he asked me whether or not he should get involved in political things and I said yes. And he did and had a brilliant career at it.

(01:14:24):

So when you see things you don't like in the world, don't wait until you're elderly or a full professor or something to do something. And us old fogies are at least working hard, trying to make that a very good career path. I think it's worked to some degree already. That is when people are looking for new faculty members and so on, the issue of how you treat minorities and are you going to try and deal with the problems of society are part of the criteria by which you're likely or not likely to be hired. And that was is very different from when I went. So after all, we have to have good young people in science, otherwise people like me don't have anybody to steal ideas from.

Nate Hagens (01:15:14):

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I think ecologists generally will never see the fruits of their efforts in their lifetimes because we are planting seeds. My father read your book, *The Population Bomb*. I don't think we'll ever know the cultural awareness and maybe subtle changes that might happen 10, 20, 50 years from now based on the knowledge of young people today. So on behalf of all those people, I thank you for your life of work on raising awareness to our cultural problems, especially population overshoot, biodiversity, et cetera. And thank you so much for your time, Paul.

Paul Ehrlich (01:15:56):

My great pleasure, Nate. Keep at it.

Nate Hagens (01:15:58):

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