

Policy 360 podcast - Episode 95 – Transcript – The Unseen Health Effects of Forest Fires

Judith Kelley: Forests hold a special place in human life. I think we imagine things about forests, they're part of our fairytales and our stories about once up a time. The light filters through the tree tops. Places are respite for us, and places, also, that produce things for us. We have a really special relationship, as human beings, with forest.

Judith Kelley: It's kind of scary when you think now about how, overall, the amount of land that's covered by forest has shrunk so much, and now we're having a hard time, sometimes, holding on to some of the forest we do have. Whether it's in California, we got fires, or in the Arctic. Or now in the Amazon, about 80,000 fires have been registered, which is a big jump from the previous year, of 80%, and they're so widespread that you can see the smoke, even, from space.

Judith Kelley: So, welcome to Policy 360. I'm Judith Kelley. I'm Dean of the School of Public Policy. Today we're going to discuss some new research, research that shows that forest fires are actually more harmful than we've previously thought, because it's not just about the impact they may have on the environment or on the economy, but also on human health.

Judith Kelley: Subhrendu Pattanayak is a long-time faculty member here at the Sanford School. He specializes in environment and energy, global health, and economics. Welcome to Policy 360.

S. Pattanayak: Thank you, Judith.

Judith Kelley: So, Subhrendu, what went through your mind when you first saw the size of the Amazon fires?

S. Pattanayak: Yeah, that was a pretty deeply disturbing moment. I do a lot of research with my wife, who's a professor at NC State, and she has been a Amazon person since her undergrad days at Princeton. So I've actually gone to Brazil often to do some work with her, and flying over from, say, Miami towards Manaus, you see these vast swathes of forest. You would think, "There is so much forest, what are all these crazy environmentalists talking about? This is never going to go away." But those were also the glory days of slightly-liberal governments and left-leaning institutions, and there was much more protection of these forests.

S. Pattanayak: Not just since the recent election but in the last several years, things have reversed in Brazil, and it's one of the countries that is actually registering a pretty rapid loss of forest. That's a source of sorrow because we didn't just go do research in Brazil, we spent time in there, we saw sloths, anteaters, jaguars, and butterflies. But forests are more than just the species, forests do a lot for the functioning of the planet, and that is actually what I've studied all my life.

S. Pattanayak: All my life I've been studying how that forest contributes to things like health, which you alluded to, but which effectively turns into an economic benefit or a gain, and that's where I tried to quantify how much that is. So, seeing those forests disappear at such a pace was frustrating because there is such good research, even policy work, that shows that this could be avoided. But it's also a source of hope that we have, in the last 20-25 years, amassed information. Perhaps not made it as policy-relevant as we can, but that's the job of the Sanford School of Public Policy, to turn that knowledge into practice. So, I am hopeful that we will learn from this and be able to reverse what we are witnessing on the ground.

Judith Kelley: Can you help me put in perspective the size of these fires relative to some of the fires we're familiar with in the US? When we had the Camp Fire last year, that was painted as a huge fire in California. Is what's going on in the Amazon on the same scale or is it much, much larger?

S. Pattanayak: It's much larger. There are three or four forest hotspots around the world. Indonesia would be one of them.

Judith Kelley: And we'll return to Indonesia in a second.

S. Pattanayak: Yes. The Congo Basin, or, say, in the heart of Africa, would be another one. Brazil is... that same visual image that I had flying from Miami and seeing forests for one hour, two hours, three hours. There's a lot forest in Brazil, but it's also going really quickly. Of course, people are more familiar with things in California, partly because human wellbeing is directly affected because properties are at the edge of it, whereas when something burns deep in the Amazon, most of the time you wouldn't have noticed except nowadays we have satellite technology, Landsat images, and things that we can see from the sky, which let us see this.

Judith Kelley: There was actually a period when some of the smog was so heavy in the capital that-

S. Pattanayak: That's right, and it's precisely because of that smoke that this is actually getting attention. If there had been no blanketing of the city and the people's lives, you would have probably missed this. The scientists would have complained, it would have become a technical argument between one expert and the other expert, but it's when people can't breathe, and they can't see out of their skyscraper and they can't see the next building, that's when they start agitating.

Judith Kelley: They wake up, yeah.

Judith Kelley: So, you mentioned Indonesia. There were some big fires in Indonesia in the late 1990s. Can you describe those fires for us? Is that the same type of forest? Is it jungly, is it pine forest, how big is it? What happened there?

- S. Pattanayak: Yes, it's true that these are all tropical forest, but Brazilian forests are quite different from Indonesian forests, and I think an ecologist would murder me if I just said, ..., "These are just some kind of tropical forest." They're all quite distinct, and it's true these are very different ecosystems and the species that they have.
- S. Pattanayak: That said, it's not just that Brazil's forests are burning this year. It's not, probably, the worst fire in Brazil. There are other parts of the world that are also seeing fires. In the ones, Indonesia, occasionally, are much more driven by the crazy combination of climate and people, gets these very, very high-intense fires. Because of climate change, there are El Nino, La Nina, these are terms you might be aware of. When the condition gets very dry, the traditional practice of actually burning the land, because it's a cheap way to clear the land and then plant your crops, becomes a much more deadlier process because the forest doesn't act as a buffer. It's not damp, it's not wet. You can just think, if you have a campfire and you want to douse it before you go to sleep, you pour a bunch of water on it. That's the same thing that would happen in a normal year, but in a drought year there is nothing stopping it. There is no wet blanket there, and it takes off. Then it's a tinder keg and it goes.
- S. Pattanayak: Indonesia has had three or four episodes of this, and the one that I studied the most is the one in 1997 where many people have claimed that 30% of all the global emissions from carbon dioxide actually came out of that one fire.
- Judith Kelley: Wow, that's huge.
- S. Pattanayak: So it's a third of the world's emissions that was coming out from that one fire.
- Judith Kelley: Was that also by a effort to clear land? Was that how it got started?
- S. Pattanayak: Yes. Both sets of fires, the one this year in Brazil, in 2019, as well as the ones that I have studied in 1997 in Indonesia, were agricultural fires mostly set to clear the land to grow crops and to sustain the economy that then spilled over into the forest. Before you know, in a couple of months, you've had a global crisis because it's a lot of smoke. Where there's fire, there's always smoke.
- Judith Kelley: You set out to look at the effect on unborn children in particular. Why unborn children, why not born children, why not population health in general?
- S. Pattanayak: When there's a fire, people say, "Okay. I can see there's some economic activity that is restricted. Tourism goes down, people can't breathe for a few days, and then we come back to normal." So, I think there is actually quite a bit of evidence that when there is a lot of smoke, and intense smoke, that there are some effects on people's health. That's documented. What I was trying to show is beyond the obvious, what you can see with your naked eye. There are also hidden effects, and those are pretty profound, that we don't take into account.

S. Pattanayak: The person who's burning the land is thinking that there is a low cost of this activity, but they're disconnected from where that activity is going to impact; the communities around where the fire is burning, that there are people living there, but also when it is going to impact. When there's a lot of smoke, and there is a baby in the womb, that smoke is actually not going to respect human skin; it's going to go all the way through and affect that baby. So, there's this offsetting cost that neither the farmer nor the government, nor the policymaker, nor the international community, is thinking about. Are these big or small? We wanted to see whether that's... because there's some evidence that these could be profound, so we will then study that.

Judith Kelley: So, what did you find, and how did you go about that? That must have been a long time before you could really sort that out.

S. Pattanayak: I had the benefit of an outstanding PhD student in our program, Jie-Sheng Tan-Soo, who is now a faculty member of the National University of Singapore. It has helped that we can do some more historical analysis. Here we are sitting in my office in 2013, 2014, thinking about these offsetting effects. We can go backwards in time, because of the satellite images, and construct, effectively, how much smoke was there in a region. In the meanwhile, there are these longitudinal surveys that are done, so our job was mainly to link the exposure levels in 1997 with the conditions of the families, that is the mothers and the kids, on the ground. Longitudinal surveys meant that these people were surveyed in 2001, 2005, 2010, 2014, ... We have their 17-year timestamp.

S. Pattanayak: Compared to regions which did not have the smoke, the regions, or, I would say, the islands and the districts that had the smoke, the kids were shorter. There's some statistical number where it's 3.5%. The reason to pick height is that it's a good proxy for human potential. It's a fact of life taller people earn more money. There's been countless studies that have shown that. So, we can show that the fire imposed human costs in the terms of wages lost, incomes lost, in the future, and these were substantial. These were almost as bad as one third of the actual deaths that were associated with the fire. People have imputed that some kids were kids, but our point was that even those who survived paid a cost, except we never pick that up, and it was a pretty high cost.

Judith Kelley: You didn't find, though, per se, that they were unhealthier? You just found they were shorter.

S. Pattanayak: Right. Irreversible human capital cost, in that there is no way to take supplemental pills or something to become taller. They could do nothing to do that. They never caught up with their cohort that turned out to be higher, taller kids. This is true.

Judith Kelley: Right. But you also have to wonder, why are they shorter? Clearly there was an interaction between the smoke and their development.

- S. Pattanayak: Correct.
- Judith Kelley: So, maybe it's even too soon for us to know whether height is the only thing that truly was impacted. If something is strong enough to impact how tall you get, from how tall you were supposed to have gotten, it seems like that's a pretty meaningful physical interaction between the smoke and-
- S. Pattanayak: I absolutely can see it. As I was saying that height is a proxy for a bunch of things, and there are people in the biomedical field who will look at the fetal development, growth activities. As a policy scholar, my goal wasn't to push the frontiers there, but instead to point out that this was a bad choice for Indonesia, whether that's policymakers sitting in governments, or regional governors, or community leaders, because they were pursuing short-term gains. They wanted a quick way to clear the land so they could get crops, but they were effectively imposing costs, on their own citizens that they didn't realize. That's where my research is. There's plenty of work in the biomedical field that shows that smoke is correlated with development. Not a lot of that is done in a country like Indonesia which experiences a lot of this, so of course there is some benefit of doing this work, but really I'm interested in, how bad is that cost and is there a way to avoid it in an effective way?
- Judith Kelley: You mentioned earlier that the whole reason these start is because some farmer is trying to have a livelihood. So, a society looking, as you say in this case, to short-term gains, but clearly there are some gains to society and to the farmers for having a livelihood. How should we think about that trade-off? I think that's something you looked at, as well. Can you share a little bit about that?
- S. Pattanayak: Yeah. Our study didn't stop by proving that smoke is a bad thing because it affects kids and they're short. We wanted to move on to the solution set. As you say, farmers are bearing some of the costs, and these costs actually turn out to be smaller compared to the gains to society. It was a weighing of the pros and cons. If you put more effort into fighting those fires, you're still saving money relative to losing the foregone income and wages. If you put more money into monitoring the fires and penalizing those who are setting them, you still come out ahead instead of losing these future earnings and future unborn children, et cetera.
- S. Pattanayak: What we further do in that project is... Say the rights to clean air is actually with the farmer. What we show is that the rest of the world, or the Indonesian government, whoever wants to do something about this, could actually pay the farmers to still grow their crops but not use the fires. It's going to be more expensive, fire is a cheap technology, manually clearing the land is an expensive way to do it, so they bear extra costs but they avoid these huge costs to society later on, in terms of human capital.
- S. Pattanayak: So it might be in our interest to actually pay them to avoid these costs and, in fact, to date there are lots of green bonds that are being floated. Singapore,

which is a country that also is harmed when Indonesian forests are on fire. Malaysia, and some of the neighboring... Global pollutants don't respect national boundaries, they just cross wherever, so it's in the interest of not just other Indonesians but countries in the region to come up with a program, a green bond, in the sense of, "Don't do this, and we will compensate you because you are now doing a more expensive thing."

S. Pattanayak: There are some lessons from that whole activity for Brazil, what we started our story with, absolutely.

Judith Kelley: I was listening to somebody else the other day who is in the logging industry, and who was explaining how he actually feels pretty good about what he does when he goes into the Amazon and fells some trees, because that type of management is much better than the burns. But, ultimately, from a conservation perspective and global warming, climate change perspective, we also want to preserve the trees, themselves, ideally. Don't we want to have the canopy there to absorb the carbon dioxide? If we're paying farmers to cut trees down, even though that's better than burning them, is there a mixed message here? Is there a way around this?

S. Pattanayak: You're absolutely right. I think the health and smoke angle is one piece of what the forest do. I started out with my story of flying over these millions of hectares of forest. There are biodiversity benefits. I didn't talk about, in the Indonesian case, the orangutan habitat and all these special creatures. In the Amazon fires, for example, yeah, the jaguars and pumas are fast and they can get away, but the sloths and the anteaters cannot get away, and human society puts a value on that. There may be some loss associated with not felling the tree, but it's... I thought we were mostly focusing on the smoke in the fires, so, compare to that, actually toppling a tree carefully is a better way than doing it.

S. Pattanayak: But there may be another argument that toppling the tree at all may be a bad thing to do because it's the habitat for species and we value them so much more. I think it comes down to the point that, ultimately... it's a little bit of a global political economy argument. It's easy for western powers and us global leaders to be say, "Hey, you, Brazil. What are you doing? Why are you burning your lands?"

Judith Kelley: Sure. "Wouldn't you like \$20 million to take care of your problem?" As, in the G7, Macron suggested.

S. Pattanayak: Exactly, but that's a more... the naïve about the whole thing. Instead, if you think of this as one common world and this is Brazil's Amazon forest or Indonesia's forest are global assets, yes, their local people have sovereignty on them, but they are doing us a favor by keeping them intact and providing these services like taking the carbon out of the air, preserving the sloth, keeping those orangutans there, keeping the hippo, the Sumatran tiger, and every one of those things, the megafauna, those are the ones we know. Therefore, we should be thinking of some ways to offset their costs of bearing those costs.

S. Pattanayak: If there are farmers who are going to have to change their livelihoods, perhaps we should be encouraging them to move to where it's different practices that don't involve fires, logging and clearing the land. That's really what we've worked on, many folks on campus, these assets that are owned by the tropical countries. It's not for us to point fingers at them and telling them how to manage them, but if we are benefiting from it, if the globe is benefiting, then the globe should actually pay for it. That's the argument that we're coming towards.

S. Pattanayak: California is discussing some of these policies where the State of California can actually negotiate with certain states within Brazil that are doing some things better than other states, which then hopefully create a domino effect and other states will say, "Oh, by actually not cutting our trees, by not burning our forest, we might get these good deals with California. Maybe we should be doing that instead of encouraging these practices."

Judith Kelley: Sure.

S. Pattanayak: Absolutely.

Judith Kelley: Well, it's a complex problem, one we have to pursue multifaceted approaches to solving it. I appreciate you, very much, joining us today, Subhrendu.

S. Pattanayak: Thank you.

Judith Kelley: Subhrendu Pattanayak is the Oak Foundation Environmental and Energy Policy Professor at the Sanford School of Public Policy at Duke University. He also directs our PhD program here at the Sanford School. We're going to have a link to the research on Indonesia that he conducted at our website, which is policy360.org.

Judith Kelley: I also hope that you'll check out our Ways & Means podcast because we have an episode there on climate change that shows that if you remind people that they're parents, they're more likely to take climate change seriously. That's the Ways & Means podcast, and I encourage you to check that out.

Judith Kelley: Thanks so much for joining me. We'll be back soon, again, with another episode of Policy 360. I'm Judith Kelley.