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Episode 13: Maria Bernedo del Carpio

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DI Dr. Ian Anson 0:04

Hello and welcome to Retrieving the Social Sciences, a production of the Center for Social Science Scholarship. I'm your host, Ian Anson, Associate Professor of Political Science here at UMBC. On today's show, as always, we'll be hearing from UMBC faculty, students, visiting speakers, and community partners about the social science research they've been performing in recent times. Qualitative, quantitative, applied, empirical normative. On Retrieving the Social Sciences, we bring the best of UMBC's social science community to you.

DI Dr. Ian Anson 0:41

I must confess that I don't often think very much about water. Sure, you know, I think about it when I go to the beach or when I take a shower. I might pay some attention to the way it tastes or how cold it is when I drink it, especially after a really long run. Oh, and you know, I definitely think about it when it comes time to pay the water bill. Baltimore's aging water infrastructure is in dire need of replacement, and our bills keep going up so the city can afford to repair it. I guess that's what happens when you live in a city that's been around since 1773. You know, I've even heard it said that some of the pipes

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study the water we use for drinking and recreating. But what about the social science of water?

DI **Dr. Ian Anson** 1:47

On today's episode, I'm delighted to bring you an interview with Dr. Maria Bernedo del Carpio, Assistant Professor of Economics here at UMBC. Dr. Bernedo del Carpio hails from Peru and came to UMBC after completing a PhD in Economics at Georgia State University in Atlanta. Dr. Bernedo del Carpio is especially interested in environmental development, behavioral and urban and regional economics. For those who might not know much about these topics I'll summarize Dr. Bernedo del Carpio's interests in her own words. "I'm particularly interested" she writes, "in improving the designs of public interventions that affect environmental and social outcomes." In our conversation, Dr. Bernedo del Carpio explains her recent research on a critical outcome with both environmental and social consequences. That is the conservation of potable water resources in Costa Rica. Let's listen in.

DM **Dr. Maria Bernedo del Carpio** 2:48

Professor Bernedo del Carpio. Thank you so much for joining us today, I'm really excited to have you and to talk a little bit about some of your research.

DM **Dr. Maria Bernedo del Carpio** 2:56

Hi, how are you Ian? I'm Maria. So you can call me, just Maria.

DI **Dr. Ian Anson** 3:01

Alright, sounds good. I'm doing well, doing well. Really excited to be doing Retrieving the Social Sciences today. And I really want to start out this discussion by talking about water. Right? What a fantastic topic to study as a social scientist. You know, I mean, I think about water is something that it's everywhere. I mean, it that's kind of definitional, right? In our daily lives, we're drinking it, we're bathing in it, you know, we're using it for a million different purposes every day, but we're not always thinking about it. Unless we're, you know, maybe like a chemist, or we work at the water treatment plant or

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at least maybe I'm not. So I kind of wonder, I want to ask you What first got you interested in this topic? Why are you interested in water as a phenomenon with the social scientific side to it?

DM **Dr. Maria Bernedo del Carpio** 3:55

So I would say that I'm interested in the study of public services, and good provision of public services, and natural the protection of natural resources and environment. So it's kind of, my work has been around those topics. And but it has focused a lot of water part of it because genuine interest from since I can remember, and also opportunities that appear. So and I took them right, and I guess that's a good advice for for students and PhD students and grad students to take those opportunities. So when I was saying that is something that interested me since I was a child is because I come originally from Peru, and even though I was from a middle class family, we had water problems. So we had water problems and we had water cuts. For several days in a month, and and the reason for that is water are problems are basically caused by water scarcity and natural problems, but it's also a problem related to institutional issues. And kind of we had our problems back in Peru at that point, we still have them, but were institutional problems, and we're also related to water scarcity. And so imagine that a middle class family having water problems, and in other parts, people didn't have connections to a public water pipe, right. And so I remember that my family had to buy, and several families, had to buy water storage tanks. And so we had to fix the problem caused by inefficiency of the government. So and that's a big impression for a child, right. So and also basically, in other areas in Lima, you could see the problems related to water and water availability, so this concept of scarcity of it. So that's, that's kind of the first impression that I had. And then water is a problem right now, and not only in developing countries, but also everywhere else in the world, right? Pollution of water. This variability rate for the fact that population is growing and we are already, already have water problems, and so in the future, they might increase if we don't do something about them.

DM **Dr. Maria Bernedo del Carpio** 6:40

Wow. So just going back to your anecdote. So when we talk about these, this

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you at all? Or was it, was it rationed like a limit?

DM **Dr. Maria Bernedo del Carpio** 6:54

There wasn't water available. So they'd tell us a few days before that, I don't know. On Tuesday or on Thursday, we wouldn't have water. So we had to gather water the day before, and just for the next day, right? So eventually, people got tired, so they decided to do something about it. So those water tanks were available, and so we would buy them, and then that would fix the problem. But that was the last resource kind of made the investment, which was for a lot of families a big investment. I remember that for several months, we had that issue. And other families who probably didn't have that option, they had to keep doing that, gathering buckets of water. And they are still doing it. There are some things that are still doing it. And there are some families, as I said, that don't have a connection to a public water pipe, and they have to buy water from sellers. And that's, that's something going on in a lot of developing countries right now.

DI **Dr. Ian Anson** 8:05

And certainly not something that maybe in the future would be limited to the developing world, I think as we're seeing in the United States, with droughts and climactic change, a lot of new questions being asked, right, about the availability of water. And yeah, I think that's a an incredible anecdote to, to get us started thinking about some of your research. And it really makes sense as to why you would be so invested in this topic, especially as we think about the breakdown of institutions. And as you're describing, this need for a private kind of solution to solve the problem at great cost to individuals and families. So I want to think specifically about some of the research that you've conducted in recent times. Obviously, you've been incredibly productive over the past few years publishing on a variety of topics and economics. But of course, I want to talk about water toda, and I want to think about this paper that you recently co authored that appeared in PNAS with the Proceedings of the National Academy of Sciences. For those who are not in the know, this is a really big deal journal. It's a very cool one. And everybody would be very excited if they were to publish in that. So first of all, congratulations on that

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here. Obviously, as somebody who did their own PhD at Indiana University, I've got some experience with the work of Elinor Ostrom, who's a Nobel Laureate in economics. She spent much of her career at IU for those not in the know. And in this article, you're building on some of Professor Ostrom's theories of Common Pool Resource Management in the field of water. So could you tell us a little bit about this theory of the Common Pool Resource Management, a little bit about the background of this article? And maybe also what this paper contributes beyond the original insights of Professor Ostrom.

DM **Dr. Maria Bernedo del Carpio** 9:49

So, part of Ostrom's work was on common pool resources and common pool resources is a type of public good, pure public good, right, where a lot of people share that resource. So it's non-excludable. And it also has a part of a private good in the sense that it's rivalrous. So if I use that resource, there is less for everybody else. Examples of those can be a fishery. That's kind of a common example that also uses forest retention systems. And in our case, groundwater. So to use the example of the fishery, a lot of fishers can catch fish in a certain area in a sea, right. And every time a fisher taps some resource, there is less for everybody else, right. And hoarding, which is somebody in the 70s, to start talking about Common Pool Resources that this will definitely lead to a tragedy of the commons, right. So it's common concept that we have heard before. So in a sense that, because people want to maximize some fishers, or to use, for example, wants to maximize profits, they might have incentives to fish as much as they want. And so if everybody decides to do that, then we are depleting the resource. So having said, okay, that will lead to the depletion of the resource, if we don't do something about it, and what he proposed was to that the government should intervene, or that we need to give the property rights of the resource to somebody, to a firm or somebody that should be responsible to take care of themselves, right. And that's where Ostrom's ideas are kind of against this, this idea of the tragedy of the commons, because she says that we don't need participation of the government, we don't need to provide the resource to a private entity, right. We can manage those resources sustainably with the help or the use of the citizens in a community. The users of the resource can manage the

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identified these design principles as the ones that these communities were using in order to make this resource sustainable. And the concept became very important also concepts became very important and more and more government, governments decide to give more power to communities. And there have been so many papers that follow those ideas, several case studies analyzing the power of the people, right. So, how people were able to manage these resources sustainably. And there has been a lot of case studies and also observational studies, but because the work became so important, so relevant and used by governments in the sense that they were getting more, more responsibility to communities to protect these resources, then the literature realize we have to do more a more rigorous work and establish a model and establish the mechanisms behind which these communities are able to protect the resource. So, I mentioned that before. So, also design, or establish these design principles under which the communities are able to manage their resources. Those are design principles are for instance, monitoring, the use of sanctions, the establishment of borders, real physical borders, and also social borders, and other design principles. And, and we focus on on monitoring. And so in our work, what we are trying to do is first establish a model through which these institutions monitoring sanctions, borders, affect the state of the resource and to test this model, using causal inference, right? Establishing the causal effect of each of these, well monitoring, but because we focus on it, we start with monitoring and to focus on the effect of monitoring on water, which is our case.

DI **Dr. Ian Anson** 15:04

Wow. So monitoring is going to be really important here in this sort of bottom up strategy, according to Dr. Ostrum, according to this research, in allowing this this resource to be preserved without the top down influence of a government is what you're saying. And I mean, that's a fantastic insight, because I think it really changes the way that we look at these resources, the way that we look at how, you know, how governments how authorities involve themselves in these provisions, it's really a fascinating insight. And I want to sort of hone in on one thing that you mentioned is that there's really just not enough rigorous testing of these ideas out there in the field. It seems from the basis of having read your paper that you're doing some pretty rigorous testing

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seems like a tremendous number of observations to do this work. Did you go to these these locations, do you spend a lot of time in these communities conducting the experiment? Or did you have to sort of work with other people in the in the area to get this data? How did this research actually function from the perspective of data collection?

DM **Dr. Maria Bernedo del Carpio** 16:23

So I guess, I would have to tell you before, what a randomized control trial is, the methodology that we use, and then you can kind of figure out why we have to go to the communities and organize all the fieldwork, right. So, so in order to establish causal inference, we use our randomized control trial, where we, we essentially have a group of communities that are treated, and a group of communities that are not treated, and these and we select those randomly, so that on average, these two groups have the same characteristics. And so we intervened on one of them, or one of the groups, right, so that every effect that we see after is because of our inter, intervention. So that's kind of a very simple idea, but very powerful, because it allows us to see the effect of our intervention on our outcome.

DM **Dr. Maria Bernedo del Carpio** 17:33

It's a very powerful kind of logic. It's one that I always think of people in sort of white lab coats in an psychological experimental setting, when they've got people in a room maybe, and they're doing some kind of intervention. But this is we're talking about entire communities. And so that's an incredible sort of research process that you're talking about here, it's actually intervening in the communities in the field. I mean, that's, that's an incredibly powerful kind of experiment. So yeah, tell us a little bit about how you constructed that intervention.

DM **Dr. Maria Bernedo del Carpio** 18:08

So if you think about it, so the most, it became more difficult because before our agents had been individuals, so gathering around 300 or 400 individuals wasn't that difficult. Because we could work in, I don't know, 10 communities,

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observations, right? Because in these studies, we are concerned about the power of the intervention. And that means that if there is an effect, we have enough sample size to find that effect, right? So we don't want to have a small sample size, and then we don't find that effect because we didn't have enough sample. So we have to have a big sample so that we are able to say, Okay, we are able to find an effect, if there is an effect, we're able to find an effect of this amount, right? So that's a very important point. So we needed a big sample of communities. And the good thing for us was that we had done work before in Costa Rica. So I work between 2014-2016 in other projects in Costa Rica, so I knew the communities. I knew the leaders in these communities. I talked to the committee, the part of the committees in the, in the water management organizations, and I knew kind of that they were willing to participate. That they were willing to help their communities. And so that approach to people was going to be easy, I would say, compared towards that other situations I can imagine. And that I knew the communities and kind of knew where to the workshops, right, to whom to talk, in order to convince people that this could be a good idea. So that was an easy part. Um, so we have to, we actually work and that's important to mention, we worked with CATIE, which is a University and Research Center in Costa Rica. And we have done work before with them. So we prepare our field, our field team, they ones that went to the communities were from CATIE, right, so very well trained people, and willing to help and interested on the problem, right. So that's definitely need that invested in the problem, invested in the research that was very helpful. And, and so part of it was training this, this field team and making sure that every, everything worked in the field. So I went there, for this research. For every research I go to the field, and make sure that the treatment is the same for every community. That's vital, right, because we have to be able to say that everybody receives the same treatment. And this case was the installation of a monitoring system, right. So we did workshops in every community, so that everybody learns about the monitoring system. And then ask people whether they wanted to participate. And people that were willing to participate and to help the community became the monitors. And then we train them to do the monitoring and for the app to use, and now so we include the technology, right? And that was basically it, in some words.

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had a little bit of nerves attached to it, as you sort of put this out into the field, I'm sure that there were a few moments where you're thinking to yourself, Oh, no, I want to make sure this is perfect. And there's a lot of moving parts involved in this, right, like, you're mentioning the use of an app training all of these people. But really, I think it speaks to the, the fact that connections and local knowledge are really important and helping to carry out this kind of research. And I mean, I think that's it's a fantastic example of social science research done right. But I want to talk about your conclusions. I want to think about this monitoring program. So what are the characteristics of a great monitoring program? You know, let's say that I'm really worried about my water supply. I mean, thankfully, we live on the east coast, United States, you know, we turn on the tap and it sort of feels like the water's endless until we get our water bill. But it's not, right, it's a finite resource, wherever we are. And so what are some good sort of principles of monitoring that this research has helped you to establish?

DM **Dr. Maria Bernedo del Carpio** 23:37

Oh, okay, so the results of this study show small effects of a monitoring system, but in the right direction, right. So we find that citizen users are more satisfied with the service, we find better water quality, and less water use. And so that indicates that the monitoring system had positive effects. And so we always say that more indications are needed. And, and when we conclude this paper, we say, Okay, this is the things that we think we could have done better, right. And one of the one of the things that we explore in the, in the research was to use these these apps. So the monitors use their phones, their smartphones, to complete a survey about the certain characteristics, right? How was the water? Did you have water cuts? Was the water smelly? Did you see leaks around the community? Did you see people using water for uses that you are not supposed to use it for. And so they were using this app to complete the survey. And so we kind of find that the technology is good to gather information, right? So and monitors, usually because they know what the monitoring system is about. They're the ones that have the smartphone, the ones that knew how to use it, and usually young people were the ones volunteered, right? And we found that technology was good to gather information. That's very, that's something that has been seen in other types

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communicate information, maybe technology's not the best. So right, just send that information through through a text message, so that the older people and the committee members of the, of the water management system, read the results through the app. Maybe that's not the best way to make sure that they are reading the information. And so maybe we should try with other ways. Maybe just presenting, the monitors presenting the information to, to the people in, in a community workshop. And they do these community workshops, every six months, every year, so they can present the results. And then they, they also the committee members can be accountable for those, right? And in these workshops kind of promise or say what they are going to do in order to fix those problems, right? Another point that we thought it was important was to keep monitors, monitor incentivized. And not, so we gave them kind of I would say a token of appreciation, or a way to kind of solve their, the fact that they were using internet in order to to complete your tasks, we kind of gave them a very small amount of money so that they could buy more data, right? Because that's usually the way they use internet in developing countries. So that they they won't be negatively affected by helping us, right? So that was kind of what they received but they were incentivized with messages so that we were telling them that they were doing a great job, that they were helping their community, right? So the fact that they were helping the community, devoting their time to help others, that recognition, I think it's very important. Or and maybe eventually random prizes so they are also received some kind of a prize, right, for the work. And so I think keeping monitors motivated is a big deal, and, and telling them what they are doing, right, that they are helping others, which is very important. And also, something else that we learned here is that we need, so this was an externally encouraged monitoring system. So it's a monitoring system that wasn't endogenously created by the community. It was kind of proposed by us. If they didn't want to be part of it, then they didn't have to, but we propose it, and only the ones that wanted to have it were part of the sample where we did the randomization, right? So that's a big, important part because all of them were interested. And we proposed it and and it wouldn't work if monitors were were not available, right? So this monitoring system had parts of people's intervention, citizens intervention, and people willing to help willing to participate. So that is key, but we propose it. So that's why we call it

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organizing a certain way, and that's the, that's how she came up with these design principles. So with, based on her work, she said, Okay, I see that people are able to be successful organizing themselves and managing the resource because they have these and these and these monitoring assumptions have been able to constrain, establish borders for the, for the resource via physical social borders, and conflict, mechanism for conflict resolution. So, so she found these characteristics, but those were endogenously created by the community. In ours is different in the sense that we propose to people which is already an important point, because it could be that in some places where they have a common pool resource or they have to protect a resource, right, and they have been able to organize themselves, but their monitoring system is weak or is informal. Maybe we can propose something better so that they establish that in their community and have them manage their resource. So in that sense we said that these monitoring system needs to be part, and that's something that we learn, needs to be designed with the people. So we talked to some leaders, we talked to the water management institution, but I think we could have had more participation of the people. So if people are participating, and designing, I think they would have been more engaged with it. And I think that's something that we could have improved.

DM **Dr. Maria Bernedo del Carpio** 30:57

That's a fantastic insight, and one that keeps coming up again and again across a variety of episodes of Retrieving the Social Sciences. This idea that the buy in from communities, this bottom up participation is so important, not only to the actual outcomes that we're interested in as social scientists, but also to the process of research itself. And I'm so grateful that you shared some of that insight with us, because I think it's so valuable to our understanding of both the outcomes of water management and this monitoring process that you're describing. But again, also this, this process of actually doing the social science that is so unbelievably difficult sometimes, but which in the case of this paper, I think has borne incredible fruit. So congratulations again, on this article, what a rich sort of source of insights about the social world. Before we let you go, I just want to ask you one more question, and that is, you know, we have a lot of listeners to this podcast who are students, who are just getting involved in the social sciences maybe even

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of the social sciences in the future.

DM **Dr. Maria Bernedo del Carpio** 32:08

Yeah, let's say that based on my experience, once you start to study a topic, just read every paper related to that. So once you have become the master of the topic, that's definitely very important. And a lot of social sciences uses statistical tools. And I think becoming more and more expert using those is, opens opportunities for research, right, that are interesting. And I would definitely advise to kind of go deeper into the waters of causal inference, and use all the technologies available, available right now. Machine learning if you are like studying technology, or languages, because it kind of improves techniques to to get rid of effects that we don't want to. So being able to prove our techniques are is a good advice. For PhD students, I would say write, right? Write, write, and submit and correct, and resubmit. And then that's something very important because sometimes we want to have the perfect paper and that's, there will be always somebody that tells you that there is some mistake and probably there is one, right? And but somebody else won't find it (laughs). But the thing is that, moving your work, right? Correcting the work, presenting it, and making it better, and then there's a moment when you can, you have to move on (laughs). So that's, I think it's important advice, because we always want to get the perfect paper and that's not, that's, that's impossible.

DM **Dr. Maria Bernedo del Carpio** 34:06

Well, Maria Bernedo del Carpio, thank you so much for joining us today, for offering these insights. Certainly, I agree with you that there's no perfect paper, but this recent contribution you've made to PNAS is a pretty darn good one. So, thanks again. And we really, really appreciate your time.

DM **Dr. Maria Bernedo del Carpio** 34:22

Thank you. Thank you, Ian.

CC **Campus Connections** 34:30

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DI Dr. Ian Anson 34:37

It's time now for Campus Connections, a part of the show where we connect today's featured discussion to other work happening on UMBC's campus. Today's Campus Connection is all about gullies. While gullies immediately bring to my mind the epic 1992 G-rated adventure movie Fern Gully starring Robin Williams, this recent article is about real gullies with real world impacts. Dr. Matthew Baker, a Professor of Geography and Environmental Systems at UMBC recently co-authored a paper in the Journal of Environmental Management. Dr. Baker and colleagues studied the formation of gullies along roadways in areas of Brazil, where sugar cane farming is intensive. The authors show that such gullies form more readily than previously suspected. So what's the big problem? Gullies can cause severe damage to agricultural lands including soil loss, surface runoff, lower soil water holding capacity, lower quality and quantity of water and many other ills, according to a 2011 study on the subject by Jahantigh and Pessarakli. Freshwater is a precious resource in our increasingly vulnerable world. And as it turns out, both successful common pool resource management and proper agricultural practices are necessary to ensure that we have it. Thanks to UMBC social scientists, we might have a better chance of enjoying clean and plentiful water in the decades to come.

DI Dr. Ian Anson 35:57

That's all for today's episode. Until next time, keep questioning. Retrieving the Social Sciences is a production of the UMBC Center for Social Science Scholarship. Our director is Dr. Christine Mallinson. Our associate director is Dr. Felipe Filomeno, and our production intern is Jefferson Rivas. Our theme music was composed and recorded by D'Juan Moreland. Find out more about CS3 at socialscience.umbc.edu and make sure to follow us on Twitter, Facebook, Instagram, and YouTube, where you can find full video recordings of recent UMBC events. Until next time, keep questioning.

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