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Changing Practice and Research in the Context of Disasters

"Engaging Communities and Government for Rapid Impact Analysis of Disaster Aid"

This presentation addresses the transformative potential of transdisciplinary work and stakeholder engagement in both rapid research and disemination practices in a disaster recovery context in Puerto Rico. The specific stakeholders the presentation and research addressed included general community members that expressed a need for disaster recovery assistance, some members of local, state and federal government agencies who work in disaster response and recovery. In this presentation,

(AGENDA)

1. We begin by addressing our positionality and defining the complex problem that motivated our team of scientists from different disciplines to work together.

2. We go on to describe the research methods, process and findings. Special attention is given to where convergence of different fields contributed to the objectives of the research.

3. Finally we address our efforts to diseminate the research and facilitate broader application. It is in the engagement of findings to enable change that we enter a zone of proximal transformation where equitable recovery and equity are shared goals but the socialization of knowledge meets structural and conceptual challenges we are currently trying to overcome.

[slide: Complex Problem]

Transdisciplinary Positionality and Background

I still remember the first time, my colleague from public health and program evalation, Dr. Chopel brought to my attention research findings that showed that poverty and inequality

grew in places that received greater amounts of federal disaster recovery funds. We both shared a concern for the uneven impact of the pandemic on the Island. Puerto Rico had seen a cascade of disasters, fiscal crisis in the government, hurricanes, earthquakes and now a pandemic.

As an engaged, native anthropologist, living and working in Puerto Rico, the ***theater of disaster aid*** "allocated" but *not disbursed* weighed heavily in assessments of how to move ahead in service of recovery and mitigating damages from the inevitable next crisis. Thinking about my positionality, I reckon it informed my quick visceral reaction to reject and disprove work that was critical of disaster aid. *If this were a Marvel movie my spidey sense would be tingling warning of a neo-liberal agenda justifying not giving of aid using victim blaming tropes that point to the informality and corruption of those affected by disaster.* Aid had not been received yet, how could we add our voices to criticize it? From my position the focus should be on the additional cost, the socio-economic burden of *aid not being distributed.*

[slide: Puerto Rico Disaster Context]

Looking to better understand the flow of funds and economic statistics I reached out Dr. Fernós Sagebien, a local economist to join in the conversation and study-design of a transdiciplinary research into the **complex problem of disaster aid's relationship with poverty, inequality and the spread of COVID-19**. Most of the research in this area had focused on secondary data and missed the field component that could help reveal the mechanisms in place that reproduced the relationships observed. *How was the distribution of funds linked to growth in poverty?* By the time we started our research only 27% of the $67 billion assigned had been disbursed. We hoped to communicate our findings in time to make a diagnose rapidly if the trends Stateside were also true for Puerto Rico.

[slide: About the Research]

 I *thank Dr. Chopel for insisting and for the many conversations that led us to move beyond*

the immediate context to connect the Puerto Rico experience within the body of disaster work being done sociologists looking the flow of federal disaster aid to communities across the US and Dr. Fernós Sagebien for his assistance helping us dig deeper following the data.

[slide 6: Disaster Research Team]

So it was that an economist, a public health expert and an anthropologist set out to investigate:

[slide 7: Guiding Question]

How did the disbursement of disaster aid after the 2017 hurricanes impact relationships between hazard damages, poverty, and population vulnerability to COVID-19 in PR?

[slide 8: Specific Aims]

Borrowing the structure from public health, we set out four specific aims.

To answer this question we delineated four (4) specific aims:

1. Examine the changing rate of municipal poverty from 2015 to 2019 and whether damages from Hurricanes Irma and María (2017) accelerated increases in poverty.

2. Ascertain the influence of the disbursement of federal aid on the change in poverty rates.

3. Show the relationships between hurricane damages, disaster aid, economic inequality and each municipality's ability to prepare for a public health threat by investigating distribution of COVID-19 cases across municipalities.

4. Identify potential underlying mechanisms of dynamic relationships using qualitative research.

Using convergent framework we brought expertise from economics, applied anthropology and public health, to bear on the analysis of quantitative and qualitative research.

[slide 9: Data Objectives]

Answering the questions behind the first three objectives seemed quite straight forward. We a lot of the data used was publicly available. It was a matter of importing numbers and designing the formula and models to analyze them. Except that as an anthropologist that lives and travels through many of the towns on a frecuent basis, I wanted to read the raw numbers and see how they portrayed what I had observed. It was here when I raised questioned the trusted sources.

[slide 10: Data Challenges]

I remember downloading the data from the American Community Survey and at face value it seemed to me I was reading a fantastical story. A Category 5 hurricane hit the Island caused an estimated $90 billion in damages, earthquakes hit and somehow poverty reduced. *It was as if we had shipped all the poor off Island or granted jobs or access to universal income.* A similar sense of disbelief came as I matched the damages assessed with municipalities I had visited. I new the devastation first hand and it was not commiserate with the assessments used.

[slide 11: Hurricane María reversed the poverty trend]

It was in moments like these when having a broader and diverse brain trust was beneficial. Holding constant the other demographic changes we estimated fixed effects panel models to examine the change in poverty pre- and post-hurricane. We were then able to observe that though poverty decreased from 2015 to 2017, after the hurricanes, this relationship flipped and poverty began increasing every year.

[slide 12: Other findings]

Among our findings When we looked at the relationship of poperty damage to poverty, contrary to findings Stateside we found that poperty damage in Puerto Rico is inversely related to increases in poverty. *Since property damages did not predict increases in poverty we explored alterantive variables and found*, disaster associated fatalities per capita have a

strong positive relationship with the change in poverty rate over time. **This suggests municipalities that suffered the highest human toll from the hurricanes experienced a long-term disaster that caused poverty to steeply rise.**

[slide 13: Specific Aim 2]

Building on Aim 1 findings, in Aim 2 we examined how disaster aid alters the poverty rate post-hurricanes. Our key independent variable for this analysis was total disbursed aid, which included assistance to individual households and assistance to municipalities.

[slide 14: Table with results Specific Aim 2]

Holding constant the fatalities, we found disaster aid was positively associated with increasing poverty rates. **In other words, more aid accelerated increases in poverty.**

[slide 15: Specific Aim 3]

In the third Aim, we calculated correlation estimates between COVID-19 case counts and total aid disbursed, number of fatalities attributed to Hurricane María, total damages in dollars, and the Gini coefficient for each municipality.

[slide 16: Correlation Matrix for COVID-19]

In our review of COVID-19 cases we found the highest correlation with COVID-19 cases was with **total aid disbursed,** followed by the number of hurricane associated fatalities per capita. Finally, COVID-19 cases positively correlated with the Gini coefficients, indicating inequality was significantly associated with COVID-19 cases.

[slide 17: Specific Aim 4]

Up to this point, except for damages not predicting poverty, our findings mostly followed similar trends documented in Stateside research. Poverty , the distribution of aid on the Island correlated with increases in poverty in municipalities as well as higher incidence of COVID-19 cases. The question that were left to answer were how and why?

To better understand the relationships observed, we conducted observations and semi-structured interviews with 76 participants in 2 towns in a selected region. Achieving these interviews and transcription in such a short window of time would not have been possible had I not used field research assistants from each town who already had a social network that allowed them to access a diversity of participants.

[slide 19: Site selection]

The region and towns were selected because of the different relationships observed between aid disbursement and poverty, even though the towns are close to each other. In order to extend privacy and honor confidentiality agreements we refer to the sites with the fictitious names Nube and Suelo.

[slide 20: Site selection and]

- Nube the town representing the average relationship between aid and poverty in PR, has a population of under 40,000 people and is described by residents as *campo* (countryside). In Nube, **the percent of people living below poverty grew by 4%,**

- Suelo. the town with the smallest identified relationship between aid and poverty (although still a positive relationship) has a population that approximates 70,000 and has both rural communities and more suburban developments.

- In Suelo poverty **was reduced by 19%.**

[slide 21: Nube EcoSocial Model]

In Nube

- 71% of ithose interviewed described their communities as being devasted by the hurricanes.

- 60% described the damages **reported as major or total loss** in our sample came from Nube.

- **70% of federal aid received in Nube went to households.**

- Only *17% of our sample had received funds.*

- Organizations of all kinds were cited as providing support throughout the emergecny and recovery.

- Themes of gratitude recognizing the social support network were typically associated with Nube.

Using an eco-social map the thickness of the individual's center circle communicates the perceived role of the individual in the recovery process in relation to interactions in different dimensions of socialization. IN this case the individual role is smaller than we will see in Suelo but the ring of support provided by the close relationships and community concretely add to the wellness and recovery.

[slide 22: Suelo EcoSocial Model]

When we look at the individual experiences of each town, in Suelo

- In our sample, only 21% of participants from Suelo had access to federal aid.

- 40% of the sample interviewed and described the damage to their home as major or total loss were from Suelo

- only 25% of participant sample in Suelo described the damage to their communities as devastating.

- **Participants earning under $20,000 reported having difficulty accessing aid from social organizations**

- When asked about recovery most, thought things were able to return to before the pandemic, but shared more themes of despair.

In spite of the differences between the towns, there are several common themes found across

the interviews.

We used an online resource called Voyant-Tools.org to perform a computer assisted analysis of the text. This process guides an inductive analysis that is later reconciled with a thematic analysis that also incorporates deductive codes. The analysis was

 An inductive theme that arose from textual analysis and was not in our a initial framework is the **violence of bureaucracy.** This theme pertains to language used connoting violence that is ascribed to the government against the people in its care. Additionally, textual analysis reveals repeated connections between health and well being and the hardships endured as a result of hazard damages.

Another common theme was the distinction that *food was good and welcome, but money to rebuild was more important.*

To illustrate the qualitative findings I want to share with you a couple of voices from the Nube that captures how federal aid and compound damages from cascading crises impact public health and covid response.

Isa lives in one the fieldsite we called Nube. It is a rural municipality with one of the high levels of poverty prior and after Hurricane María. Isa lives in a hillside not far from the town center. Her home is in a plot of land where her husband's relatives also have their homes. During the hurricane she was at home until she sought refuge in her in-law's house next door. Isa around age 60, a seamstress, her husband is a mechanic in an auto repair shop in town. During the hurricane they lost the roof to her house along with all her furniture and lost her sewing workshop which was in her garage under the main floor of her house.

"...with the little bit we got from FEMA we were able to through down some cement to

reassure the concrete roof, but we still don't have cabinets, nor beds nor dressers. Everything was lost, even the kitchen cabinets. But we made do. A friend of mine, after María, came to take her mom - who lived across the street alone, to live with her to the States. This friend realized our need and told me " Take the matress because my mom wont be using it", and that's how we came to have a mattress... Heck, if I am honest, I still have boxes down below because I live here, but in al honesty, we had to move to my mom's house so I was practically living with her. But then she died, because she never got out of her depression. The devastation shook her. For all intensive purposes I was living with my mom. It has been hard, I was there and yet I knew I had lost all of my sewing machines. But when the pandemic started my eldest son was working in a supermarket and there were no masks. So I began looking for scraps and pieces of cloth to make him masks and I, said change it every 2 hours, every days, I don't know what, all I know is that I made him masks and I would give him like a dozen, "take it". And then he told me, "Mom.. its that my colleague does not have masks" and I said "well, here you take these" and I kept making masks, and making more, and they kept asking for more and in my life I have never sewn so much, and with that I was able to buy 2 machines for my workshop."

Isa's story higlights how the slow recovery compounded hardships. Before the aid came, there were years of hardship, where lack of utilities, work closures, the material losses and loss of safe access to a private place to call home generated greater bouts of depression. Life without water and electricty proved to be too hard and frustrating for her mom, Isa explained. In the end, with her failing health she died 6 months after María. In that time, Isa was living with and taking care of her mother while cleaning her house from the extensive water damage caused by the loss of the wooden the roof during the storm. Neighbors, the church she is a member of, all help her move forward. Two years after the hurricane, she got approved one third of the funds needed to get a concrete roof. At the time when fieldwork

was taking place Isa was among the 38% percent in her town that responded as having received aid. Across the Island, an analysis of FEMA individual assistance shows that aid averaged $1,200. Isa was able to finished the job by taking a Disaster Assistance Small Business Loan. Though Isa began making masks for others as an expression of solidarity, there is a leveraging of aid, goodwill and opportunity that occurs. Her story depicts however that **once aid was received, there was a gradual economic turnaround.** Planning to finish improvements that are suddenly possible takes shape at the same time she is able to buy her new sewing machines.

When looking at stories gathered where aid was not received we find participants where homes were destroyed but titles were not had, youth or young professionals that lived in rented living quarters that suffered great damages and were not fixed or people who lived in suburban developments and did not qualify for FEMA aid on other grounds.

In the same town, Mayra who was a young social worker empoyed in a school. Her annual salary is under $20,000. She and her husband rented an apartment in the countryside. When talking about the hurricane damages and aid she explained her home suffered major damages but was not covered by federal assistance because she was renting. "*At least in the apartment where I lived, what happened was that some walls, many walls were wooden and the apartment did not have screens and when we realized it was full of cockroaches, we moved there because of need, but when we realized that the panels were infested, that was horrible, horrible horrible. Then there was also we suffered damage from flooding, water filtered through and in the living room our furniture was damaged... Add to that, there was a lot of need in terms of medical services because many needed power and there was none to operate machines and manage the health of different people."* Mayra goes on to add her

husband had lost his job, address the devastation of roads, months without utilities and food scarcity endured. Months after the hurricane she was able to contact an aunt who had moved to the US and established an arrangement to live in her house in a subdivision in our other research site, Suelo. Though she now has a decent home to live, she still does not consider her life as having returned to normal. She is still struggling.

In both stories we see the impact on mental and physical health, a loss in quality of life post-disaster in the town that was more rural and suffered greater damages. The impacts interact with each other, complicating life in ways that solving one problem does not fully eliminate the damage done to other conditions.

In the stories, we also see in both examples of shared sense of mechanic solidarity, shared among more homogenous social and kinship networks. Families housing relatives, neighbors providing goods and assistance.

Though the individual stories did not provide a picture perfect explanation for why poverty increased in the municipalities where more aid was received it does reveal that in a household with prior steady income and entrepreneurial skills more funds were able to be accessed and leveraged.

When we take a step back from the individual stories and look a the eco-social system and where the money is flowing we see mechanic solidarity interfering with government assistance.

[slide 25: Insights]

In review, our work suggests that current processes for aid distribution after natural hazard events if unchecked will deepen inequality and health inequities.

Our first finding as expected, showed that though poverty had been decreasing the 2017

hurricanes reversed this trend.

To understand where and why poverty increased our work revealed that, in Puerto Rico unlike the US, property damages run opposite to poverty. Here, the better predictor for increasing poverty, were hurricane related deaths. Aim 2 built on this finding and showed that more aid, accelerates poverty.

These findings echos those of Howell and Elliott (2018),

"**natural hazards do not just bring damages,** *they also bring resources*; and, equal aid is not equitable aid, especially when it is systemically designed to restore property rather than communities."

[slide 27: Review Statement]

Our work thus underscores the urgency of translating these findings into policy changes.

When we add Aim 3 we see a recursive process emerge, that directly impacts public health. It shows that **economic policy is emergency preparedness policy is disaster response policy is public health policy.**

Property-focused disaster aid leads to more poverty, increased poverty leads to poorer health, and poor health in any part of the population helps infectious diseases to spread throughout the entire population. Changing how we target aid that way will help us advance toward two universal goals—reversing poverty growth and slowing the spread of diseases.

All policy must be made with the understanding that vulnerability to hazard damages and the ability to recover from disasters are directly shaped by existing socioeconomic and racial inequities. When the COVID-19 pandemic arrived it compounded and magnified

existing inequities. The correlations between COVID-19 case rates and various aspects of poverty are a warning that unless policies are developed and implemented with a conscientious equity strategy they will serve to deepen inequity rather than alleviate it.

Any assessment of a policy's impact on health should incorporate an assessment of its impact on economic equality and other social determinants of health.

[slide 28-29: Recommendations]

Five specific policy recommendations were identified:

1 Property damages and fatalities tell two different stories about the response to hurricane damages. It underscores the importance of directing disaster aid to effectively protect people and communities rather than prioritizing property. One way to do so could be by using public health measures, such as morbidity and mortality, as inputs into aid disbursement strategy decisions

2 Use different sources of data to plan and make regular adjustments to aid distribution.

3 Adjust hazard damage assessment procedures to ensure that funds provided will enable repairs to be completed in both urban and rural communities. In our sample, not even one participant who needed a roof repair received the full amount needed to complete the repair so that they could live under an intact, leak-free roof.

4 Review and revise the FEMA aid application process to make it more accessible to lower-income homeowners. Denials of aid applications were often based on homeowners not having the correct legal documentation. They also lacked the means to fight unjust denials.

5   Review and revise assumptions about using Small Business Administration loans as an alternative to aid for rural households. Our case studies revealed that loans were given in lieu of aid to people who had minimal assets to rely on for survival, even counting the ownership of multiple chickens as a small business. The ease with which the government extended debt instruments to poor homeowners stands in stark contrast to how difficult it was for that same group to receive disaster relief aid.

[slide 30: Working on Change]

As part of our commitment to seed change the research team went back to the communities to share and seek comment on our findings and policy recommnedations.

[slide 31: Working on Change]

Interesting enough, within Nube we found out that though a stronger presence of acts of solidarity was witnessed and validated by those present, they identified a gap and opportunity for change. The work and asisstance we documented had taken place organically and without systematization. Those present shared how several decades ago the communities used to have community eaders that helped serve as liason to the municipality and organizations. This was a structure that younger generations present had not known of but that was discussed as a way to improve disaster response and improve recovery.

[slide 32-34: Examples]

[slide 35: Outcomes of Town Halls]

In Suelo, the town hall meeting was quite different. In this case, the municipality took an interest, provided a location in a community center, brought their disaster management and community leaders. In this meeting, those present took away as key insights that the way they were organizing aid was not reaching the population that worked but need assistance,

because their income prior to the hurricane just barely afforded them their needs. Adding hurricane losses and loss of income they faced ongoing strain and express a sense of abandonment.

After validating our findings with the communities we turned around to share our policy recommendations with government officials.

[slide 37: Working on Change]