



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

Measuring Resilience

An approach using Data from Nepal, Bangladesh, and Uganda

Webinar Transcript

Katie Heneveld

Good morning, afternoon and evening. Thank you all for joining today's webinar to learn more about measuring resilience in Nepal, Bangladesh and Uganda. My name is Katie Heneveld and I am an assistant researcher for the Feed the Future Innovation Lab for Nutrition and will be your mc for this webinar today. As attendees are joining I'll begin by going over some housekeeping items. I'd like to direct all attendees to a few functions on the zoom webinar at the bottom of your screen you should see a chat icon and the Q&A icon. Use the chat feature to engage in relevant conversation with other attendees if you have a question for one of the panelists please use the Q&A feature.

Panelists will respond to questions in the Q&A box throughout the webinar and we've allotted the final 25 minutes of the webinar for Q&A. If you are experiencing any technical difficulties send a message in the chat box to all panelists so that our technical support staff can work with you to resolve them. This webinar is being recorded and will be made available on the Innovation Lab for Nutrition website and the USAID Advancing Nutrition website.

There you can also register for upcoming webinars and review recordings and slide decks of previous webinars we will repeat these technical housekeeping items in the chat throughout the webinar as people may join at later times. I'd like to begin by introducing Dr. Patrick Webb who is the director of the Innovation Lab for Nutrition and the Alexander Mcfarland Professor of Nutrition at the Friedman School of nutrition science and policy. You'll provide a brief description of the Nutrition Innovation Lab before introducing the panelists for today's webinar. Dr. Webb over to you.

Patrick Webb

Thank you very much Katie and hello everyone and welcome to this latest in our series of webinars showcasing work done over several years by a wide range of collaborators of the Nutrition Innovation Lab. This is the website. You can go to the website and download previous recordings of webinars as well as well over 100 peer-reviewed articles relating to some of the research that we've been doing and with many more to come.

Next slide please. So very briefly the Nutrition Innovation Lab under Feed the Future, is an activity that has been trying to generate actionable policy, relevant empirical new knowledge that links agriculture and other food-based interventions to improve diets and nutrition. And that's involved a host of different kinds of studies, primary data collection, and secondary data analysis and across mostly Africa South of the Sahara and South Asia, quite a range of different kinds of questions from biomarkers and environmental enteropathy all the way, to satellite imagery on temperature and rainfall and foodborne mycotoxins.

So next slide please. To do all of this work and linking it to diets and nutrition, we've engaged with a genuine host of collaborators. Some of those were at the global level, many at the local level, including governments of countries in which we've worked and local institutions of many kinds: NGOs, businesses as well as universities.

Next slide. Of course throughout, we've been also engaging with a range of USA, U.S partners, obviously USAID and we're very grateful to the funding for this work by USA but other partners as well. Next slide please. So today, I think this is the 13th in this series where we've been trying to share even preliminary soon-to-be-published findings from a range of topics and today's a really interesting one resilience, a hugely challenging, complex concept which carries many questions that still need to be answered.

As most of you know, USAID has embraced the resilience question and even calls what was the Bureau of Food Security, the new Bureau of Resilience and Food Security, and next slide please; and has embedded the in its new food systems, construct its conceptual framework.

The idea of resilience is here front and center. As you can see resilience wraps around all of the dimensions of the food system that USAID and his partners are worried, are concerned about all the way from the agricultural production and environmental resource.

Use dimensions through markets, through food environments, through to diets and nutrition. There are many ways one can think about these questions and we're today going to explore one particular way of thinking about these issues and framing it essentially from the right hand side looking at how diets and nutrition outcomes play a role in understanding resilience.

To do that, we have two amazing speakers: colleague Dr. William Masters, Investigator in the Nutrition Innovation Lab, Professor at Tufts University in the Friedman school but also in the Department of Economics. He joined us from the AG ECON Department of Purdue University and he served as Chair of the Friedman schools Department of Food and Nutrition Policy until 2014. He's very well-known. He's earned awards including an award for the publication of enduring quality in 2014 and a recent one on the quality of research discovery an award from the Agriculture and Agricultural and Applied Economics Association to which he was elected a fellow this year.

So we're so glad to have him as a friend and colleague and many of you know his work in relation to the cost and affordability of healthy diets and the Candace project. And working alongside us and also part of this group, Sonia Zaharia is a postdoctoral fellow in the Nutrition Innovation Lab, background in Economics and Finances. She came to us with a Master's in Sustainable Food

Systems from Wageningen and a PhD in Finance from Goethe University in Frankfurt in Germany and has brought a lot of insight and skill sets to bear on these kinds of analysis.

So we look forward to debating, to hearing, to discussing the issues that they put on the table in a sense a kind of a thought experiment how can we use pre-existing data to explore some of these issues around resilience. What you're hearing now is not a study designed to measure an intervention or designed to measure resilience, but using panel data to try and explore what resilience means. So in that spirit please, let's debate and think through these issues and I hand over to Will Masters to kick us off thank you Will.

Will Masters

Excellent thank you Patrick and thanks to everybody for joining. I see there's about 230 participants already online and hope to see many of your questions in the Q&A box. And of course, you can chat with each other directly. So lots and lots to think about on this topic that has been so captivating for us. As you'll hear the work that Sonia and I will share, I think, I hope, resonates closely with your own experiences, in your projects, in your programs, in your settings. And that we can be discussing that today and over the coming weeks, definitely enter questions in the Q&A box as well as talking with each other in the chat box.

So what's on the screen now, is the definition of resilience in current use at USAID. You can read it faster than I can speak it. The summary: ability to manage adversity and change without compromising future well-being. And really crucially an effort by USAID to provide all these resources at the URL you see, which I'll talk about in a moment. So the next slide gives you our agenda for today. I'll start by setting the stage and introduce our method, and then Sonia will go in depth into what this particular contribution is. This one specific added element to overall USAID thinking about resilience, and what that's what we've been able to find specifically about maternal and child nutrition. And then, Patrick will close again with questions of implications for programs and policies in the context where we've been working.

Next slide. We'll begin to share this stage setting. Next slide please. Emphasizing the very widespread use of this term. This term is in the air. Resilience is something that many people are talking about. Here is the definition from the Google dictionary which is written from the Oxford English dictionary. This second definition there: ability of a substance or object to spring back into shape after being deformed; that's actually the oldest. So if you look at etymology and usage that dates back to the 18th 19th century, the first definition is the one that's much more commonly used today: the capacity to recover quickly from difficulties or toughness.

Because the oxford dictionary, their example is “the often-remarkable resilience of so many British institutions”. Right, these institutions have suffered defeat, have had scandals but they've come back from that. And so, that's an example of and the next image I want to share, is the frequency of use of different words in the English language. I think this is very helpful to think about resilience, what it means to people is to look at this this slide here. So let's look just at the takeoff decade of the frequency with which different words are related to development appeared in all English language books, that google has scanned. and so that's not a hundred percent of all books but a very large faction going back to 1900, regarding these three major phrases words

that enter into phrases about the development process, and are used in many other contexts. In these books. So the orange word inequality was quite important.

Throughout you can see the early 20th century, it had this particular takeoff of an increase in its frequency of use. These are actually the percentages of all words in English language books, starting inequality took off in the 1960s now look at when the different words took off. Vulnerability takes off in the 1970s. Sustainability really takes off in the 1990s and resilience which had been a word that was used in books way back then in the early 20th century, really takes off in this early 2000s, but especially in the 2010s. Next slide. And the point is that the frequency of the words of the word resilience was something that USAID was quite quick to build on, quite quick to use. So starting in the early 20 2010s, really late 2000s, there were this sort of presentation from USA officials talking about using resilience. In in in ways to address especially climate driven shocks, but conflict-driven shocks that were leading to recurrent crises, extremely expensive.

Next slide please. And the idea of resilience was to provide a more cost-effective approach that would anticipate change and build in recovery so this is a an example of a study of the cost effectiveness of anticipating change, and what you see is that compared to a late response, early response would save a certain amount two and a half in this case million dollars, but having a safety net would be somewhat better, but having resilience as well as the safety net even more cost-effective than that. And so what we see is this very important use of this concept in the next slide please. Being built into so many different USAID activities, many of you will be familiar with these in your own context and I hope you can bring in questions, comments, about these different facets and the next slide really gets at the degree to which USAID has been a thought leader in this area of course.

On the left you see the organogram of how resilience is currently structured. If you will think about this within USAID on the right, an example of pickup of this in this case by the FAO knowledge portal next time. So this is a very rich and deep area of work. There are a lot of people working in this space with a wide range of measurement tools, and again, USAID a real thought leader in getting better measurement for different kinds of resilience in different contexts with respect to different types of shocks.

So if you haven't looked at these, the measurement guidance series, you know that's a really great resource and the next slide gets at a different kind of resource which is the training materials that are quite rich and deep in a variety of issues. And the next slide and even other kind of resource all of the different webinars programmatically in this case showing webinars. There's also many publications and other resources about the very diverse kinds of expertise that we're going to talk about today, is dietary and nutrition resilience but there's plenty of other aspects of resilience that come into this, this area of work for USAID.

The next slide was what we're contributing, is one specific idea about nutrition to add to the mix which I hope you'll find engaging, interesting and insightful, helpful to think about resilience in other contexts, with other metrics we're drawing on economics, where resilience has been a question in finance about companies, where resilience has been a question about individuals in terms of earnings over time, in the labor market how people recovered in their career paths, and

studies of stock prices and the prices of a company's stock value. So here's an illustration of economics work on this from the World bank, and we're not going to use these particular mathematical formulas but we will be doing exactly this kind of economic style, research and bring you a little bit of a deep dive into that economics to get the flavor of what we did and then come right back out to its programmatic implications so that, as you, as you, as you listen to this and see the slides that we'll be sharing, you can think what does this mean for my program, my kind of data, my type of intervention? And I hope you'll see that it resonates quite helpfully next time, so our approach begins with the Nutrition Innovation Labs panel studies, the longitudinal study in the Uganda and Bangladesh.

We'll be sharing results from where as soon as we had three successive metric measures of dietary nutrition outcomes. We could begin to think about resilience in in this potentially new way, so our concern in resilience is with people who have experienced adversity. And here when we observe adversity simply as a decline, a worsening of their circumstances. So using the red arrow here to show a harm that's happened. Next image you want to see whether people are able to recover, and that's the green arrow leading to a state in which people had been harmed but perhaps are able to recover. And you can see the green illustrating that idea of harm and then recovery, and the next image conveys the idea that when we're looking just at outcome we are able to think about resilience to any shock at all and I think many of you might be familiar with the idea of all-cause insurance, whether something was lost because of flood or fire or theft or accident, the insurance would make you whole, would pay for the damage that was done from all causes.

The life insurance policy or kind of health insurance would be examples of all cause insurance for a particular kind of outcome and that's very important because whether it's individual resilience say psychological resilience or a household's resilience a family or a network of related people supporting each other or a village or a community, a safety net that helps people recover from all kinds of adversities, really what we're looking at here and then, we can unpack that and ask about specific outcomes are they resilient can you rebuild your house can you regain certain capabilities and also specific causes. You have insurance against fire, insurance against you know, specific kinds of harms. So we will be looking at exactly what there's sort of depth. But for now we're asking for all causes in a given outcome do people recover, in this way after a damage, has been done and the question that we're asking is this and the next image will show why that matters, because it's entirely possible that our outcomes are measured with noise. We know that there's a lot of random noise just in measurement, depending on the metric, we're going to have more or less noise but there's also just random events that happen in life and so our control group here, our comparison group are people who initially gained in this community, either because we mismeasured them and thought they gained but they didn't really or because something good happened. And the next advance shows how with random noise those who gained will lose something after. So the next image shows what we're testing for which is that with resilience. Those who initially lost will gain more than would be expected from randomness and this is really the crucial insight that we're building on here, which is if people have recovered did they recover by chance or was it really because someone helped them? Or they helped themselves to get back up on their feet.

So we're always asking about someone who stumbled, someone who lost ground and remember, we'll be talking about dietary nutrition but the concept is more, is broader than that, and we're asking compared to people who initially gained that those who lost recover, more a statistically significant and economically important and in terms of human development, a crucial question is did people recover more than just than just random the next image conveys? How we operationalize this mathematically in order to test statistically? Was the gain recovery bigger than expected? What we do is we map initial change against the later change.

So in the initial change, we're interested in people who initially declined but then recovered. So they would be observed somewhere in this quadrant of observation. These would be individuals or households who experienced an initial decline, but then they recovered and we would see that if there was just random noise, these observations would be matched by other observations down here, where people had initially improved and then given up those gains in the subsequent period and in our data, it's in the in the Nepal surveys happens to be from 2013 to 14, and then the next year from 2014 to 15, if there was, if the observations aligned along a 45 degree line, we would have just random noise which is called in a sort of technical sense mean reversion, because people are reverting to an average in some sense. So random noise would be a 45 degree line and the next image shows the way Nepali women in terms of their dietary diversity actually lined up along this, along this line. So this is almost 2 000 women in the Terai sub-sample of the Poshan community study, only because they were observed in four sequential years, same time of year approximately each of the four sequential years, and we're asking in the initial of two years either 2013 to 14 or the subsequent 2014 to 15, did they recover more than they'd lost or more than you'd expect from what they lost?

So the next image shows you that in this particular metric the diet diversity score about half of the initial declines were reversed in the following year. And the next image shows that that was more than those who initially gained, had given up or reversed. So what you see is this asymmetric mean reversion in a technical sentence, so we're drawing on the finance literature where the term of art is asymmetric mean reversion because these people are gaining back more than these who had a positive shock gave up, so there's a kind of ratchet here, going on where the people who lose are helped back and the people who gained keep their gains more than just randomness, would suggest so the next image so right, so we are testing for this kind of resilience, in in a range of other outcomes that Sonia will describe, and a range of populations including variation within the population.

So at this point, I hope that you have a a picture, a broad picture of what we're bringing to the conversation and can begin to think about how this relates to each of your project outcomes or programmatic interests in terms of the outcome of measure remember.

This we're looking at here is diet diversity score but there's many other metrics, but you will share some of them. The ones that we've studied but there's many more that you could look at and also many specific kind of potential sources of resilience and many particular shocks to which there could be resilience. In this context we're looking at resilience to all causes in a few particular outcomes of interest. So the next slide please. So just to close out with you know, one image that I hope conveys the idea that Sonia will start with in just a moment, is we're comparing recovery among those who initially declined, which is all these people to those who initially

gained, so for any given slope of this relationship here, we're asking did these people have more than expected recovery or was it just random or perhaps was there something else? In which those who declined experienced a shock that continued to harm them more than randomness would suggest? So that's our setup, that's setting the stage. Next slide please. Sonia can now provide a little more depth on the method, but very quickly get to these various outcomes and the actual context in which we did these comparisons. Thank you.

Sonia Zaharia

Thank you Will. Hi everyone. Thank you for joining the webinar today. So I'm gonna dive right into the more technical part of this webinar, and I will first introduce you to our method to measure resilience, and then I will show you a few examples where we applied the method to maternal and child nutrition. So as Will has really nicely explained our goal with this framework, is really to focus on one aspect of resilience. So what we want is to distinguish resilience from random fluctuations because we want to make sure that what we see in the data is through recovery, and we are not just picking up some random noise. So in practice what this means is as we want to estimate and compare these slopes that you see here, which measure the rate of recovery in the data and to do so, we have used a model that was inspired from the time series literature in Finance and that we have adapted to be used with less time points. So for panel data on the next slide, you see two equations that are written in first differences.

They are written for an outcome y where we regress changes in y on past changes and why or with the goal of estimating the reverting tendency of declines and improvements? And this is by also accounting for a trend in the data if there is any. So the coefficients of interest are row minus and drop class, just to visualize how the estimation works on the next slide. Let's go back to the quadrants that you have seen before. The first equation estimates the slope on those observations that have experienced an initial decline. So in this specific example, we assume that those that initially declined have recovered afterwards, which means that the slope will be negative. So we have a negative row minus. The second equation estimates the slope on those that experienced an initial improvement and here again, we assume that they are located in the lower shaded quadrant which means that those that initially improved subsequently reversed. And again we have a negative slope for such a case. In this example, the slopes are equal meaning that declines and increases are reverting in a symmetric way so this would be a typical, a case where we have random noise or random fluctuations that are reverting, due to a statistical phenomenon that is called mean reversion.

So they are reverting to their mean. They are fluctuating and reverting to their mean. So how would the resilience look like on the next slide? You can see an example where the slopes are not aligned anymore but we have a convex shape. So here the rate of recovery of declines is larger than that of improvement. So it's larger than expected due to view randomness. This would be one example of resilience. We also have other possible cases that I'm not going to show here. Another example that I want to show is on the next slide, where the rate of recovery on declines is lower than that of improvements. So it's lower than expected and here, we would have a case where we have recovery without resilience on the next slide. I also want to show that we could also have observations located in the other quadrants, so you've what you've seen until now, are always those that reward the changes that reworked, but we could also have the changes to not

reward so we could have that declines are followed by declines and improvement; improvements followed by improvements in that case, the slopes would be positive and this can be modeled by the two equations that we have with positive row plus and row minus so the model is actually pretty flexible.

And on the next slide, you can see that we have a lot of different cases depending on the values. Lateral minus and or plastic and the combinations that we have between the two. So the model can accommodate a wide range of dynamics, so we ended up with 11 different cases of which only three are what we call resilience. In our framework, I will now move on so with the next slide, I will move on to showing you a few examples where we apply to this model to survey data. So next line, the outcome, the outcomes that we have looked at are dietary diversity measured weekly and daily, so we measure dietary diversity by using dietary diversity scores, which count the number of food groups that were consumed by an individual in the past week or in the past 24 hours, and the food groups are determined using the whole classification of foods and the score ranges between 1 and 8 food groups.

The second outcome that we look at are women's body mass index, and the third outcome are children's weight for height z scores and the population that we look at are women of reproductive age so between 13 and 47 years old and children aged two to five years and the data that we have is from three different countries. So we have household survey data at the Nutrition Innovation Lab that was designed for different purposes, and measuring resilience but because the data is so good for measuring resilience in the sense that we observe quite a large cross-section of individuals at repeated points in time we could use it to measure resilience.

So the first country is Nepal where we use the potition survey which is a national representative survey from which we only use data for the Terrai region. We wanted to keep all the data points and only the Terrai had sufficient data for all time points because in the other regions, there was an earthquake that affected the data collection. So the data from Nepal was called, collected every year between 2013 and 2016. So we have four points in time for Bangladesh, we have a household survey from the Feed the Future zone of influence. The data was collected between 2016 and 2017, every six months and for Uganda. We have data from six weeks districts, from northern and south southwestern Uganda. The data here was collected every two years between 2012 and 2016. For both Bangladesh and Uganda, we have three points, three successive observations for each individual household on the next slide you can see the results the estimation results that we obtained for Nepal. So this table only shows the estimates that we obtain for row minus, which measures the reverting tendency of the clients. So what you can see here is that we have negative and statistically significant coefficients for weekly dietary diversity. Only so, we do find resilience of weekly dietary diversity for both women and children but not for the other outcomes. And just to give you an intuition of how to interpret these coefficients, so let's assume that the dietary diversity score declined in in the first period by one food group. The estimates suggest that this decline here was reversed for women by 36 percent. So by about a third and for children, for it was reversed by about a half.

For daily dietary diversity, we don't really find anything that is statistically significant for anthropometric outcomes. The results are really different in the sense that we obtain positive coefficients. So, positive remember means that the declines are followed by further declines. So

basically, these biological outcomes appear to be persistent over time at least based on our model estimation and on the next slide, we have the results for Bangladesh and Uganda here. Again we obtained for all outcomes and both for women and children, only positive coefficients. So again, we have that declines are followed by further declines so we basically didn't find resilience according to our model and definition here. So now in the next step and on the next slide, we had a closer look at Nepal where we found resilience of weekly dietary diversity for both women and children. So what we did was to look at how their resilience varied across households and across these streets. So we looked at quite a few different characteristics, and I will only show you some of like a snapshot of our results which were most interesting, so who is most resilient.

On the next slide, we have household characteristics. So we looked at a wide range of household characteristics, from agricultural practices to household wealth income, access to credit, membership to different groups and so on. And here, I'm showing a snapshot of the results that we had for women's weekly dietary diversity. So these are the coefficients and the coefficient estimates and they're 95 percent confidence interval. Negative coefficients again mean a stronger reversion. So more resilience and positive coefficients mean less reversion, so less resilience. So what we found is that, women and children from more market-oriented households as well as those with better access to credits were more resilient so you see households with more one or more credit, had a negative coefficient, statistically significant. Also those households were, which sold a larger share of their own crop production. Women and children in those households were more resilient. On the opposite side, were those from households that consume the larger share of their own crop production. So this mirrors the other results when we looked at geographical locations, So on the next slide, I'm showing again a snapshot of the results. We found that women and children from districts that had a more developed infrastructure were more resilient. So by infrastructure, we mean hospitals roads supermarkets post offices and so on. And here, we found that those districts with more female teachers. So this implies more schools were more resilient. Also those with more post offices as well as those with more different types of supermarkets, were more resilient. And with this, I'm finishing my presentation and I will hand over to Patrick to talk more about policy implications.

Patrick Webb

Thank you Sonia. From the level of participation, the interest in the chat box and very useful and interesting questions. It's quite clear that this is not just a challenging topic but one of great importance to many people, especially those who are tasked with programming in for resilience in vulnerable or fragile environments. So next please. I'm just going to show a couple of slides no more than four, and then open up for discussion from our own data. I just wanted someone, Salvador was asking about seasonality, how things change over seasons. And I responded to him saying that the data that Sonia was showing for each country was collected at the same point in time for each year, because panel data need to be comparable. But if you look at this particular diagram for about a thousand households, sorry 340 households, peri-urban households in Nepal. What you see is very, is that different levels of food insecurity by season number one but especially by farming household, versus non-farming households in the same community.

Next slide, click please. The blue lines are the farming households. Next click. And what you see here is the levels of self-reported household food and security, same community yes over

different seasons is way higher among non-farming households in those communities, but across different months of the year which relate to the agricultural cycle price variability, in relation to food in the markets, employment variability, as wage laborers and so on next please, so we have to understand seasonality. Also many people have been asking questions about shocks so there were no specific shocks involved in the assessment of the data that Will and Sonia were talking about that said in Nepal, unfortunately we were able to almost have a natural experiment. Next click please. Because of the Nepal earthquake which affected, unfortunately killed many people and certainly affected large parts of the country and within our sample, the Pochan survey we were able to look at conditions before the earthquake and then after the earthquake and this shows that, next slide, interestingly those livelihood activities that involve cropping and livestock production, were the best recovered let's say at least not recovered right, So they recovered more quickly in 2016, despite a large shock in 2015.

Other livelihoods other kinds of activity for example the first bar at the bottom the loss of employ wage employment, salaried employment that was seriously a problem, as was loss of money and valuables. Due to the physical damage, now does that mean therefore that those engaged in agriculture and livestock were more resilient? Well in one way, yes they were relatively less impacted by earthquake losses and they recovered relatively quickly after earthquake losses, but that is just obviously one small dimension of the resilience question in a high, in a large community where not everyone is engaged in agriculture. Next slide. So just a few things to think about from what will and has been talking about in particular we need to and these are questions we need to be thinking about, at what level do we measure resilience? Could it be a net resilience given that there are winners and losers in shock conditions as well as stress conditions? Some households gaining some losing some communities and so on. Should we be thinking of resilience at the zone of influence level? Should we be thinking about system level? Resilience versus trying to measure it at individual households. Although those outcomes do matter of course secondly, there's never, there's rarely just one shock to be worried about covariate shocks. There are increasingly stressing systems, food systems in many parts of the world. Covariate meaning drought plus locust, plus longer term climate change, plus army worm, plus armed conflict right, may be happening at different times, different places but resilience programming, we can't rest on its laurels by say improving the resilience of just one sector maybe agriculture or maybe health delivery systems right, if a system is to become more resilient there has to be greater resilience to a multitude of shocks over time.

We got the clear sense from Sonia that you need data over multiple points in time. Someone raised the question, well you know, when do we know we've achieved resilience? Okay great question. Over how much time do we know that we've improved resilience? And arguably that relates to the kind of resilience we want to achieve. Whether it's at system level community or household level. Whether it's nutritional resilience with nutrition and diets. You can't wait a long time for things to get better because the child dies or serious malnutrition is used there, has to be an immediate response. Some other dimensions of socioeconomic development could take a bit longer and need to be measured over a longer time frame right. So it's not one threshold is going to apply to everything and then the real challenge of attribution of intervention which is a major problem in all kinds of programming and development activity, but there's as the humanitarian community, community has long known and long understood.

It's very challenging to calculate, estimate and enumerate how much you protected by resolving or preventing a shock from having its worst effects right. By protecting past gains compared with estimates of future gains that might have been foregone right. So it's one thing to measure losses houses, lost income, lost live number of cows, but it resilience is more than that it's protecting past gains, is protecting future potential development and these are things that need to be understood. I just see you know, individual resilience in terms of mental health that's definitely a longer term dimension. And we have to understand individual trauma and community level trauma in the context, not just the things that are of concern.

Next slide. And I believe so. Let's talk about it. I mean we can make households more resilient through various kinds of programming, it can be argued that a lot more needs to be done to make systems themselves more really resilient, not just food systems in a generic sense. But the services on that deliver health care the markets, the delivery of inputs, the asset accumulation, the income flows. The flows matter as much as the absolute amounts lost or gained right. How are these? How can we strengthen systems to continue to deliver during and after shocks? Is one very important question resilient systems are going to there. Then that deliver let's say income or health care or better nutrition, can then support additional outcomes across the food system recall. The conceptual framework that I showed up front that USAID uses now gains are needed across the food system to make that whole system more resilient. So purchasing power jobs wealth accumulation cognitive development educational attainment all of those are multipliers that come from strengthening the services, that deliver other things and then importantly, preparedness resilience requires us not just to build back better but ideally to make to be prepared to respond better during periods of stress, to target better, to tailor better by understanding where the weaknesses the fragilities lie and planning ahead in terms of what kinds of interventions might be necessary to address the problems that manifest attribution. I mentioned what might, what might, what didn't happen because of an intervention is very hard to value, it's very hard to measure, it's very hard to convince a donor that what you did prevented something from happening. But I think we do absolutely have to pay more attention to how to do this. So broadly speaking we're here. We've just been sharing some preliminary thoughts, some preliminary analyses to start thinking through some of these questions, from a nutrition and dietary lens and to bring more metrics to bear on questions around what should we measure? How should we measure it? What is the quality of evidence needed? The periodicity and so on.

So with that last slide, I believe we will return open the floor, do we have any more slides that we occur? So we're acknowledging the various funding streams mainly from USAID, both from Washington and from the missions in these countries as well as the national partners who were instrumental in generating the data, the panel data, large numbers of households in each case, that were underpinning these analyses. Next slide. And I think we're there so we will now go to Q&A and I'm I've already seen we have lots of great queues and we need a lot of different a's from Will and Sonia, and for many others who are interested in this, so Will I'm going to with you a lot of interesting things we've got a question from Elana on how can we differentiate or should we differentiate between community shocks that apply at a community level versus individual level? Obviously, individual households have shocks like prime age mortality of income earners and so on, but there's different kinds of shocks at the community or systems level. And there may be overlapping effects but you know, how should we be thinking about those kinds of things?

Will Masters

Yeah. I mean, I think that's a great question and it's also echoed in the other questions that people asked. and the main thing I would say is that because we're enlarging the frame so if you think back to the food systems framework where resilience underlies the entire pathway from or set up pathways, from different kinds of shocks, different kinds of stressors, climatic social and individual all the way out to the outcomes of interest what we're really doing is asking for a lot more data so because resilience underlies all of these different things and extends in more dimensions especially over time that we're really saying, this is the time to recognize that our understanding is limited by the frequency of surveys, the diversity of populations that get surveyed and whether proactively the world community not just USAID but other interested in global public goods, are funding the kinds of surveys that that we've done and that we've used here. So it's really about getting enough observations of people who are experiencing different kinds of shocks without that, we can't tell the difference one chalk or another different kinds of outcomes without that. We can't tell the difference in different outcomes and then different populations without which, we can't tell the difference between resilience of one caste versus another, resilience in one region versus another, this is really a recognition that when you ask deeper questions you need a lot more data. I hope that's not punting it's giving a clear mandate that when you, when you set out to improve resilience that's signaling very clearly an appetite, a need for just a lot more surveying. Basically you know a lot more data collection not just household surveys, but also following you know, been huge strides in climate measurement, huge improvements in other kinds of environmental metrics and we're getting big improvements in market level metrics. What's happening at the marketplace, in terms of the variety and prices of foods and so forth? So rather than give a sort of answer based on the fragmentary evidence that we already have, I would say the main answer is when you're asking these deeper questions you need a lot more data I think.

Patrick Webb

That is not punting that's a reality. And much of what Sonia was talking about was how important it is to have a rich and large set of data? Can we close the slides, the slide sharing? Grace, so that it's easier to see everyone. Thanks. Other questions are the... you know an important one obviously, a lot of people concerned today about the effects of COVID-19. Anita was asking you know, how does this play out in in negative effects of COVID? I would argue that what you've just laid out is very relevant and very applicable but how would you see that?

Will Masters

Yeah. I mean one thing I would say is that while we were able to think a lot about resilience using the existing methods and data that we already have. So here, we've been talking about novels, new aspects of Brazilian right? But it's also helpful to think about what do we already know, and so most of our understanding of COVID comes from what we already know, where you know the key thing is overall livelihoods, where the most devastation has happened when people when people's livelihoods were cut off. That's when the sharp reduction in dietary intake, where the wasting occurs, where the households with widespread stunting. I think we will look back and see this as the most widespread mass stunting event in in h an history, where in terms of numbers

of children exposed to a sudden decline in household income, it's primarily where people have lost their livelihood, not where access to food supplies were cut off because our food supply system has been remarkably resilient. So that's the first lesson of resilience understanding in COVID is that most markets have continued to have a diversity of foods at reasonable prices. What's happened is that certain categories of household, have lost their livelihoods, and of course many millions of others have been impacted directly from illness.

Patrick Webb

So one interesting thing from a question from Abdullah. Have we considered the role of social safety nets or other interventions? That that is a perennial one and a very yeah very interesting an important question Abdullah. Is in a sense do you consider the response to a shock or a crisis endogenous or exogenous to what's going on right? So it's endogenous to the resilience but it's like potentially exogenous or not right. So it depends how you, how you use that concept and yes we were looking in looking at the quality of diets, it's not just based on own production, it's based on purchase of food. In all of these cases, even rural Bangladesh as well as Nepal and Uganda. And so resilience matters the income to buy food and the determining the choices of affordability, depend very much on whether or not there's social protection income transfers, short in short-term wage labor or salaried employment by someone in the household. But yes the role of social protection with or without humanitarian response to a shock has to be considered and has to be taken into account in collecting data of this kind and I see will nodding but any do you want to amplify on that?

Will Masters

Yeah. I mean the one clue that we got I mean there's a relatively small sample of population that you saw from senior slides, the one clue that we got was more market connectedness, more access to markets households with credit they were able to weather the shocks better. and so that does suggest that public programs that provide cash safety nets could substitute for the household's own cash in that way, so that once we think about market connectedness as providing the kind of diversification options where someone who does have credit from credit sources lending them in the past, they have more diverse ways of coping households that are buying more from the market. They have more diverse ways of coping than one which is just reliant on a particular income their own farm for example. So that's one way in which cash is exceptionally versatile. Cash confers resilience in a very powerful way. Cash for converse resilience, because it's only cash that allows you to go to different vendors, to go to different marketplaces to get different kinds of resources when you need them, it might be medical care, it might be transportation, it might be communications. You know, cash to fix your cell phone or something and only cash provides that kind of versatility. So there's a very special safety net role for that flexible assistance and we get some hints of that in our data.

Patrick Webb

Though in addition to cash as several people are pointing out, there is some role for social capital not just monetary capital but social capital, social cohesion. The networks that you have or don't have are part of social protection if you like right. So if you have the ability to borrow from a

friend or a neighbor or family member or they share food or they are willing to take your child to live with them you know, that dimension of social capital is also really important right?

Will Masters

Yeah, yeah. And it would be terrible and there's in previous studies you know, a little bit of evidence that sometimes, social programs actually erode that social capital the people would come to rely on the program instead of building their own informal networks. I think in the main they complement each other in the main in the us for example the degree to which households have snap the more, they can help each other snap is our principal social safety net in the United States. Today, when a household experiences catastrophic illness, job loss, other kinds of disruption, the first line of defense is to obtain what we call snap benefits. The supplemental nutrition assistance program that is the lifeline that sustains millions of U.S households in adversity. That is our principal source of resilience that is provided by the federal government of the United States. And I think that there is plenty of evidence that that really helps social cohesion because it allows the households under stress to look after each other more readily many multi-generational households, many extended households, exactly as patriarchy.

Patrick Webb

So this different issue by the way, can someone let me know if Sonya is still on? I I don't want to only tax Will, so this Abdul Razak Mumammad was asking well could we just because data collection is so challenging could we just measure child wasting and diversity scores to proxy for resilience everywhere right? And I think the answer inevitably to that is no, because the effects on those two things depend on the type of shock and not every shock is going to manifest in the same way or filter through directly and quickly to impairing diet diversity and wasting and stylish. Shrestha was pointing out that you know, the apparent resilience of crop and livestock households in Nepal post-earthquake is arguably because it was an earthquake right? And that that's the key point earthquakes destroy buildings and infrastructure and jobs to some extent but may have less effect on fields and animals out in those fields as long as the farmers and are not themselves impaired. And so yes, of course, that is very much why that particular kind of shock seems to be farming households, were able to ride it through better than others but that won't apply to every kind of shock so if a locust invasion or a full army worm descending into an area of agricultural productivity is going to do the opposite, it's going to mainly affect the livelihood of crop households and have much less impact on salaried employment, and no impact on infrastructure. So it does matter to understand what are the, what's the nature of the shock and then understand how would that particular shock play out in a given context or for a given particular community well.

Will Masters

Yeah, yeah. And just to be clear Sunny, unfortunately her connection seems have lost completely so we have you know, a lot of resilience here we can keep going but definitely have lost her, which is sort of one lesson about resilience. I guess but it's never quite the same right? You may have recovered in some sense but there's other senses in which you haven't that diversity may have recovered but not others, and the different shocks .. yeah. But unfortunately, we'll I'll let you know if you come back Patrick.

Patrick Webb

Okay thanks yeah.

Will Masters

If she's able to reconnect.

Patrick Webb

Yeah so Maduro certainly has asked a nice question what are next steps what do we what in turn in research terms should we be thinking about next in measurement method and analysis relating to resilience based on what we've been hearing today?

Will Masters

Yeah. So great question. I would say the first next step is larger and more data sets quantitatively and then the next step is qualitative and thinking about where could we find situations where there are either natural experiments or enough randomization in the rollout of a program where we could begin to attribute to particular programs and begin to identify which particular shocks might have more resilience to from certain types of insurance or safety net programs or recovery programs, but honestly I would also emphasize that this is just one of many tools, so this particular seminar, this particular webinar is about just one of several things that the Innovation Lab has been doing around this area. This is not the whole resilience portfolio of the Innovation Lab. So in particular, you know, you've seen the webinars on market and infrastructure you've seen the webinars I hope on animal source foods and on contaminants and on the many different, so we don't want to forget every one of those studies and every one of those programmatic toolkit you know, guidance, research agenda that has implications for resilience, as well that make sense this is specifically a new method about resilience but there's a lot of insight about resilience from all the other ones.

Patrick Webb

Absolutely, and thanks for thanks for reminding us all that all of these are pieces of a large puzzle and you know, policy intent takes a lot of these different elements together and tries to work them together, weave them together, some work together, some are synergistic, others are quite distinct and we have to be thinking through what is most appropriate, for what we want to achieve and ASA GITZ has asked, she thanks on the methodology and was wondering could this methodology be used to assess resilience for the same beneficiaries to a single comparable event over time before and after an intervention? You know, could you use this linked to program to some kind of intervention and of course what she's pointing out is that it's very hard to find a comparable, a comparison group right, a control group for statistical rigor when you're looking at something like resilience to a shock which you can't always predict, where it's going to happen? What it's going to be? Who's going to be affected? So is this useful at all in terms of trying to understand programming impacts?

Will Masters

Yeah, yeah. I mean I would definitely emphasize the importance of making that round trip from more sort of quote, rigorous statistical research like this, back to the qualitative understanding that people have about their context and their programs. So it would be insane like literally crazy to not take action until you had you know, a peer-reviewed study proving that that thing was right. If you did that no one would ever do anything for the obvious reason that you wouldn't have done the first thing that would get you started. So it would be insane not to act until you have rigorous peer-reviewed studies that we have. So clearly that's not what happens. What happens is that people making programmatic decisions setting priorities setting out an agenda involves contributions from research like this. That I hope give kind of insight and examples. And people can speak about what that evidence from Nepal suggests about some other work in Ethiopia, or somewhere else and then someone else with experience in Ethiopia because they know that doesn't apply because of this qualitative reason. So my hope is that this is not at all a message of oh you can't know about resilience until you've measured it three times. Because our metric only exists when you've measured three outcomes and then you can ask is it more resilient than the other people not in that community? So the basic idea here right would be that we want to take each study, each kind of data, as one more piece of evidence towards an overall holistic view.

Patrick Webb

Yeah that makes a lot of sense. One thing that Andrew Thornleyman who's also associated with the Innovation Lab from Johns Hopkins was interestingly talking about the data requirements, he was proposing maybe what we what might be useful, is more clusters of fewer households across an area to get more granularity in a sense to get more, get closer to estimates of you know, who is resilient to what by basically collecting at a much more granular level, and probably at a more frequent time frame as well. Yes, if we can find somebody to fund that kind of research, that would be great but yes this this speaks to the continuing need for this kind of discussion about what are the appropriate data requirements. To say okay now we get it now we've understood this enough to support interventions x y and z right? So this is a good question Andrew, I certainly don't know you know when we'll be able to do this but let's see. Gian Pietro, the cow it was talking about going beyond cash you know, are we able to say anything more about other sectors that can enhance resilience? And so yes, I mean so far we've talked about cash through social transfer and other means and social networks, but of course many different interventions can support resilience and it depends then what which outcome you're trying to act on right? And so washing well would be absolutely critical to prevent diarrheal disease outbreaks in the context, say of a communicable disease outbreak right? That could enhance the resilience of communities, agricultural and interventions could well be important, are likely to be important you can imagine small-scale irrigation being an intervention that improves the resilience of crops to drought and making harvests in certain areas, more resilient to a whatever you know, one in five year drought by ensuring that there's water management and so on. But yeah, what do you think on that Will?

Will Masters

Yeah. I think that's a fantastic question and an area in which USAID has actually been a very important thought leader. I'm an innovator in particularly with respect to these studies that are called benchmarking studies so in a few contexts there's been cash versus something else and

asking when is that something else better than cash. I mean the answer is when it's providing some kind of public good that people can't buy with cash. So your example of wash is a perfect example of that because no amount of money will buy a reduction in environmental ecoli exposure and so forth for example, open defecation and sanitation in the water supply, the contamination issues that Innovation Lab has looked into. Similarly no amount of cash can build the infrastructure say for marketplace management that could have competing vendors, with diverse foods. at the weekly market in a given village, no amount of cash money will provide for primary healthcare facilities, say for perinatal and natal care, so those things cash can't buy, so a public good provision with technical assistance with financial aid but ultimately local government, and a country's national government are indispensable and so the USAID benchmarking studies have really shown that tradeoff, when the households need cash to buy what's available in the market and when does what's available in the market need to be supported by the health service provision. The wash provision, the agricultural technology and extension provision, the irrigation that Patrick mentioned and so forth. So it's a very interesting question what is government for and what is cash flow and we now have a much better understanding of what can we get for cash and what do we need to provide in kind because they're very different things.

Patrick Webb

Yeah, very well put and that speaks to Adam Salberg's question about labor migration and remittances right, I mean that's another form of cash transfer but from family networks so that that's one of the many ways in which social capital networks can facilitate cash transfers whether it's digital transfers or physical, and there's a different, there's another additional dimension to that labor migration of course. labor is not necessarily static and one way that many communities manage shocks is actually to move. And so they're understanding the opportunities and constraints to migration to seek either help or income, is another important dimension right? And that's, that's in a sense where infrastructure markets businesses you know, all play a role where can we, where can Nepal migrants for example rely on jobs when in the context of a shock that may cover the locations they would normally have migrated to right. So there's an element of dynamics there that we need to understand and to also think about the scale of a shock not just the intensity of a shock because the larger the scale of a shock the more opportunities it can close off, for those most effective. So thanks Adam for that question. Colleen O'connor was asking about preempting shocks you know, what kind of transfers can act as almost a bank before shocks and are there any examples of programs or policies that try and preempt the effects so thereby bolstering resilience is that something we can talk to?

Will Masters

Not yet. I mean, I think from other lessons you know, there's certainly a very big role for household capital a household's own assets. There's a very big role for social capital that could be built up ahead of time there's a very big role for you know other preemptive steps, where we're beginning to see okay, if households have more liquid assets so there's a lot of interest in the question of cattle as a buffer to what extent you know, when crises begin to hit cattle owning pastoral communities. The value of their livestock plummets and that's a huge source of vulnerability, so if there's some way to ensure that the value of the asset doesn't fall so much, that could be very helpful and I think this is really getting to one of the key insights that relates to a question that Liber and Currenziza asked which is about geographic extent of shocks and

geographic extent of resilience. Where I think one finding that we're beginning to get from data on social networks and mobility, is that geographic diversification is hugely important so people being able to move has been a huge source of resilience for human populations. So my ancestors moved a lot thousands and thousands of kilometers and then ultimately to the United States in the late 19th century. I think most people's ancestors moved a lot and what we're seeing there is survivor bias that the people who have are still alive are those who were able to move around and benefit from geographic diversity, but also even when you're at one place being able to source food from many different places, and being able to sell whatever you're selling to many different places, is probably the single most important source of resilience we think about all the sources of resilience that you could preemptively put in place. the most important one I would think is probably something about mobility freedom, opportunity to access different resources in different locations, because the locational the patchwork nature of resources especially in agriculture, is really evident whenever you have flooding climate shocks, hurricanes, natural disasters of any kind you know, if the earthquake in Nepal had been everywhere in Nepal it would have been a very different story. It was geographically constant and similar. So many other things and just to close on the just the terribleness of COVID is in part its ubiquitousness, so you may know, that in the United States today COVID is growing rapidly everywhere there's no place in America with few exceptions really you know, something like 10 or 15 percent of counties in the United States now have not had an increase in COVID county level beta's very fine grain level, so anyway the point is that covariate shocks that happen everywhere are pretty rare and particularly devastating. And so geographic diversification has been a really key source of strength.

Patrick Webb

Yeah, very important. Madaku asking how these kind of issues findings can be relevant to the household level? And I think the two obvious ways one is better understanding the challenges facing or the shock facing those households and better understanding how to tailor and target appropriate responses. Whether it's at a program level social protection at a national level or a social capital, more broadly. So these are questions that we do still need a lot more work on. We still need to find out how to measure these resilient, these vulnerabilities, what resilience means to different classes and categories of people in different contexts and then how to find the right metrics and the right granularity of data collection to tailor and appropriately fund the necessary responses. I'm actually gonna start bringing us to a close here especially since we have so many Asian participants and it's late at night for you this is I think been an extremely thought-provoking webinar, if I do say so myself we've had a lot of chats in the chat box, saying exactly that I too have learned from many of the questions and comments that have been put out there. This isn't certainly not the end as Will said, this is one piece of, this this category of work, and we need to know more this this issue is great of growing importance globally and has not yet received arguably the kind of rigorous empirical scientific research that it truly deserves to better inform policy makers, donors, governments and programming staff on the ground that's the goal that's what we need to achieve and this is just one small contribution to that.

Will any final words?

Will Masters

Yeah. I would just go back to the opening side of the setting the stage, just how recent this focus on resilience really is. And how kind of in front of others, USAID was and saying that this was a

way to think about resilience to climate crisis resilience, to political and state fragility, to resolve these complex emergencies in a more cost-effective way that was the original framing if you recall of this of this work, how data hungry, this work is if you want to get completely included we will have to have more frequent surveys or persistent surveys where you go back again and again to the same place even after the programs have ended, and more diverse surveys where you're surveying different communities. Because without that, we can't really tell. But then the closing point is we can't rely on quantitative data as the, as the answer here because we will not have that data. You couldn't wait, if you waited to act until you had the data, it would be far too late. So we need to bring together everyone's perspective with a wide range of experience around different shocks, in different places, to put together the whole picture. And I think we're beginning to do that in a very exciting way. So thanks very much for all the feedback, all the comments, in this in this webinar and also other events that we've had in the course of the project. Is this hasn't been presented in a variety of venues and audiences, and it's gotten very interesting responses. And we're, I hope, contributing to what will be just you know, a wide range of new work on this in the coming years.

Patrick Webb

Yeah thanks Will. I can totally agree, the work has improved based on the presentations and the feedback and thoughtful questions that we get and thoughtful insights that are shared. So thank you everyone for being so active. I think we hit 275 plus participants early on. So this is the last webinar in this particular series, but fear not. There will be a second follow-up series of webinars from the Nutrition Innovation Lab with its many partners, probably one look for one that may happen in December, which will be actually focused on new work in Jordan and relevant to the Gulf states in in terms of maternal and child nutrition issues, exclusive breastfeeding and metabolic disease growth in those areas. And then half in the new year, we'll have a whole new sequence of webinars that we're working on lining up for you, delivering the latest science new insights and hopefully, a little bit of fun along the way too. So appreciate you all of your participation, active engagement and we're very, look much looking forward to seeing you in the next lot of webinars. Thank you, stay safe and stay well bye.



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