The We Society: Population Data Destiny with Andy Tatem

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Transcript

Will Hutton

"Population is destiny", declared one of the founding fathers of social science, the great French sociologist Auguste Comte. How young, old, growing or declining, how big or small your population determined a country's economic and social health. And that maxim's never truer today. Especially in the Global South whose governments suffering the threat of drought, famine, pandemics and sometimes fearful natural disasters have to come up with some kind of response. But the first precondition is knowing how many people, men, women and children are living where. Hard enough in the developed world, but impossible in less developed countries.

Coming to the rescue is data. Good data. Step in Professor Andy Tatem. As a Professor of Spatial Demography and Epidemiology at the University of Southampton, he's the Director of WorldPop, a research group which brings together accurate data on population distribution and demographics with high definition satellite imagery, which is becoming the global gold standard. With a focus on leaving no one behind in humanitarian efforts, he's become the first port of call of UN agencies and our own Foreign, Commonwealth and Development Office. Andy and his team's research, it's an amazing tribute. Social science, doing global good.

Great pleasure to have you here. Welcome to The We Society.

And when we invited you onto this curiously named podcast, what was your first thought?

Andy Tatem

My first thought was, thank you very much. I'm very excited to be here. But also, on The We Society name. It got me thinking in the perspective of our topic today, that you and I are lucky to live in a society that despite all the newspaper reports and social media feeds, is functioning. And I can send my kids to school, I know there'll be enough schools, I know there'll be enough teachers. I receive a voting card for local elections. And that's because we've all worked together as a society over the years. And the thing that oils a lot of that is data of knowing how many people are where, and when, and being able to allocate resources effectively. If you go to a country where that's perhaps not happening, where there are populations routinely missed from data, they disappear from policy making. They disappear from having their political representation. And there is where, maybe if you asked someone there, they do not feel as part of a 'we society'. Maybe there they feel left out.

Will Hutton

Well, you've kind of made your case in giving your answer. Well done! But tell me you know, when I when I first kind of looked at this, I thought, "Auguste Comte", you know, "Population is destiny". You know, I thought "OK, maybe it's the core thing"? Maybe population is the Alpha and Omega. It's where you have to start, particularly in the Global South. The majesty of what you do. I mean, just give the listeners a sense of it.



I think we partner with governments around the world with UN agencies who are struggling to fill gaps that are increasingly existing in population data. And as I just mentioned, population data underlies so many decisions that we and governments have to make in terms of resource allocation, political representation. If we don't know that a population or a demographic group exists, then how can we effectively allocate resources? How can we be sure that we are including them in decision making. This is where we came in to try and support these governments with some of the new types of data and technologies that are increasingly becoming available, and trying to think of ways together with them, how can we fill these gaps when we cannot go and knock on doors and count everybody every single minute of every single day?

Will Hutton

I just got an image in my mind and it's probably right that your centre is like a mini NASA, you know, and that the there's kind of all around the world there's images coming in from satellites and you're constantly mapping it. And you can tell us where people are in Kenya, you can tell us where they are in Ghana you can tell us where they are in Brazil. You know, is it like that?

Andy Tatem

Not at all. It's...

Will Hutton

I got it wrong!

Andy Tatem

No sorry. It's... Well, it's like any kind of other office. Some of the group is overseas working together with a National Statistics Office or a UN agency to try and understand what the problems are they're facing and design research together. And doing that in a way that ensures that the decision makers can understand what's being done and be able to communicate that to the public or to their presidents.

Will Hutton

Well, how do you identify where to start? Which countries, which areas, which are they? Which are the... Where's your, you know, where's the low lying fruit?

Andy Tatem

Well, it often nowadays comes to us. I think we started in the early days of WorldPop just thinking about. What can these satellite imagery do? What can mobile phone records do to try and estimate and map numbers of people more accurately? That prompted academic papers, a bit of news reports and then the UN agencies who are supporting these governments were trying to fill gaps in the data, saw this is a possible solution, in the fact that we cannot raise billions to support censuses around the world every single year. This is a possibility to fill some of those gaps. Not replace a national census, but as a way to fill those gaps.



Will Hutton

Now there's 7, over 7 billion mobile phones in the world, and 7 billion people. So how essential to your work is the fact of the mobile phone, and in what way does that help you collect data?

Andy Tatem

So, the mobile phone is one component of things, and it's a very useful one when you're trying to understand how people are moving around. Nowadays we're all carrying them, and maybe 20 years ago it would have been a pretty terrible data source because not many people had phones.

Will Hutton

But these are... Sometimes people are trying to search are... I mean, they're not, I mean, people living in remote rural areas.

Andy Tatem

Largely they, yeah, the number of phones has massively increased. We still need to understand importantly, who has the phones, how are they using them. Whether that represents one phone as a family or it's, everybody has phones in that family, or they're changing network operators all the time, or they've got a smartphone and they're using Facebook. Things like that really help us understand how to properly treat aggregated and anonymized data. It's important to say that because it's quite sensitive data, coming from mobile phones. But it gives a broad idea of numbers of people, as long as you can account for some of these biases. And this is important thing where social sciences comes in to help us understand those populations and methods, for measuring those demographics of those populations.

Will Hutton

Give us a sense of which governments? Which countries have come to you? In, I don't know, the last couple of years and how you've helped them?

Andy Tatem

So, there's been, yeah, there's been quite a surge in recent years because of COVID. There was a plan... Every country plans to do a census once every 10 years, and it tends to be around the 2010 mark, the 2020 mark. The problem was COVID came along, and many countries could not go door to door, knocking and spreading COVID around. They also had a lot of their budgets taken away for COVID response. And so, we had quite a few countries in the past few years coming to us saying our census has been delayed or we cannot do it. So, one country, for instance is, Papua New Guinea had planned to do a census in 2020, their last one was 2010. Increasing uncertainty in the numbers of people in the country, where they were for country planning, for allocating resources. And so, we worked with the UNFPA, the agency for supporting census and population numbers and the national government, to work out what data did exist that could help us. We worked together on methods. We found data that was produced through a distribution of bed nets and as well as...

Will Hutton

Sorry, of bed nets?



Yes, bed nets for malaria control. So, they're often health campaigns that are going out. So, this is a situation where maybe there's a different part of government that is collecting valuable data on populations. They're going out and surveying sample communities to work out how many bed nets am I likely to need. And that's data on population counts that's collected more recently than the National Statistics Office. So, you have the potential there to make use of all kinds of small sources of data to then link up with things like satellite data and mobile phone data to come up with estimates that are more recent and more reliable. And so those Papua New Guinea estimates are now on their official National Statistics Office website.

Will Hutton

And you did that, and you and your team did that?

Andy Tatem

Well, yes, I guess us together, with UNFPA and the country office. And it's important to have that country ownership, because they're the ones who are ultimately using those data and making decisions on them.

Will Hutton

When you say "decisions", are those decisions about the availability of, I don't know, vaccines, the availability of doctors, the availability where you might... If you've got, you might build a road, where you might put a mobile telephone mast, whatever it might be, I mean, that's what you're talking about?

Andy Tatem

Yeah. And then the National Statistics Office has the mandate to produce the official statistics that then the rest of government uses to do all the things you're talking about. For taxation, for the actual number of GDP that the country has, for electoral planning, for allocation of where to position schools, where to put a health facility. And it's all about also doing more with less. If you have that good data at small area scales, you can target what limited resources you have. And make them go further and ensure better equitable use of those resources.

Will Hutton

So what? What fires you up? Is it being a bit of a sleuth in actually coming up with, as you did in Papua New Guinea, with bed nets? And what's driving you?

Andy Tatem

I think it. I mean I think it used to be, I used to be a more traditional academic where I would be interested in a specific challenge, and I was trained as a geographer. It used to be not a very cool thing to do. My housemates used to think it was - "advanced colouring in", they would call it.

Will Hutton

That's always the joke, isn't it?



And yes, and nowadays it's quite a sexy topic, I think. We're all using Google Maps there's billions being put into AI to extract information from satellite images.

And so yeah, that drove me at the start to see what I could do with the skills I had. Over recent years I've been much more interested in ways that we can get our research quickly used, and partner with those decision makers. So that, yeah, we can address some of those challenges that they're facing and are increasingly facing as funding for data for this kind of activities goes down.

Will Hutton

Because governments haven't got the money to do a census, the alternative is to come to you, and you'll put it together with a range of data sources that are publicly available but aren't integrated by anybody. I mean do. You ever make mistakes?

Andy Tatem

Mistakes is a difficult one. We are restricted by the amount of data that comes in, it's often garbage in, garbage out. If we only have data that's collected 10 years ago, then we can't possibly hope to just be able to take a satellite image and accurately estimate how many people there are. We have to have something to link it to reality, and sometimes that involves working with field teams who go out and collect that data. Sometimes there has been recent data collection from health campaigns. Other times there's a census, but there are areas that are under conflict and so cannot be reached, and therefore we can make use of the data that has been collected to anchor our estimates and predictions to into those areas that that are in need.

Will Hutton

Just a brief pause. In the conversation to tell you a bit about the Academy of Social Sciences, which is the organisation behind The We Society podcast.

I'm Will Hutton, the President of the Academy of Social Sciences. We're a national body for academics, practitioners, and learned societies in the social sciences. We champion the vital role of social science in our society, from education to government and business. You can find out more about the Academy of Social Sciences work, support us, or read up on our fellows by going to the website: acs.org.uk. That's acss.org.uk.

Now, back to the conversation.

Where is this most useful? Is it used for public health? Is it education, is its agriculture and food. Is it water systems? I mean what... Where is it? Where are the hot spots of demand coming from, and where is your data being most constructively used?

Andy Tatem

It started from the health field. So, after my PhD I went to work at jointly Oxford University and Kenya Medical Research Institute. And we would focus very much there on malaria. And there's a lot of knowledge about how malaria affects certain areas more. It affects certain populations more. But governments didn't have any data on that - of where those populations were, where those malaria rates were higher at very small...

Will Hutton

Really? In 2000 and...

Andy Tatem

They had some data.

Will Hutton

Really what the first decade, second decade of the 21st century they didn't have the data on where malaria was happening? I find that that's incredible.

Andy Tatem

They did, but not at the, kind of, small scales where they could target and design strategies and to be able to get that thinking and decision the flexibility to be agile and allocate resources to places.

Will Hutton

In, in my mind's eye, when you talk about maps, you know, I think about an Ordinance Survey map, or I'm thinking of a Google map. But is it like that? I mean, how do these maps actually look?

Andy Tatem

They look - they can be made to look incredibly pretty. Which is great for kind of academic presentations and for presenting to government ministers and presidents. But in actual fact the useful data is often at a scale of something like a district or a catchment of a health facility. So, what we do is produce estimates at each 100 by 100 metre grid cell in a country or...

Will Hutton

100 metre grid cell!

Andy Tatem

Yes. So, what we're trying to do is bring together all the different types of data that we think can be used to more accurately estimate populations. So, if you think about a city like London, there are perhaps the richer areas that have more, bigger houses. They have more greenery and therefore are likely to be the more the richer ones than the poorer areas that maybe have smaller houses, more high rise apartment buildings. And so, what we're trying to do is build up a picture of the landscape through all these different types of imagery that exists nowadays.

Will Hutton

And what about the ethics of it? I mean, there's got... I mean, this is people's private data. You've got 100 metre cells, square cells, and you sitting in Southampton can know who's in a different part of the globe occupying 100 square metres. It's kind of incredible, I mean. How does it work in terms of ethics and privacy and all of that?

Andy Tatem

I think the important thing is that firstly we don't know, we are producing estimates, and we are producing those often from open sources of data. And the other thing is we're producing those

in collaboration with those decision makers. And we're really producing nothing more, perhaps sensitive than you see on your mobile phone in terms of, nowadays you can go on Google Earth, Google Maps and see individual buildings. And on Google Maps you can look at the roads where it turns red because of traffic.

Will Hutton

But you're more than a kind of global Google Maps. I mean, we can look to Google for that. I mean, you're talking about human beings.

Andy Tatem

Yeah, we're talking about estimates of residential population. Those can fluctuate substantially because of movements, because of migration and those can be highly uncertain. But the aim is to make it a step beyond what exists already. In some of these countries it's been 20-30 years since the last census and decisions are being made on a straight line projection, 2% growth rate every year and assuming that is reality. And some of the datasets we're using can at least make us a step towards accounting for the fact that populations have changed over that time.

Will Hutton

What about migration? It's a story of our age, really. I mean it's transforming politics in the industrialised West. It's hot potato in the United States for obvious reasons. It's a hot potato in Europe. You know, there's populist right wing parties. There's people on the move. You can presumably tell us who's on the move and where they might be going? I mean is that part of what you do?

Andy Tatem

We're working with partners who do work with mobile phone's data. We do work with partners like Facebook who are aggregating their data and working with academics to try and get better data on broad scale movements. What we focus on largely is how those, not so much who's moving from where to where, but how those populations have grown in different locations, and we see fantastic rates of rural to urban migration. We've, we've we talked about...

Will Hutton

Come on, you say "fantastic rates". Come on, give us some examples. Which of the urban areas growing rapidly and which rural areas are depopulating?

Andy Tatem

So, I often look at an example of as a... For instance, there's a small fishing village in Ghana called Kasoa, which in the 1980s had 3,000 people. By 2010 it had 70,000 people. Today it's got more than 500,000 people. Bigger than Edinburgh for instance. And it's those kind of massive growth rates that are occurring through migration into urban areas, and then fertility rates that are declining but are still higher than what we see across much of the Global North.

Will Hutton

Why has that village grown?



Because of proximity to the major capital areas. Because of infrastructure that's there. Because of opportunities for earning more than is possible in a rural village, that are often left behind - and sometimes completely left off the map and allocation of resources.

Will Hutton

Is that the exemplar stuff that's going on around Africa in particular?

Andy Tatem

I think it is. Yes. And the this is the...

Will Hutton

Those are stunning numbers. Three thousand to half a million in 45 years.

Andy Tatem

Yeah, that's an extreme. But there are big shifts going on. I mean we look at the next 15 years, we will go from the projections [that] will go from 8 billion to 9 billion. A large percentage of that is in sub-Saharan Africa. Then in the next 30 years we'll add an extra billion, nearly all of that in in sub-Saharan Africa. So, the world is going to look very different soon, and already we're seeing some of those shifts.

I don't know if you've been to any sub-Saharan African city. I've spent a lot of time over the years going to Nairobi. There used to be one tall building. It's called "The Tall Building". Now, you go back, it's skyscrapers and cranes as far as you can see. So, things are changing so fast in those cities, and we don't... We're sitting in the UK where maybe we have a long planning process to get a small development done.

Will Hutton

How's climate change going to affect all this? I mean, I can see the pandemics and vaccination, I can see natural disasters, how it could... Climate change?

Andy Tatem

It's so intertwined with things like conflicts and disasters in that any kind of shock to the system... Climate change is going to produce more extreme weather situations. It's going to produce competition for resources. So, there's this, this this entanglement of all kinds of things going on that are accelerating changes on top of this massive population growth that we're seeing in some of these parts of the world.

Will Hutton

What about artificial intelligence, AI? Is that going to give you another tool to go a level up, presumably?

Andy Tatem

Yeah, I think we're already seeing some of the benefits of that. So, we largely work with all kinds of open datasets and many now have been extracted through AI from satellite images. So, for instance, Google Research have released a set of mapped buildings across most of the world, using satellite images coming from each year from 2019, I think it is, to 2023. It's an incredible

resource as a basis for understanding where populations are, how those areas have changed. It's not the only resource we can use. We'll get things very wrong if we just use maps of buildings, but it's this kind of thing that increases our ability to understand changing dynamics across the world.

Will Hutton

What do you imagine you'll be doing in 5 or 10 years' time?

Andy Tatem

Ah, that's a fantastic question! I would like to see us develop more of the kind of skills and capacity that exists in places like Latin America and the Caribbean region for instance. We've worked there for a number of years supporting statistics offices that are better funded than some of those across sub-Saharan Africa, some of the poorer Asian countries, and they have been able to take on our methods.

We've been able to go away and focus on the areas that are, again, in more nee. And they have then been able to, with the support of UN and other countries, spread those methods across the region. Support countries like Haiti, that are really struggling. And so, our aim is to move towards more of those, developing more of those kind of regional centres of expertise and excellence that can support across the region. I mean, it's almost working ourselves out of a job, but there will always be, I think, more and more of these types of challenges, new forms of data. And so, in five years, I'd love to say that there is a, not only a node of expertise in Latin America, but in West Africa, in Southern Africa, in Southeast Asia, that is supporting data systems across these regions. I'd love to say that there was also more money coming in to support censuses because those are still a vital resource.

Will Hutton

In the back of my mind, as you've been talking I've been looking... You've convinced me how important this is, and I worry about the British census. Because you know, there's a talk about not doing it in 2031 or 2. What's your view of that?

Andy Tatem

Ideally, we could move towards not doing a census. If we look across to Scandinavian countries, to Netherlands, they have such strong administrative systems that are linked together that generally they roughly know almost every week how many people are in a location, and who those populations are. But in the UK, our systems are not quite so strongly in mesh together like that, so that we cannot quite do that yet. But I think that's the goal that many countries all across the world would like to head towards. And the census is the biggest, most expensive peacetime operation a country will ever do. And it's incredible amounts of money, it's a lot of resources and if you can set up the systems so that you can get the type of information out and in a more regular way, then I think this would be great for the UK.

Will Hutton

So, the census is a is a slightly kind of legacy idea. It's a 20th century idea and you are the future.



I'm not sure it's us. I think it's the future is beyond us. I think it's using all kinds of other sources of data and possibly it could be using satellite data. It could be using mobile phone data as one of those layers. But there are all kinds of datasets that every single day are collected in the health system from mobile companies that can be brought together to get the kind of information that a census produces in a much cheaper, more timely, more effective way to help us make those decisions better and the allocation of resources better. What we're doing is thinking about methods that can be adapted to each situation in each country.

Will Hutton

It is slight alarming to think that governments will have in their power the knowledge in real time of who's where. Now you've tried to, you've got to slightly dodge the ethical question. Saying, "well, no ethical question here, because we're working with governments, United Nations, so we can't, be we can't be..." But come on. I mean there is an ethical question at the bottom of this, isn't there?

Andy Tatem

Definitely yes. I think it's the situation where if these data are being used in a way that is deemed to be negative, to actually target those kind of marginalised populations. Then yes, I agree there is a...

Will Hutton

So how do we protect against that, come on?

Andy Tatem

How do we protect against it is for us is to work with multiple organisations, to make the data as open as possible, to ensure that the methods are published and open so they're completely open to scrutiny. There are... We involved where possible community groups, outside review panels, so that it is not the situation where we're passing over information, data, expertise to a single government who can then close off and run away with it.

Will Hutton

What's the thing that's you're proudest of? So, what's thing that really gets people going? "I've got to come and work with Andy, 'cause is this - I can do more of this". What's the what's? So, we're like leaving our listeners with an upbeat thought.

Andy Tatem

I mean I think there are a few kind of stories of going all the way through the process from basic academic research all the way to seeing an impact. One for instance is Afghanistan where, pre-Taliban we were working with the president, Ashraf Ghani at the time. Saw that they were basing all their decisions on straight line projection from the 1979 census and had had enough of this and so worked with us and UNFPA to come up with new estimates. We worked with the government. Those were those were produced. I went to Kabul to the presidential palace, presented them to him. Everybody was happy. And since then, those estimates have been used to justify 15 million extra dollars for vaccinations. And we know that those data were used to allocate those vaccines, and an extra million kids receive lifesaving vaccines because of that



research. So, it's doing more things like that where we see that start of a research idea all the way to an actual impact.

Will Hutton

In Afghanistan, Papua New Guinea, but - a last one and then we'll finish.

Andy Tatem

A last one. So northern Nigeria, the last census was 2006 and quite questionable field teams have found the results to be. So, we worked with the [government] and they were aiming for eradicating or eliminating polio disease from across northern Nigeria. And we were able to use the satellite imagery, working with field teams, again, there to map, for the first time - some communities had never been mapped, never been visited by census enumerators. And that was used as the basis of these vaccination campaigns. And Nigeria is now polio free and there's independent estimates after that that this kind of work saved the government, around between 50 and 150 million dollars a year because of these approaches.

Will Hutton

Professor I'd like to thank you so much as a very illuminating insight into a corner of the forest that not many people, I think kind of know about. We're delighted at The We Society to kind of draw to people's attention. It's social science working for global good. Thank you so much.

Andy Tatem

Thank you.

Will Hutton

Thank you so much for listening.

The We Society is brought to you by the Academy of Social Sciences in association with The Nuffield Foundation and Leverhulme Trust. I'm Will Hutton. The producer is Emily Finch, and it's a Whistledown production.

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