

Episode 14: The Future of Farming: Can AI and Drones Save Agriculture - or Destroy It? | DevelopmentAid Dialogues

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Hisham Allam

Hello, everyone. Welcome to DevelopmentAid Dialogues, where we explore the heart of humanitarian aid most critical topics. I'm your host, Hisham Alam. Today, we will dive into how modern agricultural practices and innovations can drive sustainable development, ensuring food security, economic viability, and environmental conservation.

We have two incredible experts Kyle Newell, a global leader in connecting smallholder farmers to commercial value chains. Kyle has led pro bono consulting engagement at EY, working as portfolio director for the African Agriculture Fund and co-founded several businesses across Africa. We are also joined by Brian Anderson, former senior director at EY, Parthenon Food and Agriculture Practice. Brian has had worked with major food and agriculture corporations and now helps Agri tech startups to develop go to market strategies while integrating sustainability into the food industry. Hello, Kyle and Brian. It's our pleasure to have you today with us.

Kyle, before we jump into the fascinating world of agriculture innovations, given your extensive travels and work across more than 40 countries, is there a particular local agriculture practice or innovation you have encountered that really stood out to you, something that perhaps surprised you or made you think, wow, this is truly innovative?

Kyle Newell

Think one of the key things is that I think more broadly, we try to almost at times over invent solutions to things and I think there's a lot of things that are just more practical that we're really looking at, especially in development in the agriculture space in the global South. And simple things like asking the end user, what are the particular issues asking what they actually really need. And helping them to be able to achieve



some of those short-term goals really create a lot of solutions that are much more practical than sometimes when we helicopter in and try to over invent a solution. And so, I think it's really a lot of what we're looking at is just keeping it simple, there's a lot of things that are very complex, but trying to keep the solutions as simple as possible because we need to address a lot of various things across the agriculture value chains but keeping it simple is always the best approach to creating solutions.

Hisham Allam

What about you, Brian? You have worked extensively with post established food corporations and emerging Agri tech startups. Is there a particular project or innovation that stands out to you as a game changer for the industry? Something that made you think this could truly transform the way we approach agriculture?

Brian Anderson

Yeah, you know, speaking from a much more developed market perspective. I think precision application, something that people have been talking about for decades, really, since the 1990s, but really, it's only in the last few years that the technology has advanced to a point where, where it's really possible and I think, you know, adoption of the technology as it advances will really change how we think about, applying chemicals and fertility products to our fields. And I think that's probably true globally. We just have to make sure that the technology is accessible.

Hisham Allam

Going from there. What are the major trends in agriculture globally?

Brian Anderson

So, you know, it's a good question, and it's one of my favorite questions to talk about, because I get to wax poetic a bit and put on my professor hat. So, you know, we kind of look back in time a little bit. There are really these phases that agriculture has gone through from the revolution of storage, which seems simple to us, but we're actually still working on it. Right. But as a human species, right, the revolution of the ability to store food so that we can time arbitrage the consumption of our calories and then mechanization, particularly in the early 19th century, and then chemistry, right? In the 1960s, we had the green revolution that came along, we really discovered how to apply fertility products, pest control and herbicides and such to our fields. And then in the 90s, we had the genetic revolution in agriculture where GMOs, right, and really started to understand the hybridization, process so that for non-GMO plants, we can also do much more selective breeding.



And I think it's a question mark about what comes next. What's going to be the next major revolution. So, I'll address kind of the elephant in the room and say, you know, artificial intelligence, AI will transform agriculture, just like it will transform many industries. But adoption and agriculture tend to be pretty slow. It's often, you know, a decade or two behind other industries. So, it's really hard to understand right now exactly how that's going to be transformative. But I will say, you know, recently, there's a really interesting publication that came out or I should say academic paper that came out in the American Journal of Agricultural Economics and what the authors found was that technology that complements labor results in underinvestment of technology on the farm. And technology that substitutes for labor results in overinvestment, right? And I think it's one reason that we see a lot of underinvestment and slow adoption on the farm, because so much of the technology is labor augmented.

You know, it really is about trying to find the technology that's going to be that substitute product, particularly in places like the United States and Europe, where agricultural labor is really hard to come by. And then I know Kyle's going to talk a lot about some regenerative practices, but ultimately, the types of technology that we're talking about, precision application, generative AI, et cetera, are going to be used more broadly to apply climate smart agricultural practices, regenerative practices.

And I think Kyle can elaborate a little bit more on that, but, you know, they'll help us develop better chemistries. They'll help us improve the genetics of our crops and kind of continue down that path that we've been on for the last 100 years of agriculture, slowly revolutionizing how we produce food.

Hisham Allam

I would love to dive deeply with you about the tech side. But after I pass the question to Kyle. Kyle, can you provide prospective for emerging and the frontier markets.

Kyle Newell

Let's transition a little bit away from the very heavily invested components and look at what do emerge and frontier agriculture markets really look like? An interesting a couple of interesting things there's about 610 million farms around the world where 80 percent of the world's food is produced by family farms.

This is a broader concept and then breaking it down into something that's a bit more tangible for the emerging and frontier markets is around 35 percent of the world's foods comes from farms less than 2 hectares in size, which is actually a little bit larger than most farms in emerging markets. But it gives a perspective of, like, there is still an importance of the world food systems coming from emerging markets.

In the global South agriculture is especially and crucially important over a billion people work in farming across the global South. If you juxtapose that into more developed markets in Europe or the United States.



Only 1 percent of people are involved in the agriculture sector. Whereas, in the global South, in some markets, you have upwards of 70, 75 percent of the workforce where people are working on small farms.

And like I said previously, many of those less than the 1 hector. A lot of the big difference between your more commercialized, industrialized farming that you see in a lot in the global North is the amount of investment that is put into the farms. Some of it goes to what Brian was talking about is augmented labor productivity practices, like mechanization. But it goes into other things like seed development access to irrigation, et cetera. If we do a little bit of a thought exercise here for example, the average maize farm in the United States spends over a 1000 dollars per hectare to produce around 11 tons of per hector of maize, comparing that to a traditional smallholder farmer in the global south, you're looking at very limited, investment into that farm producing anywhere from 800 to 900 kilograms.

So, you're looking at a sizable difference in what the farms are actually doing. My grandfather's only 2 generations ago in the 1930s was a tenant farmer and a lot of what is going on in the global South is what had been going on 80 to 100 years ago, even in more established markets, which we may look at now as being a step change difference.

And I think the one of the key trends that we're going to be looking at, especially in the global South is how do we transition from a high labor usage rate to a labor augmented, or lower labor usage rate without creating the gap in overall labor participation, because that has additional ramifications that we might be able to talk about a bit later.

But it's really this transition of how do we invest more into the farms, creating better efficiencies? But not also creating a labor crisis at the same time by moving too many people away from where they're being productively from a labor perspective.

Hisham Allam

And did you find any solutions?

Kyle Newell

A lot of it just comes down to, and some of the things we'll talk about later, but around the elements, like the right government policies, the right investments, the right investments into infrastructure and we can talk about some of that, but there's a lot of things that are just barriers to overcome that aren't going to be simple solutions where we can have a panacea and have a short-term small amount of investment. That's going to significantly help to overcome those particular things.



Hisham Allam

Yeah, I got you. Brian, digital innovations in agriculture we are hearing a lot about drones, internet of things and AI agriculture. How are these technologies making farming more efficient and sustainable?

Brian Anderson

Yeah, absolutely. So, Kyle, let us know if you find the magic solution to these persistent problems in agriculture. One of the most interesting challenges in agriculture is what I would call a persistent productivity gap. Yeah. Um, and that means that, you know, in some parts of the world, we're using AI really efficiently. And effectively, and in some parts of the world, we're not, you know, and as Kyle alluded to, there's the opportunity to really ramp up production in some of the parts of the world.

Especially as we transition from a very labor heavy workforce to a very technology heavy workforce, right? And can improve the investment that we're making in JAKER. So ultimately, you know, when we talk about technology. We're really talking about things that produce more food, right, per acre at positive returns or positive economic returns for the farm themselves. And I think drones, you know, I've done a lot of really interesting things from kind of giving us more accurate field maps, to, you know, being able to kind of scout problems as they happen, they're pretty expensive solutions, right? So, they're not really applicable to a lot of the world because if you're farming just a few acres, you really don't need a drone. The same is kind of true with IOT, right? Things if you are trying to connect a lot of hardware, you're trying to get a lot of data from different data points. It's really important, but it's also not the thing that's going you know, transform the farm ultimately, I think what's going to transform the farm is just increasing access to basic mechanization. I mean, we look at the tractor, for example, it's gotten much fancier. It has air conditioning now and, you know, satellite radio has everything, right? But the basic form and function of the tractor has not changed in 100 years and so we need to continue giving people basic access to this globally because that's where you're going to find the largest productivity jumps, right? It's basic mechanization, basic chemistry applications, basic genetic applications and so forth. Right? And I think as we discover that is what creates efficiency on the farms that your input to output ratio starts to change so that you are investing more per acre, but you're getting exponentially more out of it. You know, as Kyle kind of alluded to and that's ultimately how technology will transform the farm from an efficiency perspective, right?

From a sustainability perspective, this is where we get into that combination of hardware and software where we create something really new and novel and create a sustainable path forward. Thinking about, you know, how do you rotate your crops more efficiently? How, which crops do you grow? What genetics do you need in your crops for this particular year? And that brings me to kind of a final point, there's this opportunity, I think, for education in technology to help people understand, what is a genetically modified crop? What is a hybridized crop? Are these good or bad for you? Are they good or bad for the environment? What are the chemicals that we apply on the field?



I think the more education we can give people about, the positives and negatives of these things, the broader global adoption we're going to get on them.

Hisham Allam

Brian, I totally agree with you, but with this so much data being collected now, how is data driven decision making changing the way farmers operate day to day?

Brian Anderson

Yeah, that's a great question. You know, in the United States, in particular, especially with really large operations, It's really changing how they manage the fields day to day, where they apply chemistries, where they send labor teams to work, where they're doing harvesting, or what time of the day they're doing harvesting, or the order sequence of operations, but ultimately it's helping farmers to really, really optimize their, their efficiency and so at the end of the day, they're making input output decisions and saying, we're not going to put any more inputs into this field because the outputs aren't going to be there for that field and they'll be able to make that decision much, much earlier today than they would have been able to say 20 something years ago. Right. So it's really changing how farmers view that input output function on the farm and where they apply the inputs successfully and I think we'll continue to see that optimization ultimately come forward as yield optimization, and input efficiency.

Hisham Allam

Interesting. Kyle regenerative agriculture is such a hot topic right now. Could you share some of the techniques being used to restore soil health and biodiversity and what are some of the long-term benefits you have seen.

Kyle Newell

Regenerative agriculture focuses on restoring soil health and biodiversity using different types of methods, like crop covering crop rotation. Reduce tillage and integrated livestock management. These techniques will inherently improve the soil structure. Some amounts of carbon capture, but more importantly, and I think a lot of people really pay attention to is the reduced need for chemical inputs, like synthetic or inorganic fertilizers. What's great about this approach is that over time, it can boost crop yields and make farms more resilient to climate extremes, which is a win for both farmers and the environment, which is all about long term sustainability, there is a slight caveat there that, especially for farms that are using these types of inorganic or synthetic fertilizers. There is a transition pathway that is required to be able to get through where you might where, in many cases, you end up seeing a dip in productivity over 1 to 2 growing seasons before you end up seeing the productivity rise again, when the health of the soil, et



cetera, is actually fixed which is in many ways detriment to larger transition from into regenerative agriculture writ large but we're also balancing things that we need to balance the impact of agriculture on the environment, but also need to ensure that we're able to produce enough calories for the world to feed itself. And so don't want to make a transition that if you end up seeing some, levels of productivity dip, that it doesn't end up having a massive impact, over overscale across the across the globe. One other element, especially from an emerging market perspective that often gets overlooked when we talk about regenerative agriculture is that many small-scale farmers have already been practicing regions of methods some because it's the way that they farm for generations, but it's also due to lack of financing that's available to a lot of farmers in the global South to things like access to inorganic fertilizers or machinery for tilling.

So, in a way that these, these farmers have been using sustainable methods for years, one of issues that I think we're still working through, though, is how do we credit these farmers for doing regenerative agriculture practices? Without needing to necessarily validate them in a very expensive way so that they can get the benefits and the cost benefit of being able to sell into more established markets at even a higher premium than some other types of farmers, but doesn't require an expensive accreditation.

Which can many ways can box a farmer out from being able to access a lot of markets and something that they're already doing and created a perverse disincentive for farmers into transition or to maintain rejuvenation of agriculture practices.

Hisham Allam

To follow up on what you have just said, climate change, which is on everyone's mind what strategies do you see farmers adopting to cope with the challenges it brings?

Kyle Newell

Like, with regenerative agriculture, I think one thing to remember is that farmers have been using similar techniques 1 way or the other to try to counter changes and weather patterns or climate patterns. Um, many times when you go to events, like COP, and you get these keywords, and then you try to go and speak about those words to especially a small holder farmer or a farmer in the middle of Iowa. And you say, what are you doing to compact climate change? And sometimes their eyes glaze over, but you ask them, okay, what are you doing to work on changing weather patterns and they'll look at your kind of funny because they've been looking at these things for generations. But it's getting a like mindset to be able to come together and talk about it, but also realizing that the problem now is a lot more severe in those changes are happening a lot faster and a lot less in a predictable way, which makes farmers adapting to strategies with climate change much more difficult. But farmers are doing things like diversifying crops to improve resilience, shifting planning schedules to adapt to changing weather patterns, investing in water efficient



technologies, like drip irrigation where possible and with the likes of where possible and done in an appropriate way, having the right types of seed that can also help to address changes in climatic shifts.

Hisham Allam

But on a larger scale, how can agriculture play a role in carbon absorption and actually help mitigate the effects of climate change

Kyle Newell

On a larger scale? I think we should take a, a bit of a step back looking at ag only as the, the act of farming. Depending on how people think about the agriculture sector, sometimes we think that, oh, farming is just a person out in the field with a with a utensil, trying to grow something and we need to look more broadly around. Okay. From the quintessential concept of, like, farm to plate, what does that what's the impact of the agriculture sector have on global CO2 emissions in particular, depending on how you classify this sector. And if we take a broader approach, you're looking at anywhere between 20 to 25 percent of global CO2 emissions come from the sector. Interesting last year was the first COP that really highlighted the need to leverage the agriculture as a tool against climate change. So, I'm really excited that there's a lot of movements and a lot more. Thinking around how can add be a player there? I think three big things that are like to point out, not necessarily with respect on the ease of doing it around the agriculture sectors impact on the planet. One is reducing food waste. The rule of thumb is typically especially in the global South, about 40 percent of food Is lost pre or post production and in the global North, about 40 percent of food is wasted post plate. So, how do we reduce the food consumption patterns, and how do we also change the way that we're able to ensure that we're getting all of the productivity out of a field into.

Hisham Allam

So it starts at home.

Kyle Newell

To begin with it starts at home, but also just on the farm. So, but especially in the global North, I mean, how many times do we, we shift our plates into when we're cleaning our plates after dinner, where we're like. Oh, well, like, I didn't want all of that cucumber and I'm putting it into my waste spend. That way spin has a CO2 impact. Even if you're going to go put it into something like a soil. Or put it into a compost pile, it's still had a negative environmental impact for us to get to that point. And we should try to reduce especially in the global North, but across the globe, try to reduce the way that we're wasting food in the sector. Just changing diets, so eating lower on the food chain, meaning that the more that we eat less meat and I'm not, I mean, I like my hamburger just as much as someone else, but less meat that we eat the



more that we're eating things that are lower on the food chain. So more that we're eating grains, the more that we're eating beans, that means that we have a large reduction in CO2 emissions. And by some studies of the, of the 20 to 25% of the CO2 missions that are coming from the agriculture sector, anywhere between 8 to 10% are coming from just meat production in general, and as we look at a growing globe, it's going to end up, there's going to be a higher demand for meat consumption. And then the last thing is really around protecting land. And I think Brian mentioned it earlier, but how do we ensure that we have. Higher levels of productivity on the land that we already are using by not putting more land into agriculture production, because that has in many ways, the largest impact on CO2 emissions, or in its effect on climate changes is not deforesting an area to make it into a field. Using the fields that are already under cultivation in a more effective way.

Hisham Allam

This is a very informative and helping to framing the picture to see what is really happening and how we can control this, uh, Brian urban farming is something not everyone thinks about when we talk about agriculture. How do you see vertical farming and community gardens transforming urban environments?

Brian Anderson

Yeah, this is a fun question I think builds on a couple of Kyle's comments, right? Like, the idea that we need to be more productive and more efficient and, eat less meat, and start thinking more holistically about our food and not wasting it. You know, so one thing that's true in developed economies is that people have really been removed from the source of their food. So, it becomes something that they're very disconnected from in many ways. So, you know, I think on a really positive side, the more technology we have around, urbanizing and vertical production and kind of building our farms in places where, you know, people see them every day, might help us as humans reconnect a little bit with the food chain and think about, you know, we're throwing that cucumber away. Actually, this cucumber was only grown, you know, two doors down, or on the next block. And, I should be respectful to people that grow it. So, it's a really interesting thought experiment there, about whether or not, humans can connect with their food, through technology but fundamentally urban and vertical farming is, as we kind of keep saying, I think Kyle said it, I said it earlier, which is really about energy in to energy out and its very expensive right now. So, in the United States, if I go buy a clamshell of vertically farmed lettuce, the price of that lettuce tends to be somewhere between 12 and 16 dollars per pound. A pound is about a, what, a half a kilogram. And that's really expensive, right? I mean, ground beef, is like 5 dollars per pound, right? 6 dollars per pound, 7 per pound would be really, really fancy ground beef, which means I'm paying twice as much, three times as much, four times as much for my lettuce that is farmed vertically than I am for my beef. And to Kyle's point that's actually quite problematic if we really think about, trying to get adoption of these products globally or these technologies globally.



So, it's really expensive. And that just creates these challenges with scale on the flip side. I think, as we advance that technology, we find a better ratio of energy and we can make it. So, these products are less expensive and grown closer to consumers. We do have this opportunity. To cut out transportation costs and all the CO2 related to getting lettuce from, say, California to New York, or apples from France all the way to Spain, right? That's which are not that far apart, but, do so cutting out some of the, the CO2, for that, I think would be, would be phenomenal. And then the other part is this diversity of nutrition and the idea that we can grow a lot of things regionally. It's interesting in the United States there are a lot of farms that get set up around in Kentucky. So, for people who are not familiar with the geography of the United States, Kentucky is kind of in the middle of the country, but a little bit more east. And the truth is you can get to about 60 percent of the U. S. population within 12 to 18 hours of drive time. From there, which means that if you produce a lot of food there and, big vertical indoor operations, you can get it to, most of the country's consumers pretty quickly. And so, it's about finding those pivot points right. Increasing that diversity of production, and we see a lot of tomatoes, a lot of lettuce, a lot of vegetables and so I think that's helping people have access to fresh food year-round. And that's really great because, and I'll talk a little bit about it later, but getting nutritional diversity and nutritional security is really important for people. So, last to talk a little bit more about the livestock element that Kyle has alluded to. You know, I've seen some technologies that are pretty cool, kind of what I'll call like animal feed in a box sort of deal. So, where you can actually grow, animal feed like alfalfa in a mobile platform. And that gives you the ability to kind of drop off this production unit that grows really fast alfalfa for your animals.

And I think the more we see that type of technology as well, then the less we'll have to clear more lands to create more pasture space. Right. And the more we'll be able to reduce the carbon impact of growing the protein that we all want. So, I think there's a lot of promise but there are a lot of technical challenges to overcome as well.

Hisham Allam

That's a great point. Now Kyle, let's talk about smallholder farmers. What are some ways we can empower them? And why are fair trade and ethical practices so important for both farmers and consumers?

Kyle Newell

I alluded to it a little bit earlier. I mean, where we need to be more so thinking about how, we empower smallholder farmers is what's the best ways for us to improve their levels of productivity, and a little bit later in the conversation, we'll talk about policy how do we ensure that policy isn't creating an unfair situation? Where you're pitting farmers in the global north against farmers in the global south.



Hisham Allam

We will go further to talk about policy, but I'd like to focus now about this exact point, the ethical practices for both farmer and consumers.

Kyle Newell

I think that there's a time and place to have elements like fair trade. We always want to be behaving in an ethical way. But I do think that it's not a panacea that's going to solve all of the issues for farmers across, especially the global South. If you look at the standards for fair trade, if you look at what's the marketing ability for elements of fair trade? And it's about 3 to 5 percent of the market, which is relatively small. And so, I think it's how do we take elements around things like fair trade and ethical practices and try to embed them into our broader system without necessarily needing to have expensive certification processes that's in many ways, take the value out of the system for the small holder farmer and end up giving it to an accreditation agency as opposed to the farmers themselves. And so, if we're going to have broader standards, and broader systems in place, let's have it being done in a practical, efficient way that to allow farmers to get the benefit from those standards and not having it be exercised outside of the system just because we're looking at a different type of standard. That's there.

Hisham Allam

What is the economic impact of shifting towards sustainable agriculture at both local and global scales?

Kyle Newell

The sustainable agriculture, as I spoke a briefly in a previous section, you're having a significant portion of communities in the especially in the global South that are already practicing sustainable agriculture. are there ways for them to be able to improve upon it? I think so. And so how do we get the right types of technologies and skills to those types of farmers that they can improve on their abilities to be able to do it in the 65 to 70 percent of agriculture, or the calories that are being done at a larger scale there's elements that still need to be there to be able to help, transition in where it makes sense the farmers to transition into more sustainable agriculture practices. Some of these sustainable agriculture practices aren't going to be things necessarily, like, I don't reducing crop tillage, which may be done, but it's also elements that Brian was talking about is how do we have better precision agriculture techniques, especially in the global north that are really looking at we're reducing the inputs or the negative elements of it, so that we can still get the positive benefits of agriculture productivity, but we're reducing the negative externalities that are going into the system.



Hisham Allam

Okay. Now let's move to your favorite point about policy and governance. Governments play a huge role in shaping agriculture practices. What kind of policies are most effective in promoting sustainable agriculture? And what role does international cooperation play in supporting these efforts?

Kyle Newell

A lot of the threads of the conversation here was we're talking about sustainable agriculture vis a vis because we're talking about climate change. Climate change is risky for farmers because we're talking about enhanced risk of doing farming activities. If we look at, I would say the quintessential unbalanced and inequality in a global agriculture sector is where you have farmers in the global North have access to crop insurance, which is supported by the governments in the countries where they operate it and you don't have or can't have because it's cost a lot those same types of policies in place for farmers in the global South. And so, you have farmers that are inherently working in a risky sector, with enhanced risk due to thing elements like climate change without some of the benefits that you may have against your competitors that are producing in other markets and it's really about how do you provide access to things like that? And you have some smaller companies that are looking to be able to do that especially in sub–Saharan Africa to provide crop insurance, that's not necessarily coming from the government themselves, but a lot of crop insurance and in general, where it is actually working comes from the national governments where they're operating.

The other component is a power dynamic when policies are created around the globe, uh, smaller governments have less power to influence global policies. So, if you're talking about trade agreements, if you're talking about different types of requirements that are coming through similarly people with less power have less ability to influence global policy. How do we get the voice of people that can be grossly impacted, I mean, and like I said previously, the billion people that are farming across the globe how do we get them into the conversation? So that we're able to hear their voice when we're developing these policies where you can, in effect, end up having some negative consequences, things that may sound like they're extremely good, like sustainable sourcing standards or standards or reduction or standards that require a reduction in deforestation. They sound great on a global scale, but how are they actually impacting the farmer in many ways? We don't have their voice here. So, then we can't actually have that question answered. And I think it's both some of the policies are in place, and it's how we're creating policies and how we're implementing them, having the voice of the farmer at the seat at the table as well.



Hisham Allam

Kyle, you have raised some key points there. Brian, can you share any success stories from your work maybe an example of where sustainable agriculture has had a significant impact on a community or a region.

Brian Anderson

Yeah, absolutely. So, you know, 1st, I want to talk a little bit about something that that really has nothing to do with my work, but that for all of your listeners, you know, I'd like to talk Bring attention to community support of agriculture. I mean, ultimately, if you think about localizing your food production, joining a group if it's available to you is a really great way to support local agricultural workers production lowers emissions and lowers your carbon footprint and more often than not, that produce tends to be organically farmed, or much more sustainably farmed. So, if it's available, I think it's kind of ironic that, you know, 100 years ago humans ate very locally you know, you could get a pineapple in January in New York City, right? We get very locally and it's taken us, you know, we then we went to a very industrialized system and now we're coming back around in some ways and develop missions toward that more, especially in the United States, really toward a more kind of local and CSA support.

So, I would tell people that that's a great way to support your local community. The other one that we see that I think will be deeply impactful, and this gets back to some of Kyle's comments as well, will be alternative proteins. And I'm not talking about, you know, lab grown steaks and things like that.

Actually, more alternative proteins have been eaten historically, in what I call emerging or frontier markets where it's a much cheaper source of protein, right? And so, you'll see like a soy meat blend that fill in for meat because it's much less expensive. So, from my own personal work, right, I've helped push some of those products into markets globally and supported those companies and getting what I call cheaper protein available to different populations. And that really supports. I think a lot of again, back to nutritional diversity and helping people get the nutrition they need, but it also reduces the carbon footprint, you know, for every we'll say kilogram of beef that we replace with a soy protein product or something. We're really, really cutting back on the carbon footprint. And I like how Kyle put it, you know, eating further down the food chain. So ultimately, I've done some work in that space that I think has been pretty high impact.

Hisham Allam

Thanks for the encouraging insights. Kyle, educating farmers is key, but public awareness also plays a role. How important is it to get both farmers and the public on board with the sustainable practices?



Kyle Newell

Think it's crucially important to have both your supply and demand to be on the same page, or as aligned as possible I think with anything, if you have a disconnect between your supply and demand, it's going to end up creating more Issues there, I mean, farmers are on the front lines of implementing and so having the sustainable practices there so that they have the knowledge and tools to adapt methods like water conservation or ecofriendly pets control is crucial from their side. However, public awareness drives demand for sustainably produced food, which creates market incentives that can encourage farmers to then making those changes as well. You've seen some change, I think, and even like labeling in agriculture products, especially in Europe that start to put, the environmental impact on food packaging, which will in effect, end up creating more demand for environmentally sustainable elements and then make farmers to be able to produce in those ways. I mean, when consumers understand the environmental impact for their food choices where economically feasible for those consumers, they will end up prioritize buying more sustainable products. I think in educating farmers will in effect, enable sustainable production while educating the public builds that demand and the support for those practices. But I think there's still ways for us to, I think, both scale the solutions in the market size for sustainable agriculture, which will help to reduce the overall marginal cost but in effect, at the end of the day, we've seen inflation across the globe, driving up food prices across the globe. People are also going to be sensitive. And so how do we, how do we create sustainable solutions and having sustainable agriculture that doesn't put pressure on the end consumers pocketbook as well.

Hisham Allam

Looking ahead, what trends do you see emerging in agriculture? How can farmers and industries start preparing for the changes that are coming?

Brian Anderson

Yeah, this is always a fun question. You know, to Kyle's point, I think one of the major trends that people particularly in developed nations are going to start learning more about their food and so it's really incumbent for food industry. Members of food industry and the ag industry to put good information out there, right? Be truthful but ultimately, you know, future trends really come down to, I think Kyle and I have said this several times, but producing more with less. One of the major components of that is an increasing emphasis on food security, right? And the geopolitical environment is a little bit rough right now I think it's probably only going to get more challenging and so, you know, different governments and come up with different policies around food security. Right? And what does what do that mean? Right? It really means having appropriate nutritional diversity and the labor and the technology, and the resources to produce food regionally, right? If necessary. And that's really challenging because, you know, most of our calories globally come from just a few large staple grain crops. So, you know, that shift really ties a lot of



this together in some ways, right? I mean, if you have labor shortages and say developed nations, then you have an increasing need of technology. If you invert the labor gap, you see too much labor, right? Then you don't need as much technology and so those policies are going to look really different. But ultimately governments are going to really focus on the nutritional diversity and market stability and then second, they're going to look at, you know, how do we adopt climate adapted practices so that we can keep our food security stable for the next 100 years. Right? Um, and then finally, you know, to Kyle's point about food waste, I see a lot of conversations around food waste. How do we reduce food waste both at the farm level and then throughout the supply chain and then at the household level and you know, I think that technologies that come along that help us reduce that, particularly, I think, 30 percent or so in the United States of food actually gets lost at the farm level. So, increasing what comes off the farm, if we can recapture that would just be a phenomenal value and I would say that farmers and members of the industry should start looking at the need for food security, probably and understand, you know, what are the policies that are going to be implemented by their governments regionally and then start thinking about, what are the tools available to me as a farmer or as a member of the food industry to create market stability, right? And to manage the risks that we're continuing to see pop up and maybe that is technology and maybe that's, you know, things that we've already been doing for the last 100 years, like no till agriculture, right? But really starting to integrate those practices, into the things that we do every day, is what I would say.

Hisham Allam

Well said Brian. To wrap up, how does sustainable agriculture help build more resilient food systems? Why is it so important for feeding a growing global population?

Kyle Newell

So, by 2050, the UN projects that we'll have 2 billion more people. We're already at eight. We're going to be going to 10. Most of that growth will occur in the global South. We will have to produce more food with a similar amount of land. Almost all of the land that's arable, which is suitable for agriculture production is already under cultivation. We'll need to use less inputs. And with more uncertainty due to climate change, sustainable agriculture can help us build more resilient food systems. By preserving natural resources, improving the soil health and reducing dependence on harmful inputs. It can ensure better and long-term productivity and the stability of the face of climate change and helping to feed a glowing population while protecting ecosystems and ensuring food security for future generations.



Hisham Allam

You have had a broad and varied career from being an entrepreneur to an advisor across continents. What is one lesson you have learned along the way that shaped how you approach your work today?

Kyle Newell

You learn more by listening and instead of sometimes I'm, I'm here talking, but I think that it's very appropriate to just listen to different people. My mom always told me when I was growing up that you can learn something from everyone and I think, especially in something like the ag space that affects everyone from a job perspective to a consumption perspective. Listening to people as they talk about the issues that you're facing will really help to create more sustainable solutions, whether it's creating better products to serve the market more nutritional products to serve the market better ways to be able to incorporate smallholder farmers into value chains. Listening to different stakeholders, bringing people together and coming up with the best solutions, in a collective way, a lot of times creates the best approach to finding the best solution.

Hisham Allam

Brian, you have worked with some of the biggest names in the food and agriculture industry, as well as cutting age Agri tech startups. Given this diverse experience, is there a moment or a project in your careers that shifted your perspective on the role of agriculture in creating a more sustainable future? How did that experience in fellows, the way you approach your work today?

Brian Anderson

Yeah, that's a really interesting question. You know, in my work with startups, I've seen some, but I think have developed truly, truly transformative technology and to Kyle's point about listening, you know, one of the challenges that I think the technology industry has and with agriculture is that, they overdevelop, they over specialize, they really over engineer sometimes. And so, you know, and I believe Kyle even talked about this at the beginning of our conversation, but to me, I think it's about really understanding those venture capitalists, a product market fit, but maybe more importantly, how do we keep optionality on the table so that, you know, you can always go in a new direction or stop, know when you need to stop and listen to the market and then take smart risks, right?

Don't take your unhedged risks, so to speak. I've seen a lot of amazing technologies fail because of poor risk management or because, frankly, they over engineered it and they had a really good solution, but they didn't stop when the market said stop, they just kept going and made it more expensive or ruin the applicability for a broader market base. So that's, one of the major lessons in my career is keep your options open, take those smart risks and understand your market really clearly.



Hisham Allam

That's it for today's episode of DevelopmentAid Dialogues. We have had an insightful discussion with Kyle Newell and Brian Anderson, diving deep into how digital innovation policy and community engagements are shaping the future of agriculture. Thank you! Until next time. I'm Hisham Allam signing off and this has been development. Stay tuned for more conversations on innovation, sustainability, and the future of development.