

Remote sensing will enable farmers to make smart input decisions - Interview with Rob Neil (Chairman of Gamaya)

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By Leonardo Gottems, Reporter for AgroPages

Gamaya is a startup specializing in advanced aerial image analysis technology, both drones and satellites, combined with machine learning and artificial intelligence, to enable farmers to closely analyze their crops. These technologies will play a fundamental role in the future of precision agriculture and sustainability, and will significantly reduce the use of agrochemicals.



Rob Neil, Chairman of Gamaya

In an exclusive interview with AgroPages, Gamaya's Chairman, Rob Neil, talked about the major challenges faced by the company to make this technology available in the field. He also analyzed Brazil's efforts to adopt existing solutions, as well as emerging partnerships with other startups and major input companies.

In terms of current challenges and despite the available field monitoring technologies, what are the main issues?

There are many challenges, so let me begin by explaining the stages. I think both the industry and Gamaya are still in phase one, which I would call perfecting the technology and trying to make it really work. What we did are invention and design work. There are still many things that have to be figured out. We are far ahead of where we were two years ago, even five years ago, but we still have work to do to ensure that things go together in a smooth and functioning fashion and make everything easy for farmers, by bringing added value and affordability. So, when I say "end-to-end," what I intend for

Gamaya, our plan, is to design, develop, launch and support our products. We can everything from start to finish, so this is a key job to do, all of these different functions, and connect them all together. There are data science and agronomic science. They all have to be integrated and work well.

We are only at this stage now and are probably getting to the end of it. We released our first products in the market in 2020, earlier this year in Brazil. So, we, therefore, passed a major milestone, with products that work and used by farmers. They are the first generation. It is easier and faster to achieve improvements once you reach that stage.

The next phase, I would say, is how to automate and really use all this data to utilize information seamlessly. There will be a completely new stage for Gamaya and the industry. To give you an example, we have a couple of excellent products for sugar, and we can tell a sugarcane grower, with good accuracy, where they have planting gaps or where they have weed infestations. Very soon, we will have a product that identifies planting lines, so they can harvest accurately using GPS. But this is only what you think about natural products for farmers. Even if we provide our output to farmers, they still have to decide, "Should I replant this field or should I go in and remove those weeds? What do I do?" We have work to do because we transferred some interesting information to farmers, but we still left them with the burden of figuring out the right approach. Automation, for me, is an important step because we can make those decisions and assess further facts, and we can take the information and inform them of where it is economically viable to replant and what machinery should be used. In this case of automation, I think partnerships become really important.

If you are not integrated with other technologies, you cannot progress to the next phase, right?

You cannot get there, no. We have spent our early years on really working on stage one and perfecting our technology. And as we transition into stage two, we have got to develop other technologies and form many partnerships, because we cannot do it all by ourselves. We are a very small company. We can offer our part, which is a high quality one, but we then have to join with other people. There are companies operating in sugarcane that we that we offer add value to their portfolio and vice versa. So I think that is sort of the next big phase.

Is there a third phase?

The third phase might be a year or two down the road after that. There are many digital companies operating now, not just in remote sensing but in many other fields. And a lot of this technology is very compatible or very complementary. We do different things, but they help farmers altogether. So we have to join more common platforms. You know that I work for Gamaya, which is a remote sensing company, but I also work with a company, a digital company, which specializes disease prediction solutions and not detection, such as Gamaya. They are predicting things, but and they are also working at phase one too and trying to make sure that their technology is really good and really works well. When you think about it, that is a natural fit. Detection combined with prediction are effective in combination, makes everything more robust, and is a better way to use information. So, in that third phase, I see many consolidations, integrations, and the joining of people who are working on current platforms and creating bigger platforms. I think that in 12 to 36 months, many companies will start to combine like that. We are seeing it now, but not in a major way.

You know Brazilian agriculture very well. What is our situation in terms of current technologies and the adoption of technology? How do you assess producers here in Brazil?

I think Brazilian producers, in general, are faster to adopt technologies than farmers in many other countries. This is probably a result of being generally very large. So they are managing sizable businesses and are much more businesses-minded. They really understand the value of technology and how it can contribute to the efficiency and effectiveness of their operations. That is a great advantage that Brazil has. On the other side, problems with connectivity are still present. During the World Agritech South America Summit, I heard one lady mentioning that her farm did not even have 3G. And so it is very difficult to use devices in real time out in the field. This is a barrier to the faster adoption of some of this technology. But I assume that what will happen, by the way, is comparable to many other countries.

For an agtech company, we use to say that if you are not in Brazil, you are not in the market, because of the presence of Brazil in the global market. Do you agree?

I think it is really part of the reason why we see many agtech companies in Brazil. But I have heard that many companies not in Brazil that are doing quite well. China and the East, in general, is a center for agtech. You can see there are lots of activity in China, as well as in India, which is mainly local. I mean, those are major locals, which are developing more for small holders. China is probably farther ahead in drone technology than anywhere else because of its small farmers. Russia and Ukraine are another area where there are much local activity. Local companies are developing more for agriculture in those parts of the world. Their governments are very supportive, particularly in Russia, and are helping to drive progress as well. But it is in their own region where they are willing to invest. Brazil is particularly critical for many companies, but I am learning that there are other key parts of the world too.

There are some investments from big ag companies in technology startups or creating their own digital solutions. Do you think that is a trend? Will these companies also play a key role in digital agriculture or could some small companies challenge big ag in this field?

They are enhancing their positions, that is for sure. Whether they will become the main providers is another question. They have things going on and they have a lot of resources. They also have strong market positions that they can manage right now. Syngenta, my former employer, is in every country in the world and is generally the number one or two company that knows the requirements of all channels and most farmers. It is an established business, so it can bring products and services to the market very easily. On the other hand, they are not entirely unbiased, as they take advantage to help support the sales of their products. For many farmers I think that is somewhat of an issue, but it is also a bit of a complication, because Bayer is offering a proven platform, so is Syngenta, and so are others. How easy is it to use all these different ones? I think that there is a good opportunity for other companies to be the integrator or unbiased platform provider, which could emerge. I also think there is a lot of private equity and many other investors who are betting on that, as well as companies such as Syngenta, Bayer, BASF and Corteva. Their core competencies are chemicals and seeds. Ninety nine percent of people working for those companies understand that really well, and digital technology is not their second DNA. Therefore, they need to look at many small companies to create partnerships, which will play a key role for us during that second phase, when we are trying to automate. To be honest, we are working with all those companies on projects that will hopefully become products. They look to us to provide expertise that they do not necessarily want to develop, and we look to them to provide some access to the market.

Remote sensing has a particularly role in making agriculture more sustainable and reducing the use of inputs. How will this drive the industry for the next years?

Let us remember that there are many different uses for remote sensing, not just in the management of inputs. It will certainly help farmers make smarter decisions on the use of inputs, be more selective and careful, and not use them when not needed and only when really required. Allowing for more accurate timing and targeting is one considerable advantage that remote sensing can bring. I think there is a strong value proposition for remote sensing companies willing to do that. But remote sensing can do a lot more.

One of our current interests is harvest probation. We have a partnership with a company involved in sugarcane that is really interested in knowing about which fields will be ready to clean, so it can optimize the harvest and processing. Sugarcane is a big business, but it is not a smart business. So every time you can make something a bit more efficient, it is

really important and interesting. That is the value of another completely different use of remote sensing. Crop protection will also feature quite strongly in the range of offers. I should say just crop protection in terms of inputs and fertilizers.

How do you see the future of remote sensing, with technologies such as hyperspectral images, machine learning and artificial intelligence? What else are we going to see in this area?

At Gamaya, our particular emphasis has been on hyperspectral, which is related to the interests and expertise that the founders had when they started the company five years ago. We have advanced our capabilities in hyperspectral ever since. I would say that we are close to perfecting our capabilities in terms of drones. We invented the hyperspectral camera and hyperspectral sensors, and mastered calibration and the ability to design process information on drones. Drones are a great tool for small farms and for conducting research, but they are not highly scalable. So we are preparing for the next interesting phase of hyperspectral, which is a scalable version involving high altitude drones and satellites. There is at least one hyperspectral satellite operating, but with a such large resolutions that is not useful for us. We expect, possibly by 2023 or 2024, that there will be one or two satellites that we can link to and use in combination with our drones, as well as our capabilities to create products, conduct research in appropriate areas, and use satellites to correlate. We will be able to take hyperspectral to a scale that will be of value to larger crops, such as soybeans, corn and sugarcane.

There will be a major development in the entire range of remote sensing technologies, for which hyperspectral is a "Holy Grail," which can teach you the most about what is going on in farms. It is not always needed, but in some cases, hyperspectral can be really helpful. One good use that we think is really relevant for hyperspectral, mainly in Brazil, is for citrus greening. This disease devastates orchards. And by the time you detect citrus greening, it is too late. We have not developed the product yet, but we believe that hyperspectral will allow us to see the presence of citrus greening well before any other detection method and, therefore, enable a much more targeted, precise and surgical way to deal with it. That is the type of work that only hyperspectral, we believe, could do. Detecting problems, such as nematodes in soil and in plants, is another area that we believe hyperspectral could do the best job. It is still all in the future for hyperspectral. We hope to bring your first real hyperspectral product to the market in 2021 or 2022.

What about machine learning and artificial intelligence? How is this improving remote sensing?

You know, I am not a technical guy. Ok?

That is better then, because you have an agronomic overview.

Well, remote sensing generates a lot of data. You can never process that data without machine learning and artificial intelligence. Hyperspectral brings a hundred times more data than other types of remote sensing. So, it is an absolute critical enabler. Luckily, it now exists and is part of the whole end-to-end process. We are building our AI capabilities at the same time as we are advancing our hyperspectral cameras and hardware capabilities. So it is there and will be a barrier to adoption, but a part of the process.

Let us talk specifically about sugarcane, which is Gamaya' s first product in Brazil. And how do you see this sector here in Brazil? What Gamaya can bring to the sugarcane industry here?

What Gamaya could bring is a lot more efficiency. Sugarcane operations are considerable. There are hundreds of thousands of hectares and to survive, the industry has to be as efficient as possible, which means using the least amount of resources to produce crops. Our first products are more efficiency-oriented ones, helping them decide where they should replant crops, where they should deal with weed infestations, and where they should harvest first. These are operational efficiency improvement products, and I think, in sugarcane, they add considerable value. A farmer estimated that we make back about six hundred dollars per hectare from planting in gaps over the course of the life of the cane. The cost of our product is very low, even too low.

Could you raise it a little bit?

We need to find ways to add value to that. I think it is really interesting, because, from my experience in the crop protection business, our rule of thumb for crop protection is to make sure that farmers make at least three to five times the cost of your chemical in the first year. Otherwise, you do not have a very strong value proposition. I just told you about sugarcane, where we have offer 100 times the return on investment, which is a fantastic opportunity to create money and value for growers. We are trying to ensure that our products are efficient and work properly without significant manual intervention. That is where we are right now.

And soon, you will be involved in soy here in Brazil?

Next year.

What do you predict for soy? I understand that efficiency is also the obvious answer.

Our greatest interest in soybean is nematodes. We are partnering with a company that brings solutions against nematodes, and we are helping that company and farmers find nematodes. One of the relevant challenges is fact that you cannot see them as they are microscopic and hidden in soil, so you will never see them. So you do not really know if spraying is needed or not. This is, therefore, done on speculation or trust while hoping that you will not waste money. So what we are able to do is to paint an accurate picture showing of whether you have nematodes in parts of fields, which will justify precision treatment in only specific areas or on the entire field if there is a major infestation. This will help our partner sell more of their solutions, help farmers realize the benefits of their products, and give them some peace of mind and assure them that they are not spraying where it is not required, for example. They will, subsequently, have a higher probability of getting a return on their investment.

What is the progress of your product development? Was has been tested already?

We have certain stage gates for our projects. In the first stage, we just explore and try to determine if feasible. The second stage is a proof of concept, so we do some tests, get some data, and find out if it really does work. We are just finishing that stage. The next stage is the first interesting stage. It is developing the minimum viable product, or MVP. We hope to have an MVP next year, and that would be great for Gamaya as it would be a major breakthrough for our business and, of course, for farmers and our partner. But sometimes, these things can take an extra year, it is agriculture so we go by season. If the data is not really convincing or there are problems in collecting data, which we typically experience in agriculture, we might have to continue for another year before we can really prove viability. That is a small company' s task.

In terms of size, soy is a huge market.

Yes, soybeans is a massive market, not only in Brazil but also in the United States. It can, therefore, be our number one product soon. Sugarcane is our first portfolio with several products, but soy is going to be our biggest one.

Based on you international experience, how do you assess China's agricultural production? How does the country intend to increase its production of basic products, such as soy or corn? Or will they keep buying from other countries, like Brazil?

I'm not an expert on China, although I know China very well from my time at Syngenta. Gamaya is not in China. I think that is a great opportunity for remote sensing in China. But the Chinese are very determined and they want to improve their agriculture. They have taken a very strategic approach to the crops and technologies they want to rapidly develop. Soybean is one that they believe is better to buy, because Brazil is so efficient and effective in producing soybeans. The Chinese government looks at this as a trade off. If I want to be big in terms of soybeans, what would I give up? Do I have to sacrifice corn or rice or something else because I need a lot of soy? I think they have made a decision, this is just my personal opinion.

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