

An innovative app is helping to democratize knowledge and revolutionize farming for small-holder growers, providing them with crucial information that was previously scarcely available.

Plantix is a German mobile crop advisory app - essentially a mobile doctor - for farmers, extension workers and gardeners. It uses AI-powered image recognition to diagnose plant diseases, pest damages and nutrient deficiencies affecting crops and offers corresponding treatment measures.

Having launched in 2015, the app now has around one million active users around the world. They also use the app as a platform to offer rapid advice to other farmers regardless of their location through a Q&A section, helping each other to produce a good crop and protect their livelihoods.

The team behind the app is working to constantly increase the number of crops and problems the app can address. Now they are working to bring users from more countries onboard. They are also assessing what new services can be offered from the plethora of data the app collects.

## **Beginnings of Plantix**

Four of the app's seven founders had worked together in a Brazil-based international research project where they investigated the interdependencies of land use and greenhouse gas emission.

During this time, they worked in rural areas. Upon speaking to hundreds of farmers, they discovered two major challenges.

"We recognized that there is a huge lack of agricultural advisory, especially for small and medium-holder farmers," Korbinian Hartberger, of Plantix's founders, told FreshFruitPortal.com.

"And also, all information about pests and diseases they would need is actually available on the internet, but it just might not be in their language or they might use the wrong keys to search for it."

After the research project ended, Simone Strey, now Plantix CEO, and her husband Robert, CTO, spent their honeymoon in the Amazon.

"There, they came up with the idea of using image recognition to diagnose plant pests and

nutrient deficiency, and then collecting all this information that is available and making it available to these people," Hartberger said.

Effectively, Plantix is aimed at "democratizing knowledge", he explained.

## **Marginal support levels for small-holder growers**

The team got to work creating the first data set from a tomato plantation with nitrogen and iron deficiencies. With the proof of concept, the app was launched in 2015.

The team received a grant from the German government to support the app's development. But although the project had initially been framed as providing a benefit to gardeners in the European country, Hartberger explained that the team always had small-holder farmers in developing countries in mind.

"If you look at the big farmers, they have a lot of people surrounding them and providing services. They have a lot of technology, and actually there isn't much to improve in the yield potential anymore - they're producing on a very high level," he said.

"Whereas if you look at small farmers - who produce the biggest share of our food - then it shrinks and the level of support becomes very marginal."

For example, he said, a single agricultural extension officer may visit hundreds of thousands of farmers annually in India, and in Brazil growers may just receive one visit per year.

With Plantix, growers can take a photo of the plant's leaves or roots and receive an instant diagnosis. The app - which is free of charge and available on Android smartphones - does this by using an algorithm to make the image to its wide data set and accurately identify the problem.

It also recommends which active ingredients potential treatment products should contain to combat it, rather than product or brand names.

## **International cooperation among farmers**

In addition to the image-recognition aspect, the app also provides a forum-style question and answer platform. Here users can post a question or image of their crop and receive advice either from experts or fellow farmers in a matter of hours. A built-in translator means that language is no barrier for assistance.

"It's very interesting to see, for example, someone from Israel posting a question, then somebody from Iraq answering, someone from Nigeria adding their response and then someone from Chile bringing the final piece of information," Hartberger said.

Nowadays Plantix analyzes around 50,000 photos and receives up to 8,000 questions per day.

Around 80% of its users are based in India, which much of the rest in Pakistan, Bangladesh and Brazil.

The app can currently detect over 400 classes of problems for dozens of crops, ranging from rice, wheat and maize through to onions, tomatoes, bananas, citrus and grapes. Cotton is currently the only non-edible crop.

Hartberger explained that the team has been focused on adding crops that are important for food security and with wide distribution.

## **Challenges**

Developing such an innovation app has of course not been without its challenges.

Establishing data sets for the different crops can be tricky, especially considering that hundreds of images are needed for each individual problem in order to create the algorithm.

Another big challenge has been developing the app for an audience that has largely not grown up with computers and technology. Many users are not familiar with tapping on smartphones and instead scroll or swipe, he said.

"This is an example of something that you assume because you know that it's quite natural to you. But it's not necessarily natural for the people you produce it for," he said.

One aspect that had been a challenge several years ago but has rapidly improved is smartphone usage and internet coverage in developing countries.

"This has become a no-brainer in the last couple of years," he said. "In Brazil and India, it's tremendous how quickly smartphone usage and mobile internet coverage is developing. It's not a question that we are asked anymore."

For those that have very limited internet coverage, photos can be taken and uploaded later. There is also a substantial amount of information available offline.

## **Future plans**

In the future, Hartberger said he would love to increase the number of users in different countries around the world, especially in Spanish-speaking regions.

And the Plantix team will continue to work to increase the number of crops and problems that the app can address. Tea and coffee are two important commodities that could soon be featured.

Aside from that, Hartberger explained that an important element in the future will be discovering opportunities for new services that could be created using the abundance of data generated on the app.

"As one small example, if you are a rice farming and we know that within a 50km radius there has been a certain level of incidence of a rice disease, we can send push alerts to warn you and say you better monitor your crop," he said.

Data such as disease or crop locations could also be shared with universities or governments to assist them with their research and support programs, he added.

"This is something where we can really deep dive into the data and see what other services could be derived," he said.