



# Introduction to PlantVillage Nuru

What is PlantVillage Nuru

How it was made

What can it do

How to get Nuru

How to use Nuru

Things to consider when using  
NURU



**Neema Mbilinyi**  
**Research technician**  
**International Institute of**  
**Tropical Agriculture**  
**(IITA – Tanzania)**

**Work with a team of researchers at IITA and PlantVillage to develop Nuru, evaluate it's performance and train it's users - agricultural extension officers and farmers.**



**Latifa Mrisho**

**Research fellow**

**International institute of  
tropical Agriculture  
(IITA –Tanzania)**

**Worked with Nuru team from IITA and worked with  
PlantVillage to develop Nuru, evaluate it's  
performance and train it's users  
(agricultural extension officers and farmers).**



# 2017 & 2019 WINNER

PlantVillage Nurur: Pest  
and disease monitoring  
using AI



Food and Agriculture  
Organization of the  
United Nations



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# What is PlantVillage Nuru (Nuru)?

PlantVillage Nuru



Welcome to **PlantVillage**  
I am **Nuru**, your assistant



Home



Nuru



Community



Resources



Settings

An **mobile app** for  
identification of disease  
symptoms and pest damage  
on plants

**NURU** – Swahili word for **Light**  
‘The light that farmers can use  
to solve their agricultural  
problems’

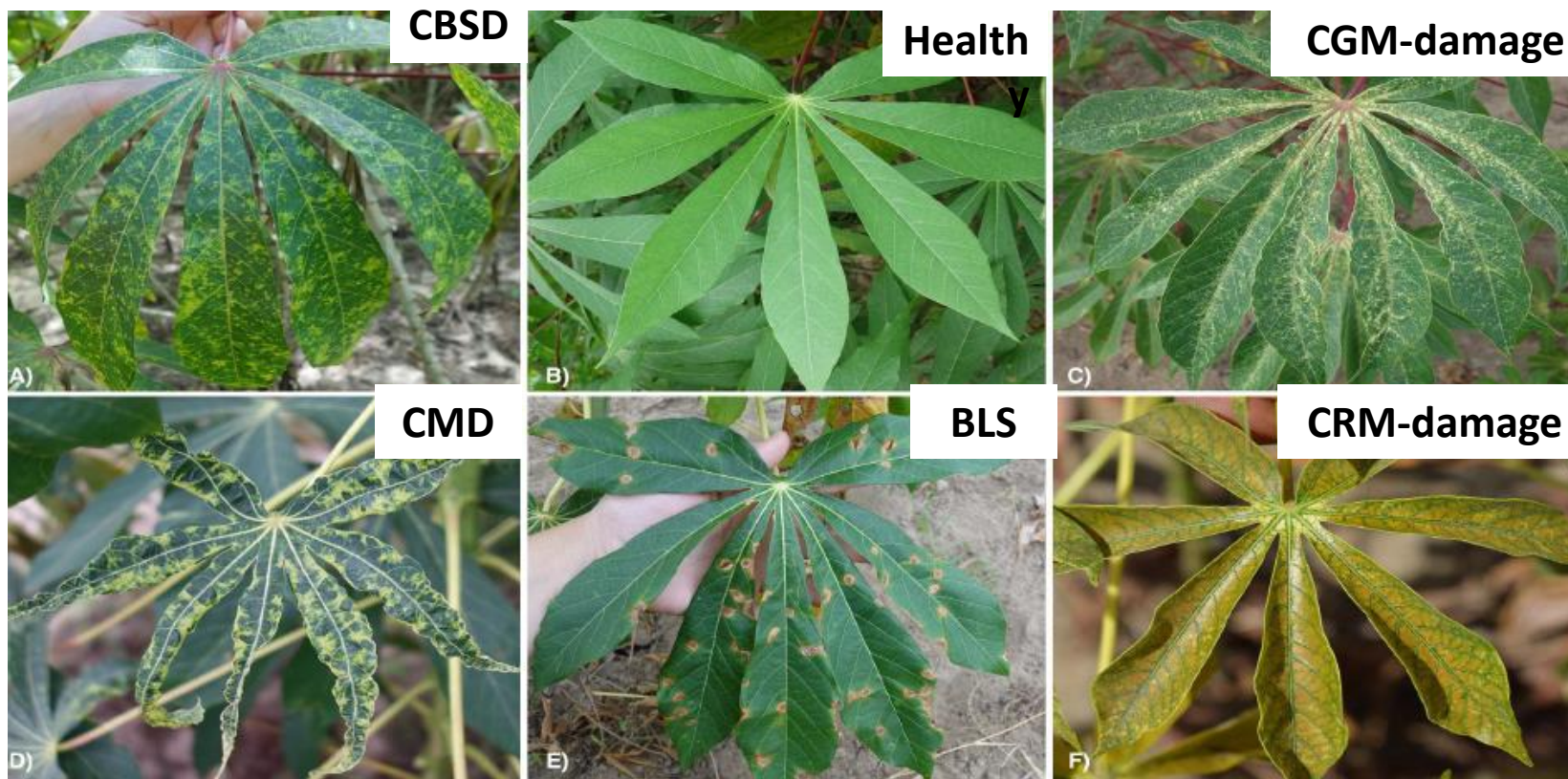
# HOW WAS PLANTVILLAGE NURU MADE?

The object and image detection technology (Tensor flow) developed by Google was modified such that it can detect objects (plant leaves) and patterns (disease symptoms).



# The Cassava - Artificial intelligence system

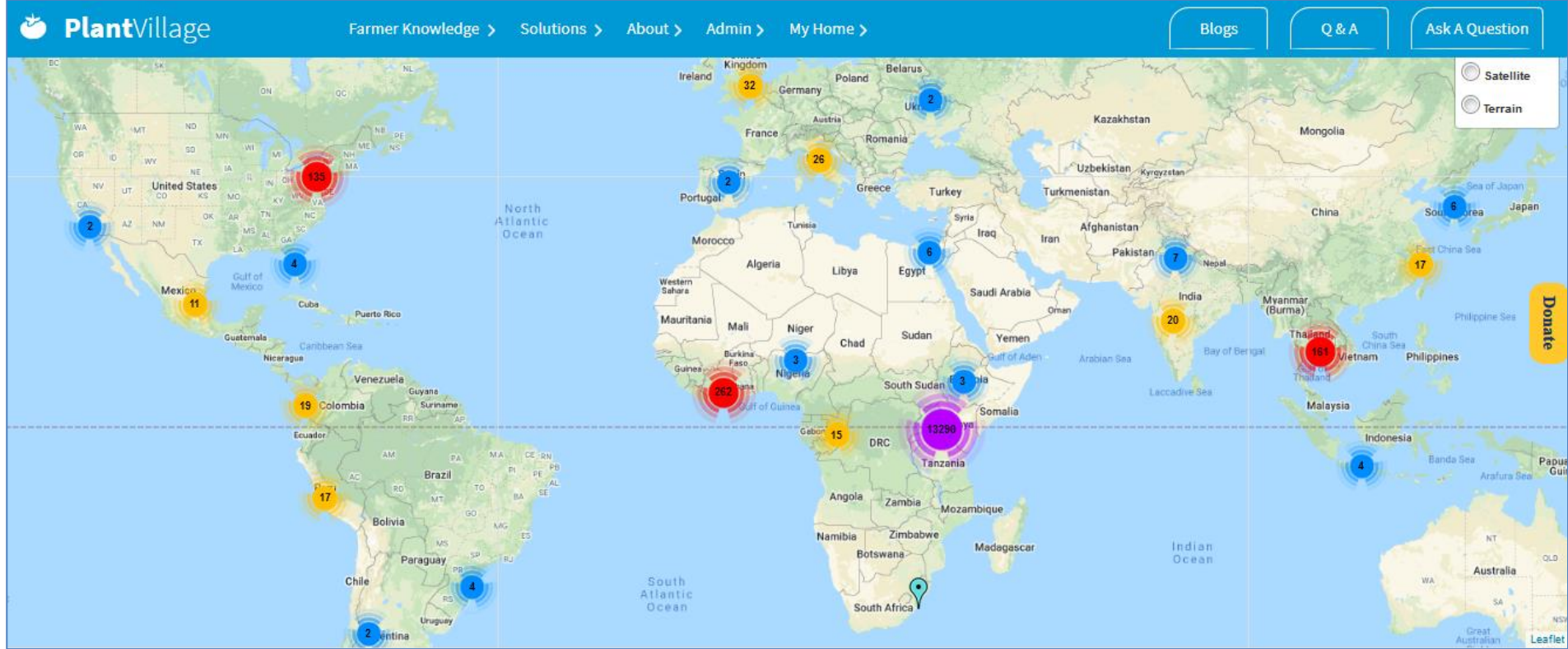
Trained using thousands of images of healthy, diseased and mite-infested cassava leaves from different cassava varieties.



**Nuru can differentiate healthy and diseased/infested plants.**

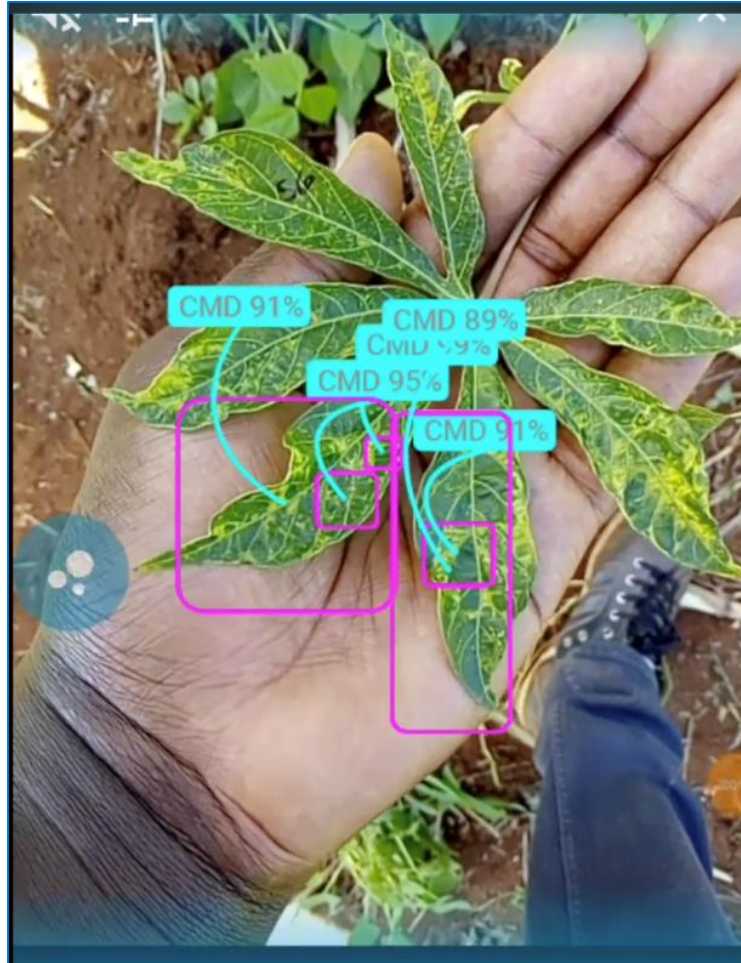


# Users of Nuru – Cassava AI



# What can Nuru do?

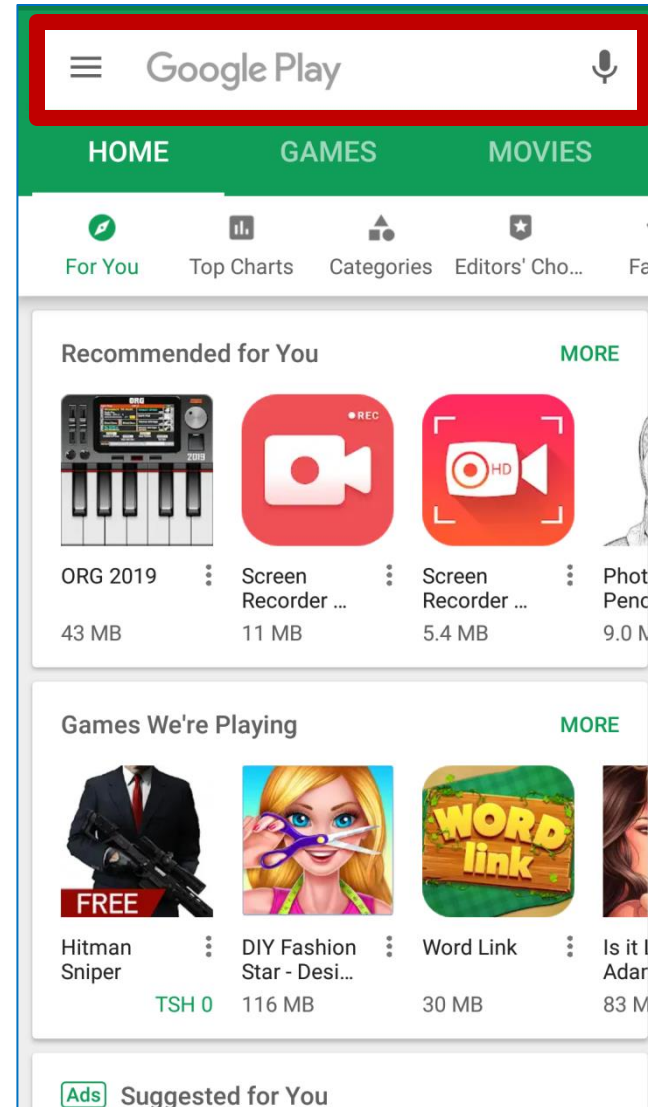
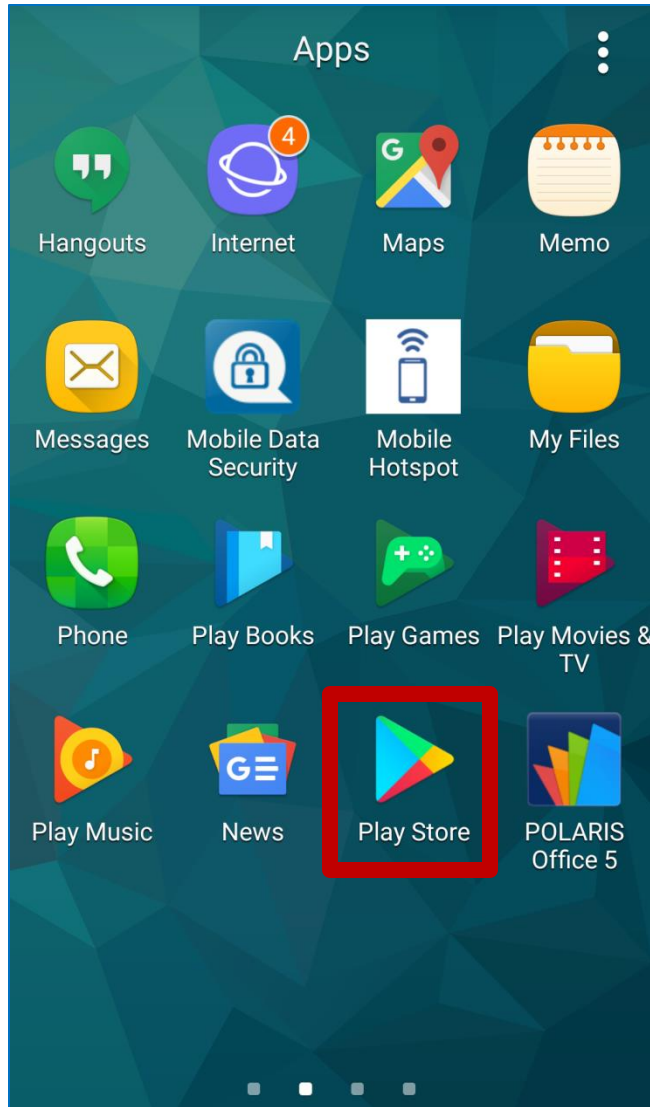
# The Cassava AI – PlantVillage Nuru



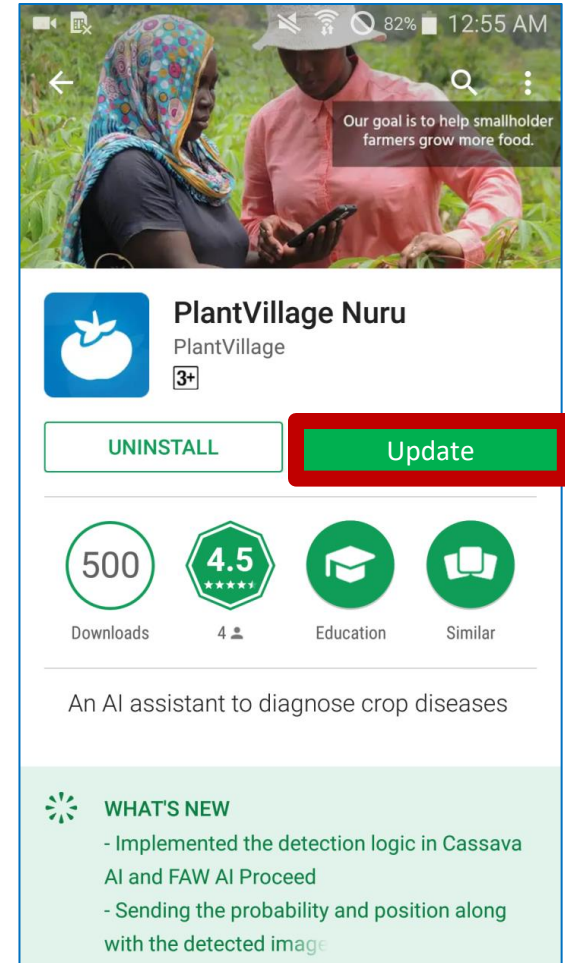
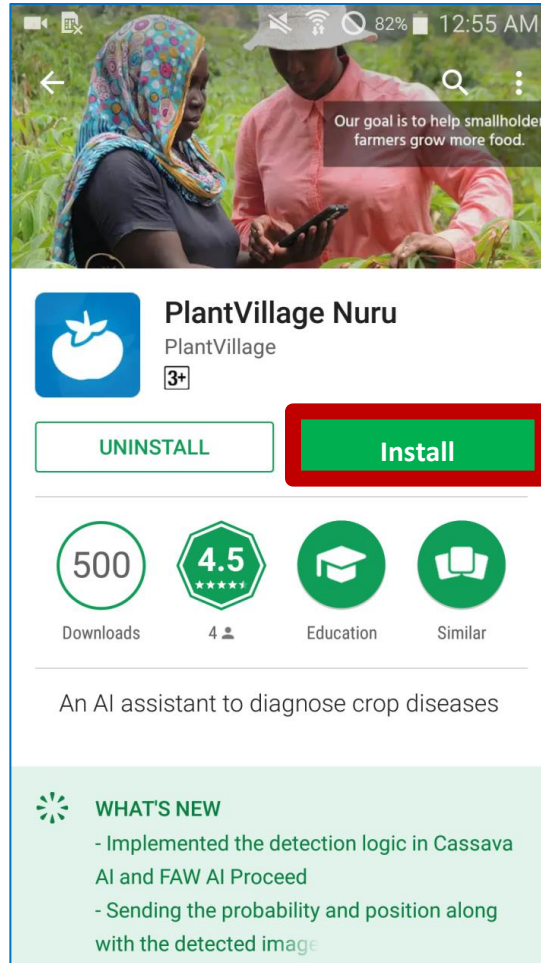
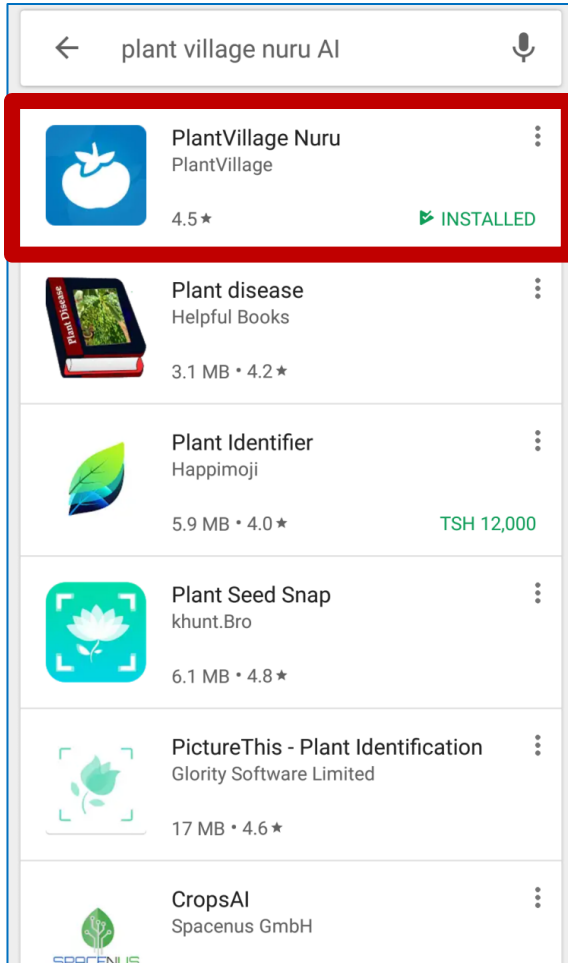
1. Determine presence of diseases symptoms or pest on the crop (CMD, CBSD and CGM-damage).
2. Gives feedback (**real-time**)
3. Shows you the symptoms of the disease/symptoms it has recognize (**teaching tool**)
4. Give you advice on management and/or control practices for the disease/pest it has recognize

**All this can be done in absence of internet connection**

# Where to get PlantVillage NURU



# Where to get PlantVillage NURU



# Where to get PlantVillage NURU

Our goal is to help smallholder farmers grow more food.

**PlantVillage Nuru**  
PlantVillage  
3+

UNINSTALL OPEN

500 Downloads   4.5 (4)   Education   Similar

An AI assistant to diagnose crop diseases

**WHAT'S NEW**

- Implemented the detection logic in Cassava AI and FAW AI Proceed
- Sending the probability and position along with the detected image

Select Language

**PlantVillage**

Swahili

English

Other

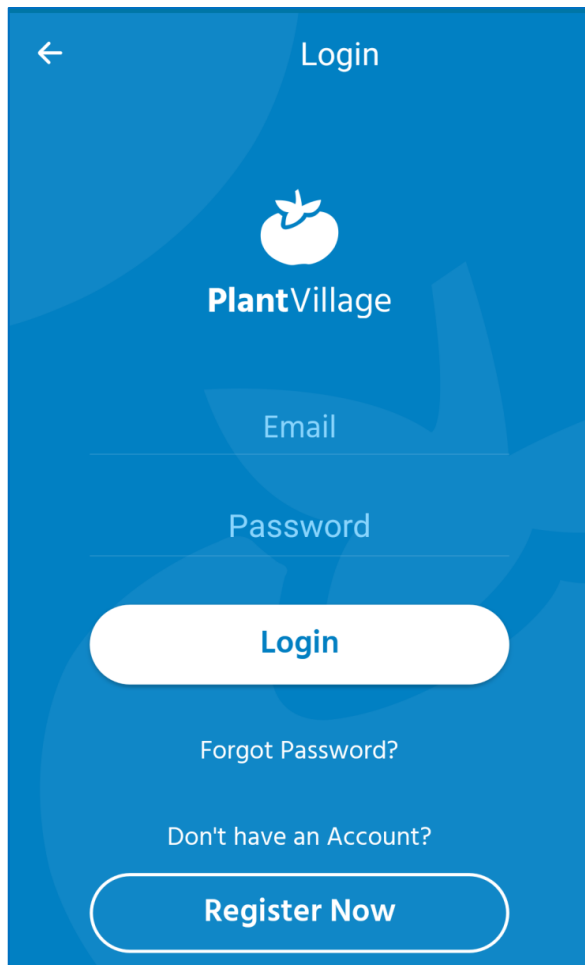
← End User License Agreement

PlantVillage is a public good resource built at Penn State University. The goal of PlantVillage is to help farmers around the world access knowledge on crop health and make decisions that can improve the amount of food they grow and their ability to get that food to market for a fair price that helps farmers improve their livelihood.


In this app, you will receive advice on what to do on your farm. This advice is provided to you via scientists at UN FAO, CGIAR as well as from published material from non-profit groups like

I Agree

# Cassava AI - Features



← Login



**PlantVillage**

Email

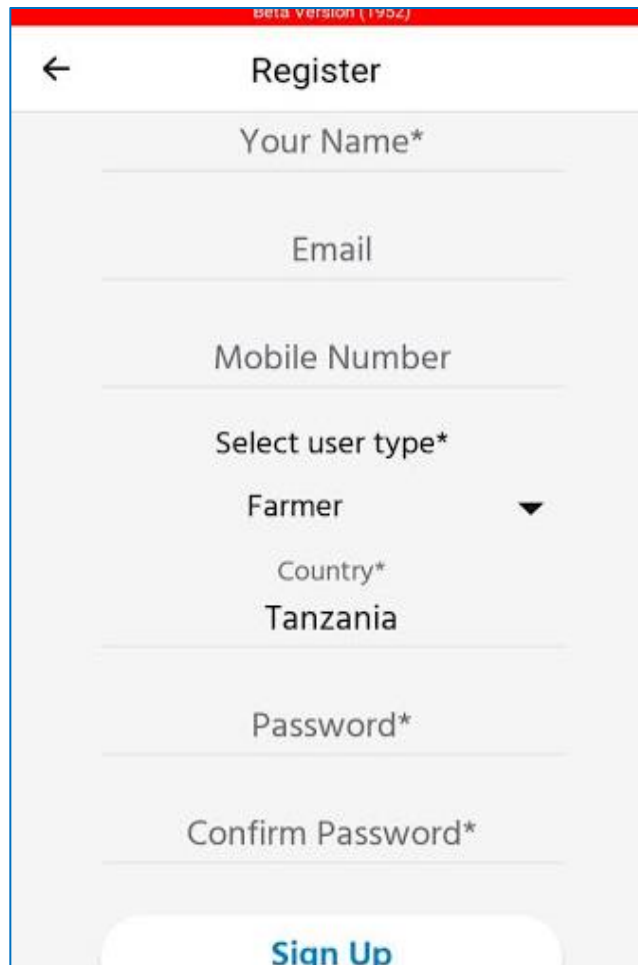
Password

**Login**

Forgot Password?

Don't have an Account?

**Register Now**



Beta Version (1952)

← Register

Your Name\*

Email

Mobile Number

Select user type\*

Farmer ▼

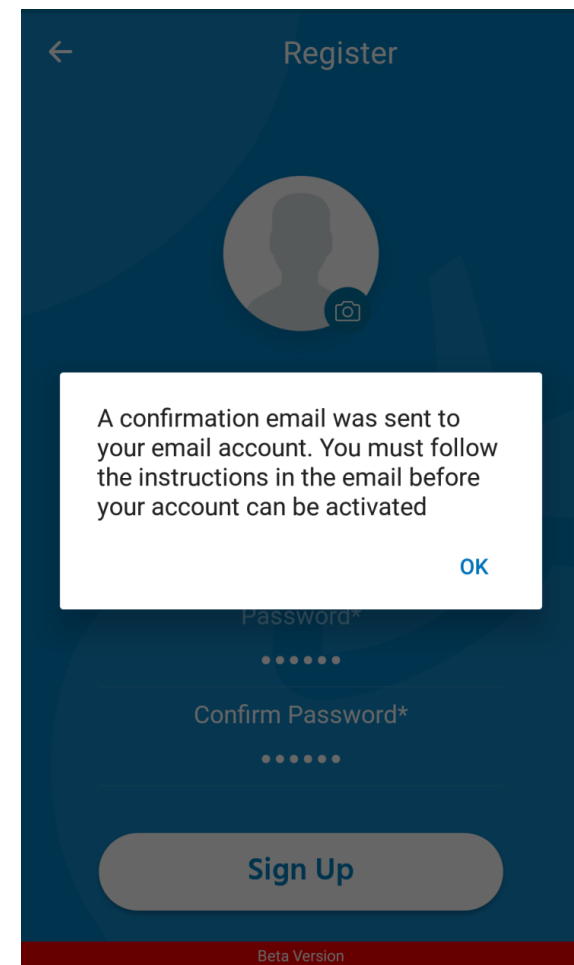
Country\*

Tanzania


Password\*

Confirm Password\*

**Sign Up**



← Register



A confirmation email was sent to your email account. You must follow the instructions in the email before your account can be activated

**OK**

Password\*

.....

Confirm Password\*

.....

**Sign Up**

Beta Version


# Nuru's Features

PlantVillage Nuru 

 **LATIFA MRISHO**

My Account

My Farms

				
Sun	Mon	Tue	Wed	Thu
29°	28°	30°	30°	28°
0.0mm	1.9mm	0.0mm	2.1mm	4.2mm



Home Nuru Community Resources Settings

Nuru 



Fall Armyworm AI



Cassava AI

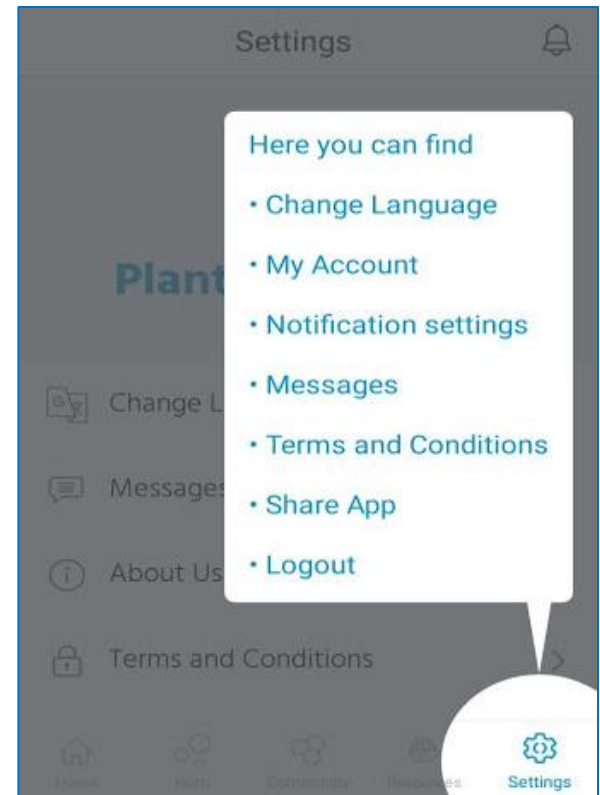
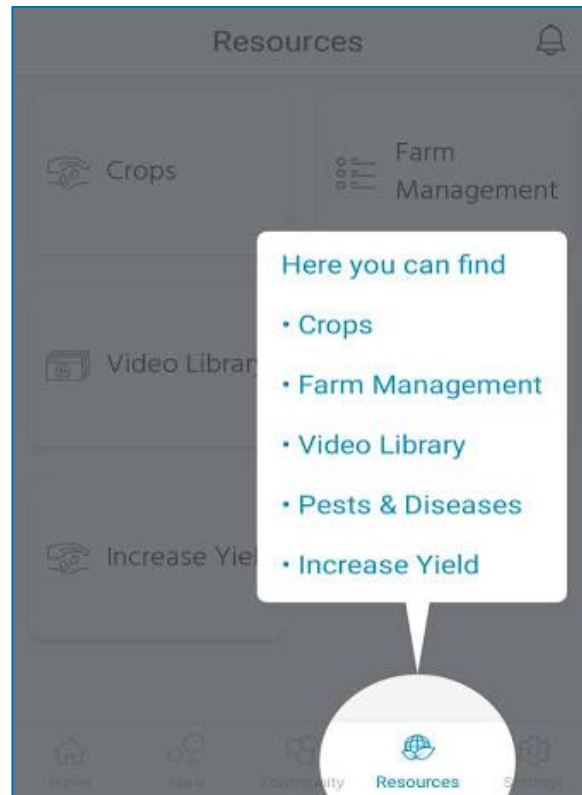
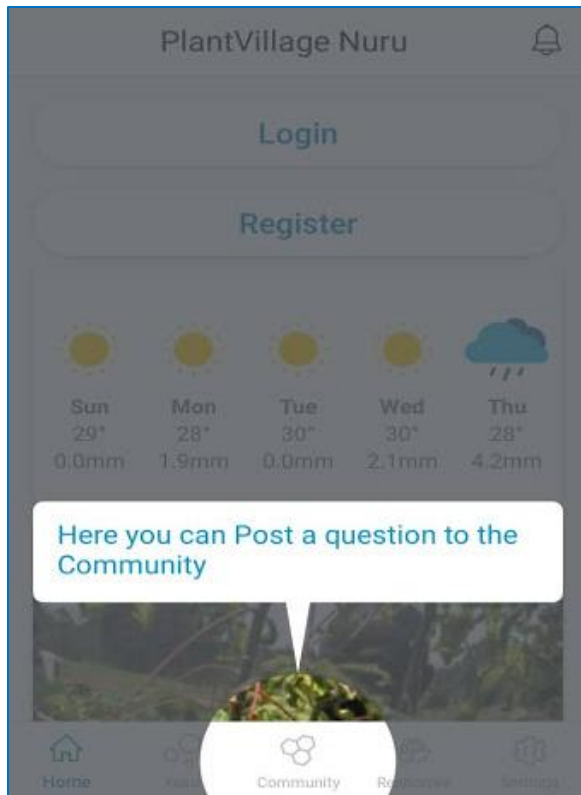


COMING SOON

Home Nuru Community Resources Settings

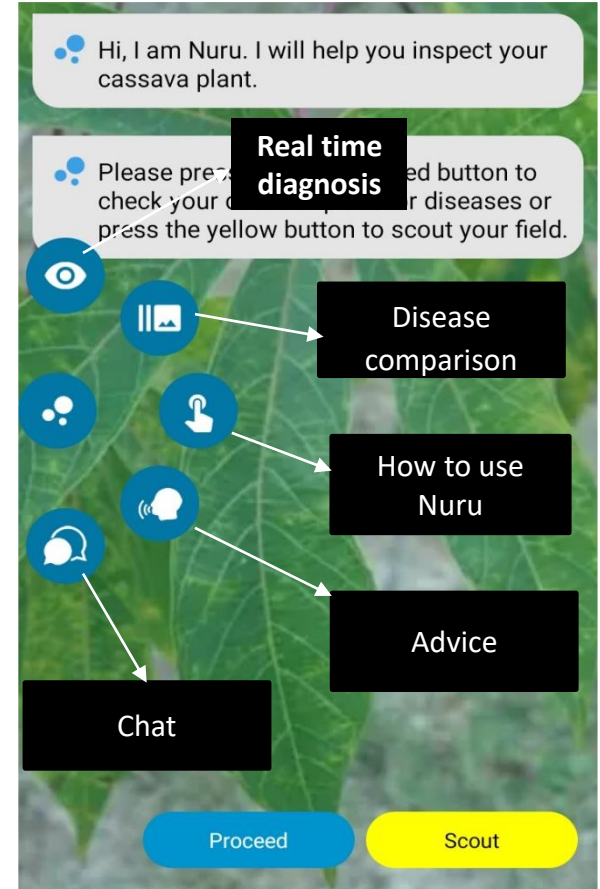
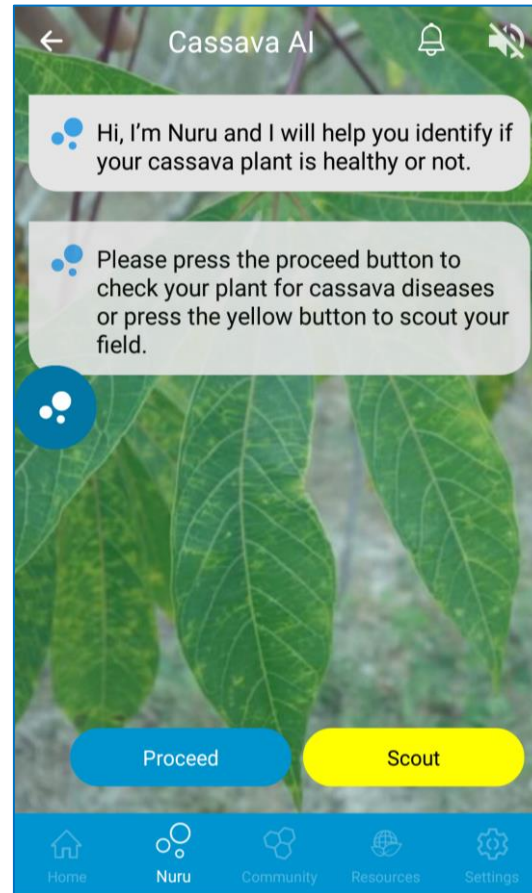


# Nuru's Features



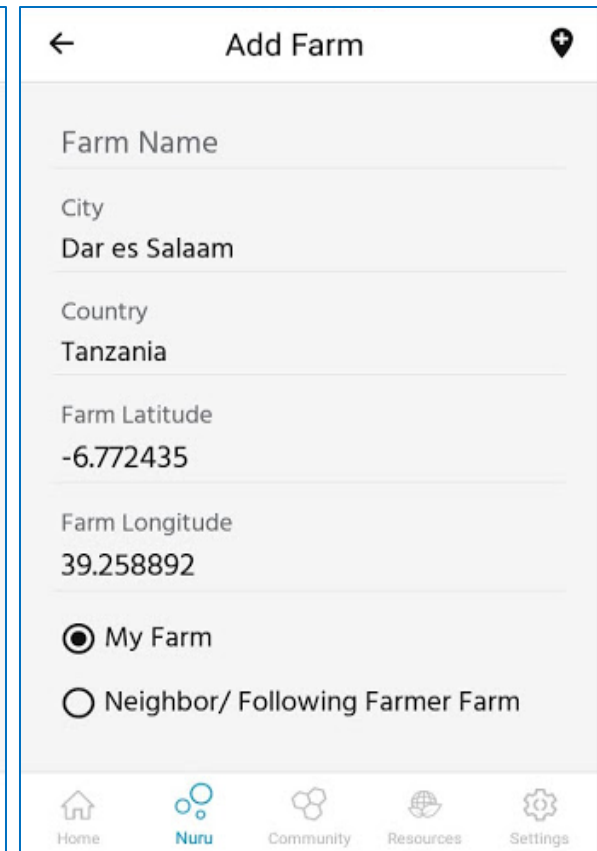
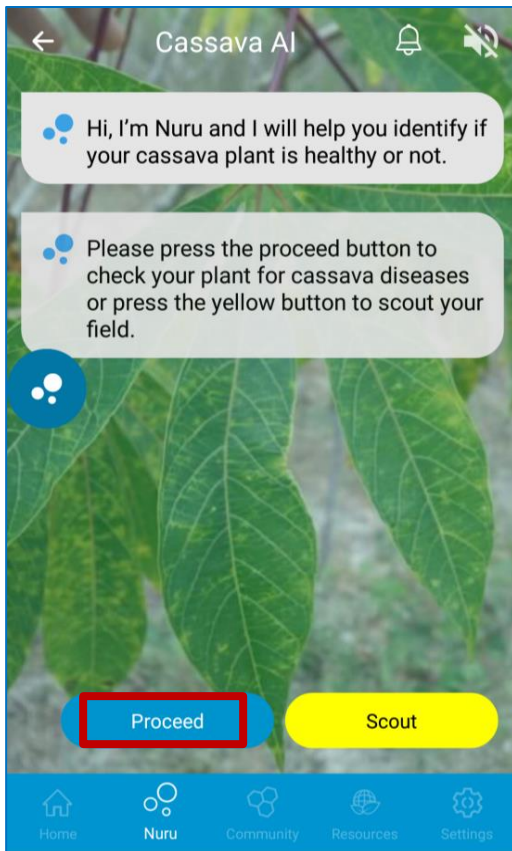
# Cassava AI – Disease diagnosis

## Check your plants options



# Cassava AI – Disease diagnosis

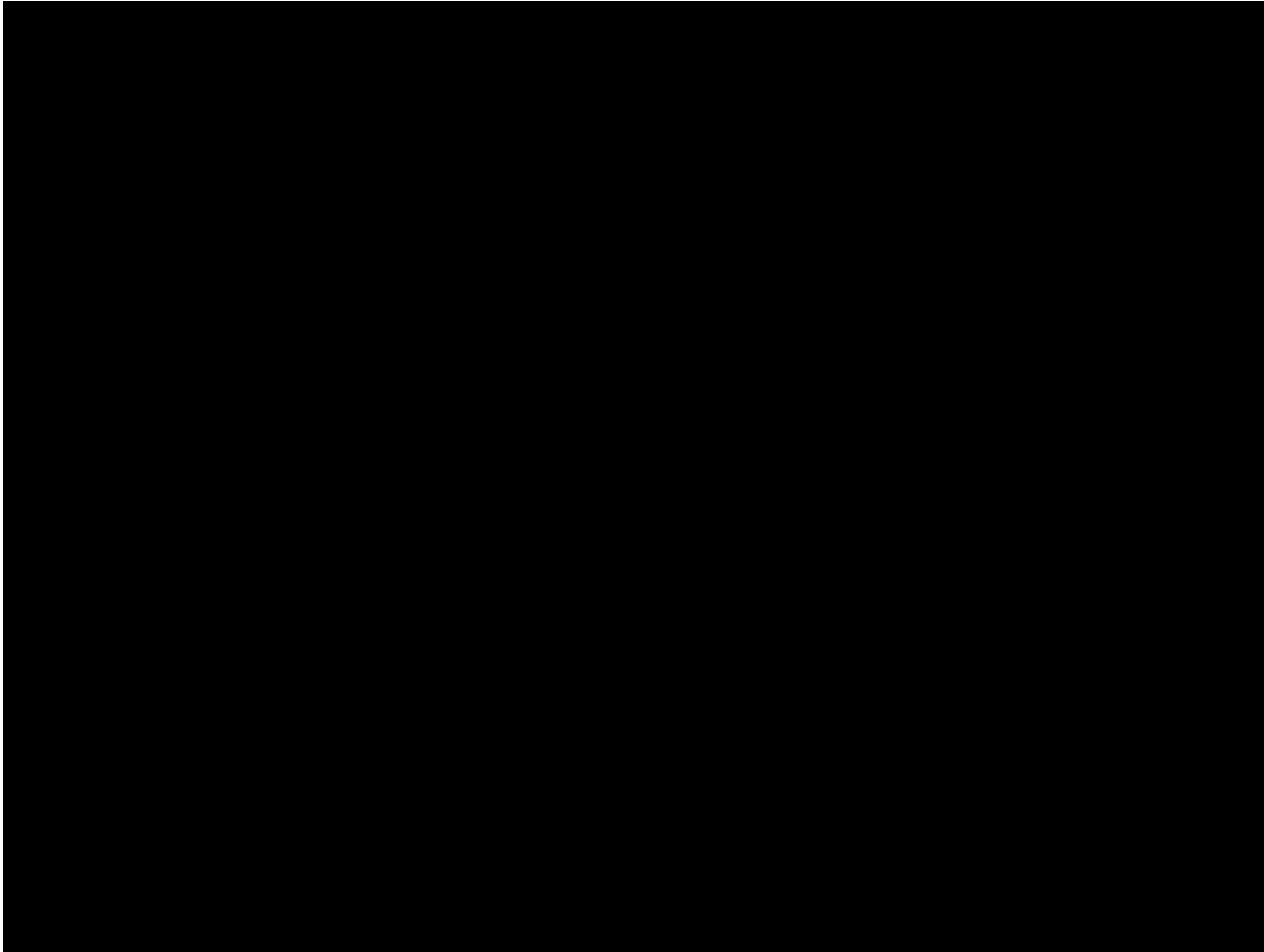
## Check your plants options



# Cassava AI – Disease diagnosis

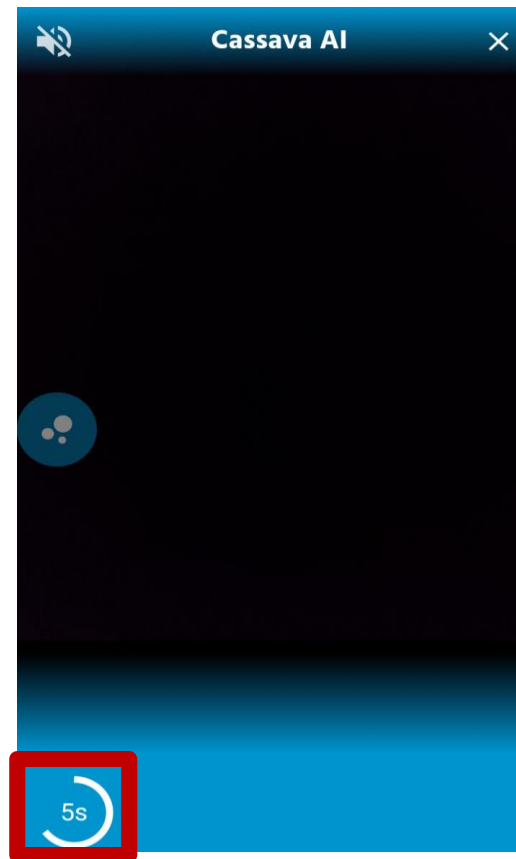
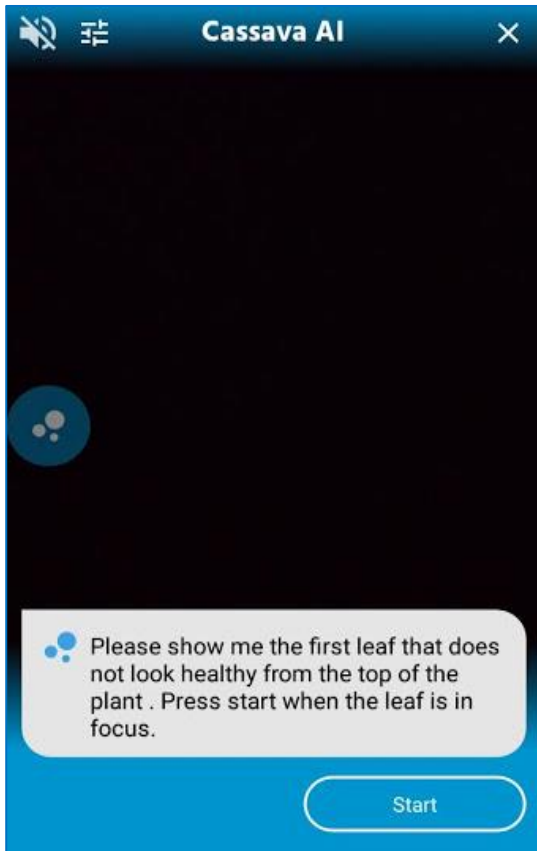
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## Adding farms



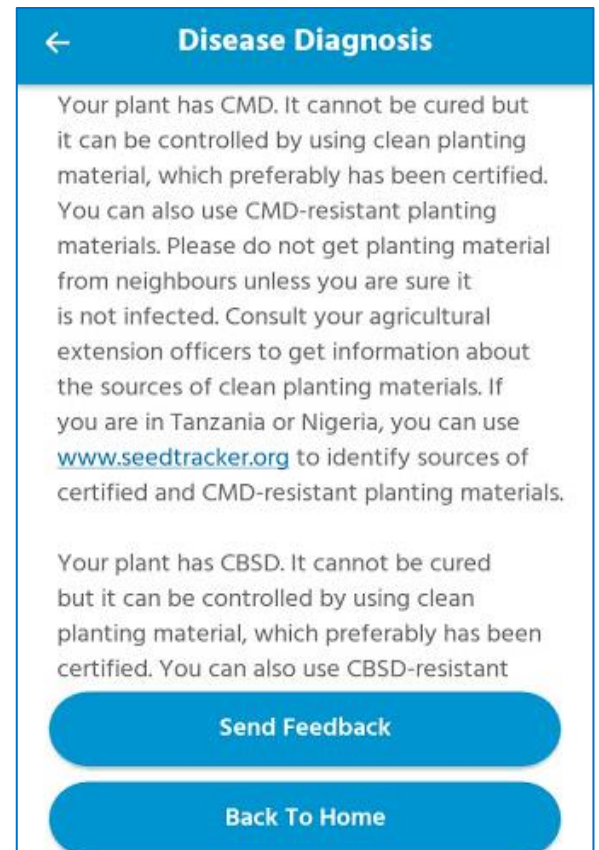
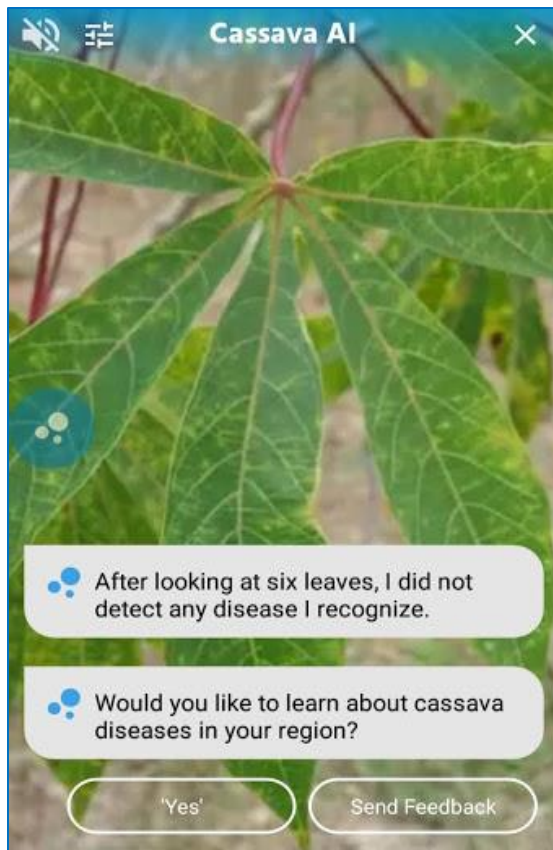
# Cassava AI – Disease diagnosis

## Whole plant diagnosis



# Cassava AI – Disease diagnosis

## Whole plant diagnosis



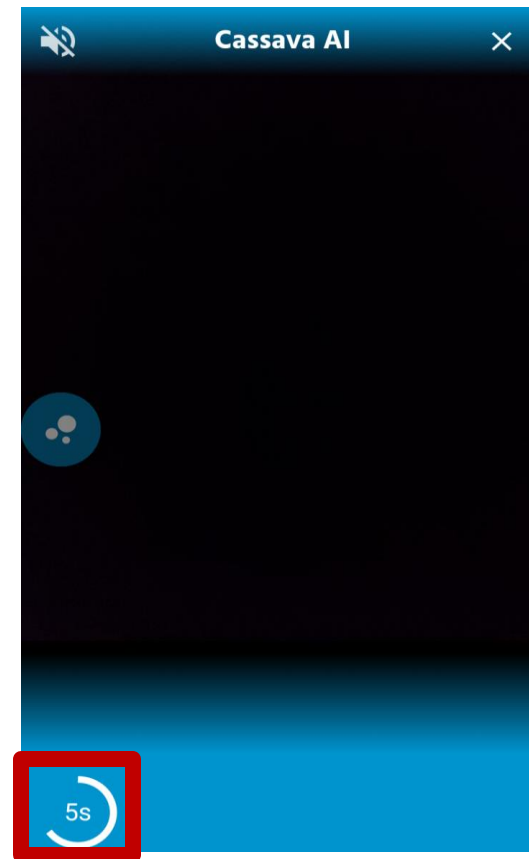
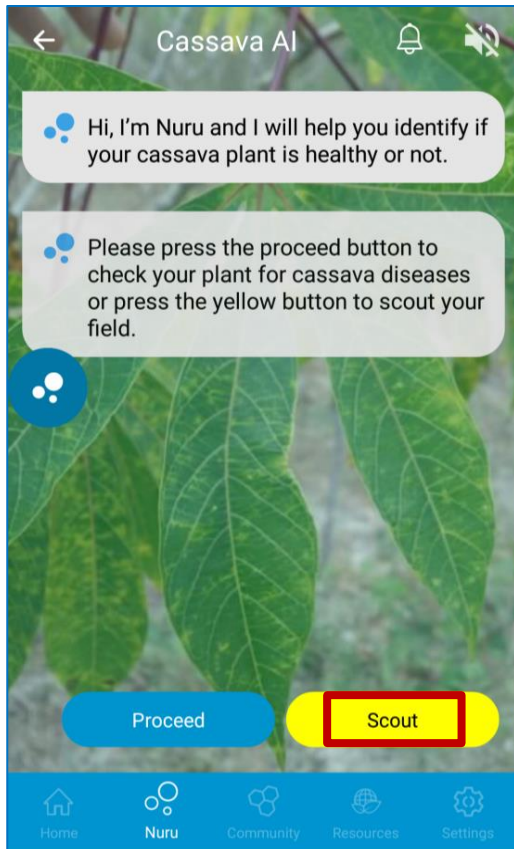
The connecting with SeedTracker requires you to be connected to the internet

# 6 LEAVES DIAGNOSIS



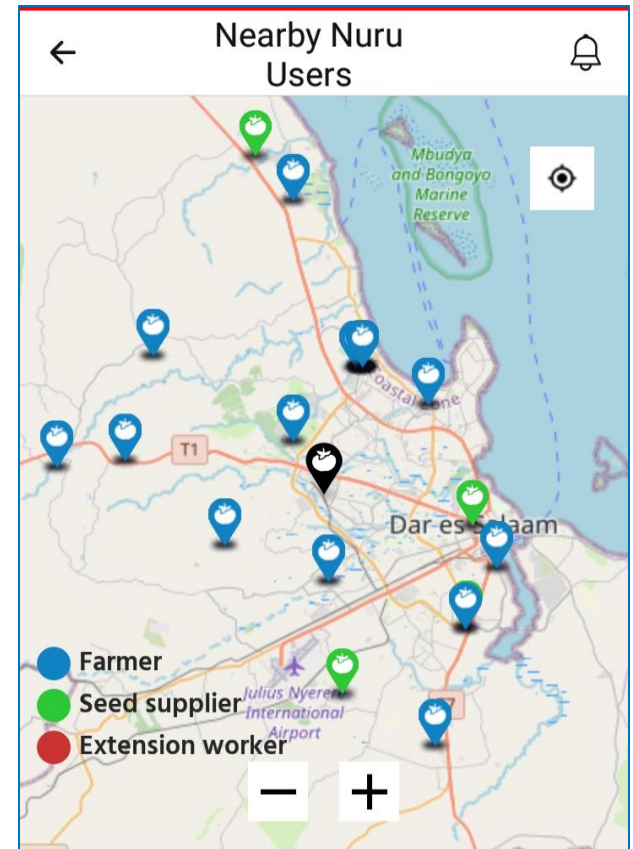
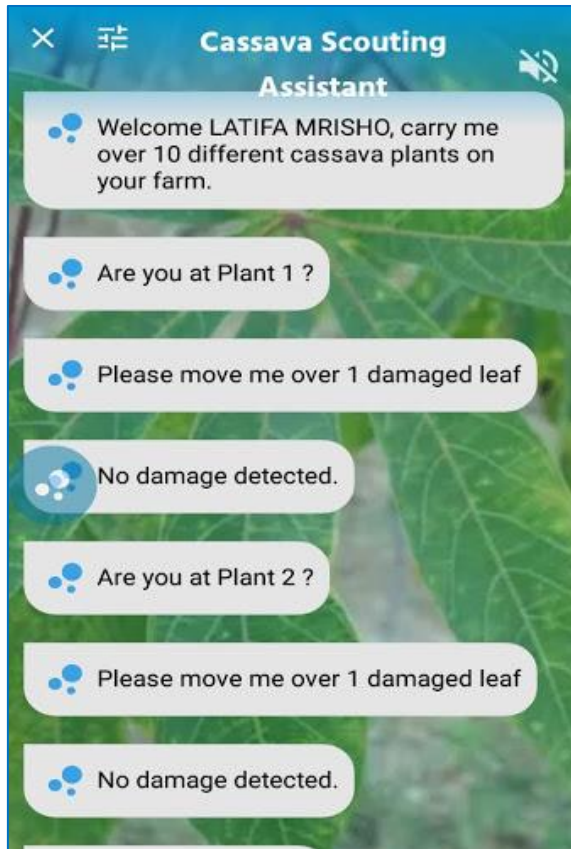
# Cassava AI – Disease diagnosis

## ‘Field inspection’ option





## Field inspection



**IITA**

*Transforming African Agriculture*



**CGIAR**

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# Things to consider when using Nuru

# Things to consider when using Nuru

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## 1. Time

- Reflection of sunlight makes the leaves appear shiny and may lead to failure of diagnosis or misdiagnosis.
- Early morning (before 10 am) or late afternoon (after 4 pm)

## 2. Leaf selection

- Make sure you select leaves that appear to be unhealthy to give Nuru higher chances of identifying the diseases in your plant.
- Make sure the leaf is focused and you hold the phone steady during diagnosis (hold the leaf on your palm when necessary).

# Things to consider when using Nuru

## 3. Disease type or severity

- Mild infections are not easily identified
- Bacterial infections, fungal infections and nutrient deficiencies can also not be identified



There is possibility of adding more diseases/conditions depends on availability of funds

# Things to consider when using Nuru

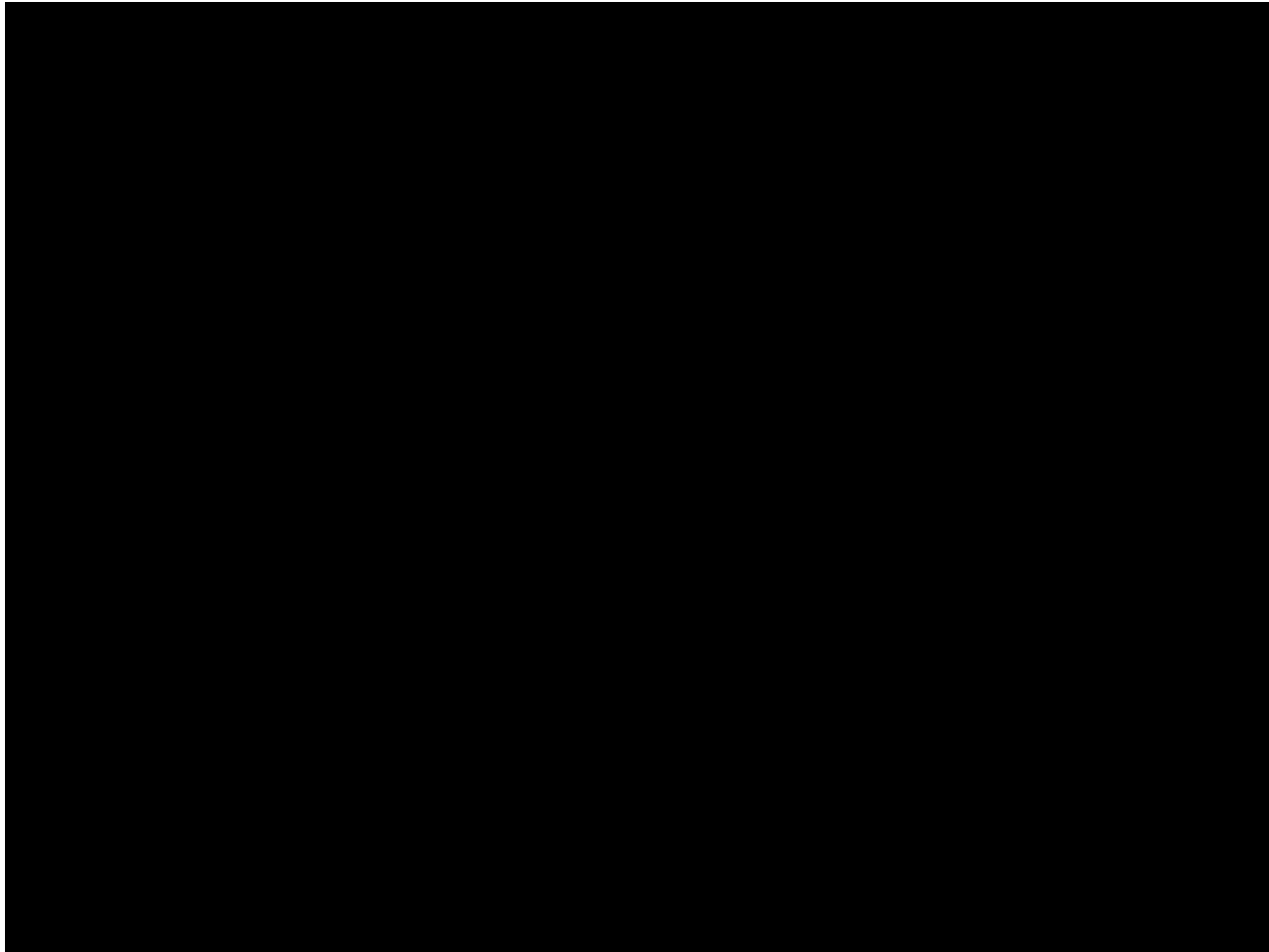
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## 4. Type of phone

- Android phone  $\geq$  2 GB RAM - Technology developments allows for smaller apps >> more affordable phones
- Sensitivity of the camera – Newer versions of smart phones tend to have more sensitive cameras (test the phones before purchasing bulk orders)
- Nuru is continuously being updated to account for the changes in phone capabilities

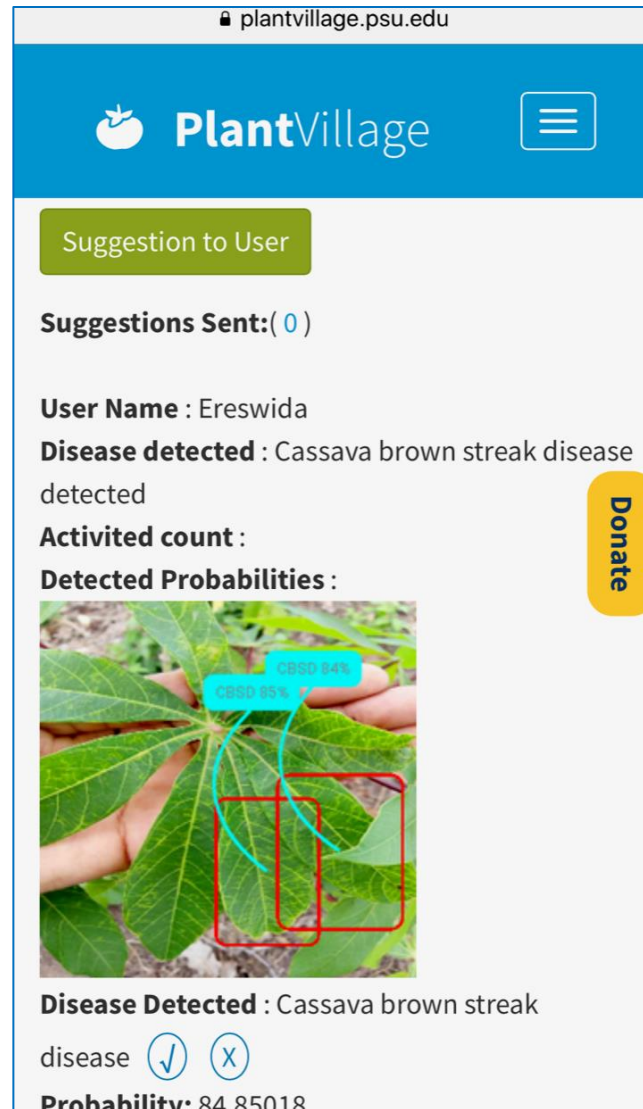
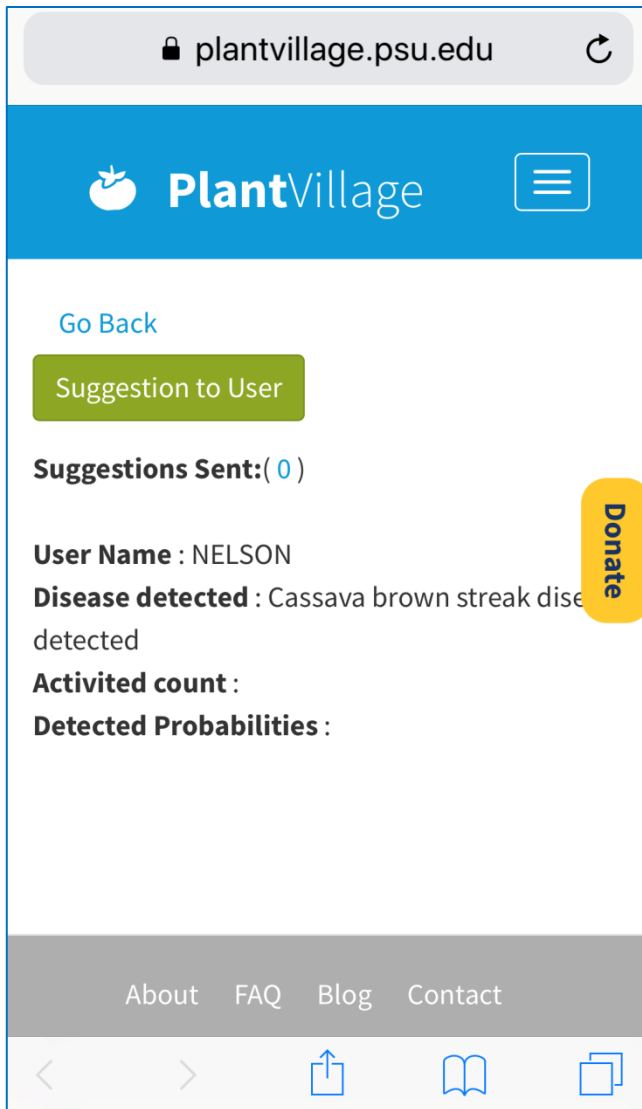
# Things to consider when using Nuru

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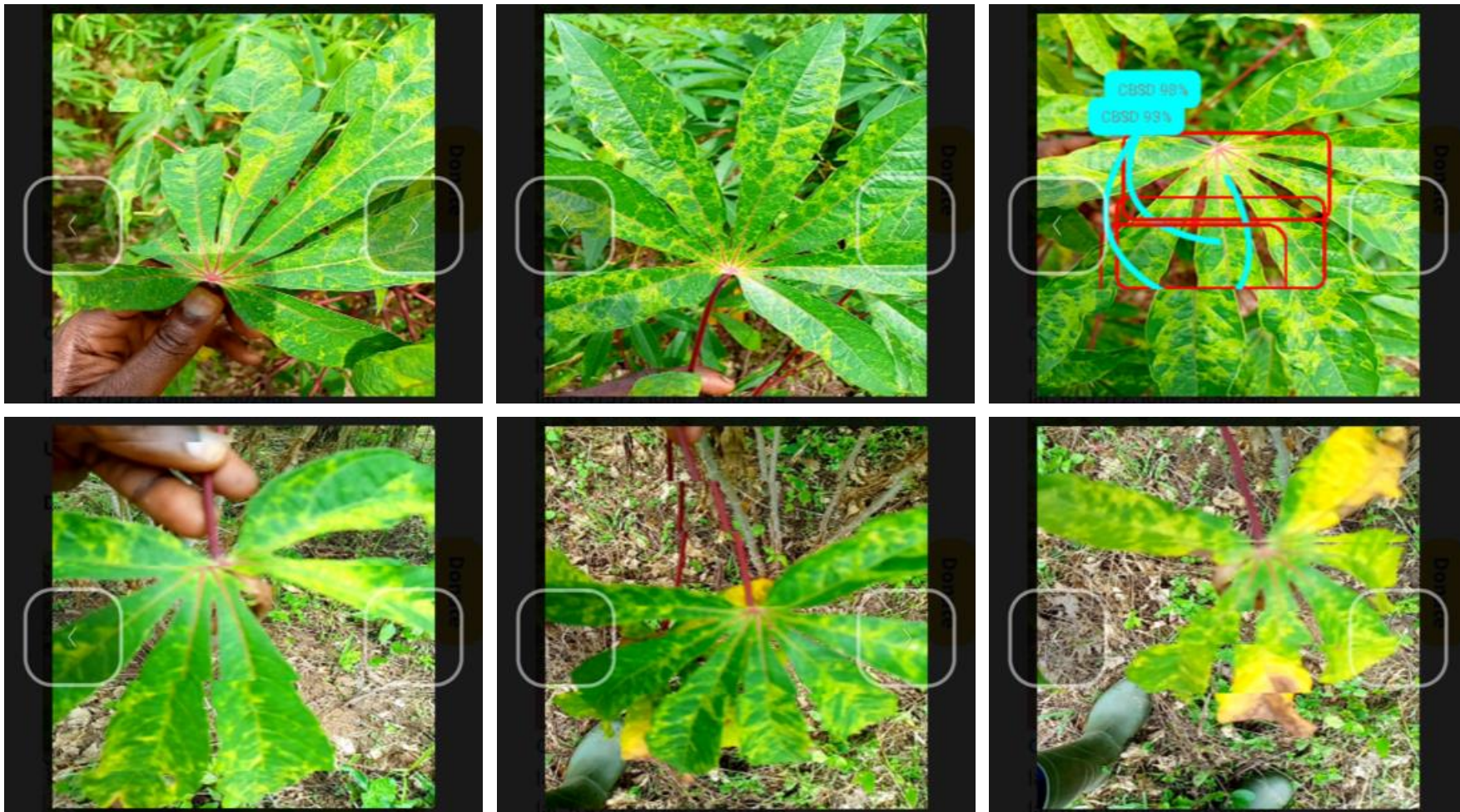
# Diagnosis feedback

# PLANTVILLAGE DATABASE





# Cassava AI – Expert view



The images uploaded in the database are used to improve diagnostic capability of Nuru hence do your best to use Nuru while connected to the internet

# Cassava AI – Expert view

**PlantVillage**

**Detected Pest or Disease:** Cassava Brown Streak Disease  
(97,7,96,6,93,2,99,9,99,7,97,6,95,2,97,4)

**Please select Disease:**

Healthy CBSB **CMD** Mites Unknown

Bad Image

Update Diseases

**Position :** top\_1

**Image Upload Type :** live

**Activated Count :** 3

**Collected Location :** Sassandra-Marahoué,Côte d'Ivoire

**Collected Time :**

**Collected Latitude :** 6.47572

**Collected Longitude :** -6.302488

**Uploaded Latitude :** 6.47572

Donate

**PlantVillage**

**Cassava Images** Go Back

**Send message about diagnosis to Mary** ×

**Content for suggestion**

Thank you for using PlantVillage Nuru. We have looked at your image with our AI system in the cloud and with human experts.

[WE ADD TEXT]

Send message to user ⓘ

Select Suggestion Link ▾

Select Video Link ▾

Wapor data last updated: 26 Sep 2020

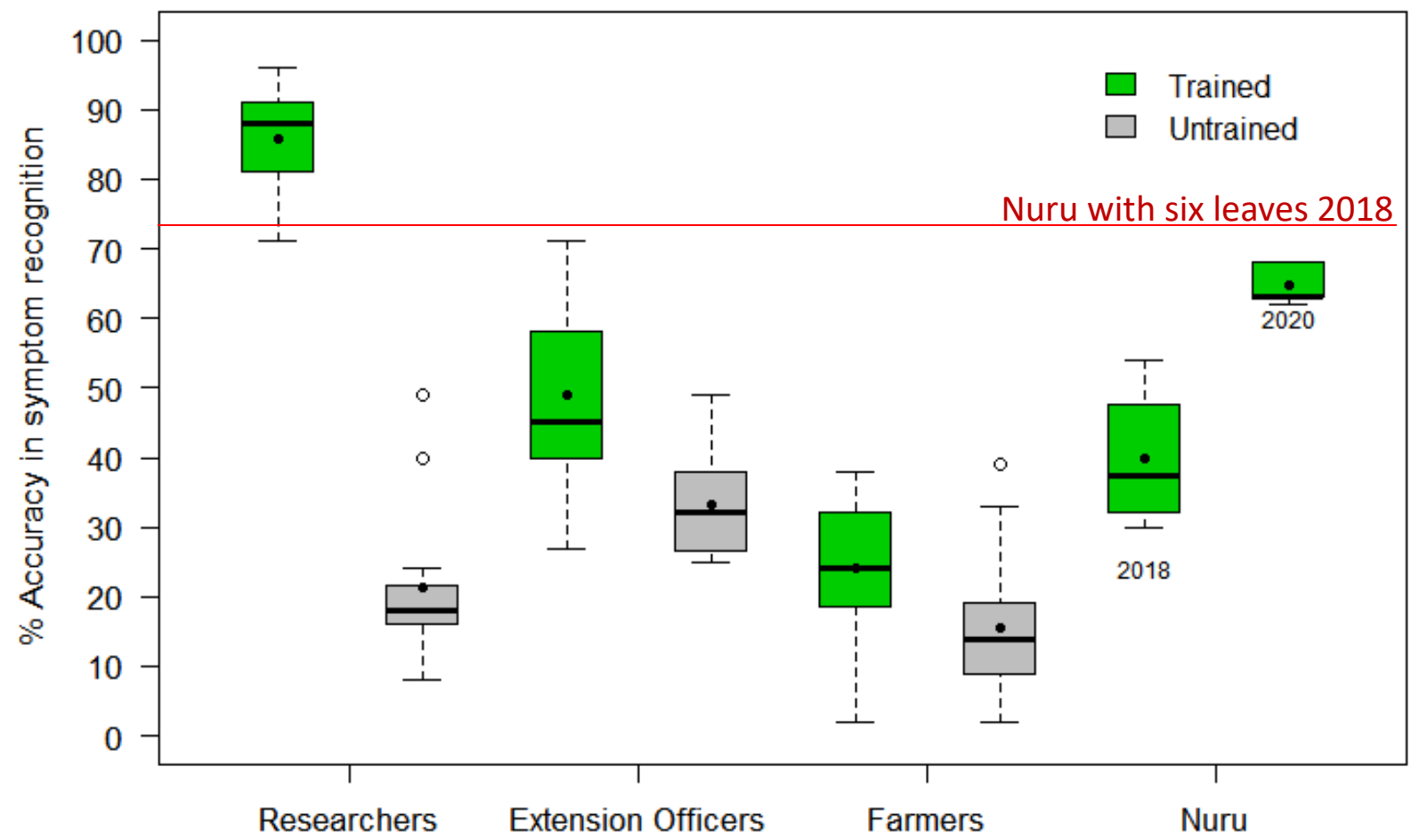
Donate

**Only possible if you use Nuru while connected to the Internet, so please opt for this method.**

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# How effective is the cassava AI

# Ability of different groups to identify symptoms of cassava diseases on leaves





Platform for  
Big Data  
in Agriculture



Neema Mbilinyi &  
Mathias Ndalhwa



Prof. David Hughes



DR. James Legg



**Thank you!**

**IITA**

*Transforming African Agriculture*



**CGIAR**

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**For any question /clarification/comment  
please contact**

**Neema Mbilinyi**

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