

## **Nuru for in-field Pest/Disease Diagnosis**

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### **Résumé**

PlantVillage Nuru is a smartphone app which uses artificial intelligence to deliver instant offline diagnosis of symptoms of major crop damage caused by diseases and pests. Its first application was for the cassava diseases/pests: cassava mosaic disease, cassava brown streak disease and cassava green mite. It can also be used to detect damage caused to maize by fall armyworm, and its capabilities are being expanded to other crops, including potato. It can be downloaded for free from Google's PlayStore. In addition to providing instant diagnoses, the app also links users to other nearby users and provides information on how to control the diseases/pests that it identifies. IITA has partnered in the development of the cassava part of the app with Penn State University, who are the primary authors.

### **Description Technique**

PlantVillage Nuru uses machine learning with object recognition to train software to 'recognize' the characteristics of symptoms caused by diseases and pests. In order to achieve this, thousands of digital images of the different categories of disease infection, pest damage or healthy status are annotated by technical experts. The object recognition software has been incorporated into an Android app that can be downloaded and used even on basic specification smartphones. Crowd-sourced translation has been used to provide translations into several languages, augmented by additional translations from technical experts. IITA has worked with the PlantVillage team to deliver the Swahili translation. The back-end of the software allows for post-event analysis of diagnosis reports received from users. These are maintained in a database and are used to generate real-time maps.

### **Utilisation**

In-field diagnosis of crop pests and disease types and delivery of relevant control advice to users via their smartphones

### **Composition**

No specific composition required

### **Moyens d'Application**

This solution is applied by downloading the PlantVillage Nuru app for free from Google's PlayStore. Usage can be enhanced by awareness raising and training of farmers and extension officers. This has been done extensively in Kenya and Tanzania.

|                                      |  |
|--------------------------------------|--|
| <b>Agroécologies</b>                 | Tous les Agroécologies.  |
| <b>Régions</b>                       | Tous les Régions.  |
| <b>Developed in Countries</b>        | Tous les Pays, le Kenya, le Tanzanie.  |
| <b>Available in</b>                  | Tous les Pays.   |
| <b>Forme(s) de la Solution</b>       | Application Numérique.   |
| <b>Application(s) de la Solution</b> | Lutte contre les Insectes, Contrôle des Maladies, Autre Lutte Antiparasitaire. |
| <b>Denrées Agricoles</b>             | le Maïs, le Manioc, Autres Racines & Tubercules.                               |
| <b>Bénéficiaires Cibles</b>          | Tous Agriculteurs.   |

## **Commercialisation**

### **Catégorie de Commercialisation**

Technologie de gestion avec un potentiel commercial limité

### **Exigences de Démarrage**

Nothing other than downloading from Google's PlayStore

### **Coût de Production**

Nothing, apart from possible facilitation through provision of phones and training/ awareness raising

### **Segmentation de la Clientèle**

Primarily smallholder farmers, but also the extension officers, seed certification officers and other agric workers dealing with crops in the field.

### **Rentabilité Potentielle**

This is being rolled out as a public good with no aim to generate profit.

## **Exigences de Licence**

The app can be freely downloaded and used with no licensing requirements.

## **Solution en tant que Bien Public**

Yes. A public good for the benefit of smallholder farmers and the agric workers who support them.

## **Institutions**



## **Accompanying Solutions**

PlantVillage Nuru becomes most effective when used in combination with SeedTracker, which is an IITA app for the registration and certification of seed which can also be used to enhance seed marketing. When Nuru makes a diagnosis of a cassava disease, it recommends users to obtain healthy planting material of disease-resistant varieties from producers registered on the SeedTracker app. Currently, SeedTracker has been rolled out for cassava in Nigeria and Tanzania, but new countries and crops are being added.