



Learning from *CajùLab project: Drone-assisted land mapping for climate smart cashew production*

Country
Benin



Implemented by



Budget

349.238 €

Duration

06/2019-09/2021

Contributions to SDGs



Implemented by



Financed by



Can digital social innovation support the upscaling and adoption of Climate Smart Agriculture best practices, how and in which context ?

PROJECT OVERVIEW

Reason

Cashew nuts are Benin's second largest export crop and the government recently set a production target of 300,000 tonnes per year instead of 120,000. However, growing evidence suggests that recent growth of Benin's cashew production expands into previously forested areas, thus eliminating the **climate benefits** of plantations, reducing **biodiversity** and negatively impacting **marginalised populations**.

With this in mind, relatively low cashew yields highlight the need for an **intensification of cashew production per hectare**, that could be realised **through better climate smart agricultural practices**.

However, the cashew sector of Benin is characterised by a **low degree of structure and data availability**, making it difficult for government and training services to develop **relevant policies** and efficiently direct **resources**.

Digital Social Innovation

The CajùLab project is part of TechnoServe's broader BeninCajù program that provides training to smallholder farmers through cooperatives about plot and post-harvest management.

The CajùLab project's digital social innovation identifies **plot health** and **land management practices** within cashew-producing areas in Benin, providing evidence through quality data and enabling policymakers and training services to **adjust resources** and **services to smallholder farmers**.

The digital social innovation works on two level:

▶ **Plantation level:** collection of cashew trees imagery by **drones** carrying a multispectral camera in Atacora and the Collines regions. Imagery is analysed by a **machine-learning algorithm** identifying cashew plot health and management practices.

▶ **National territory level:** collection of cashew plot data by **satellites** to **develop a state of play of the cashew sector in Benin**. Data are analysed by a **machine-learning algorithm** able to identify cashew crops from other trees.

This data is evaluated and disseminated through

▶ An **online remote sensing dashboard** , designed for policymakers and training providers

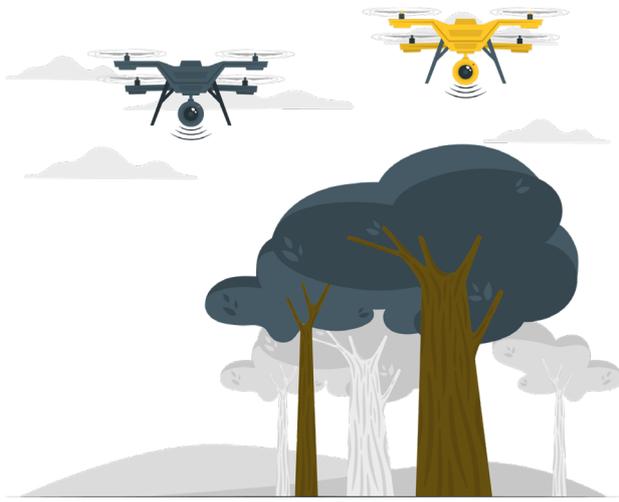
▶ An **Action Plan on Climate-smart Cashew Production** to scale sustainable farming practices among 11,000 cashew farmers, including policy recommendations and a farmer training targeting plan for the Ministry of Agriculture - MAEP (ATDA4) and the national farmer federation FENAPAB.



From the perspective of the human rights-based approach (HRBA)

The goal of the HRBA is, on the one hand, to empower **rights holders** – **smallholder farmers in Benin and cooperatives**- to claim their rights and participate in their own development process. On the other hand, to share the capacities with **duty bearers** – the **State** - to respect, protect and fulfil those rights.

The project has focused primarily on the duty bearer side, allowing for **evidence-based policy decisions, more efficient and equitable resource distribution**, and tailoring of trainings provided to smallholder cashew farmers.



12.181 ha of cashew plantations were mapped using drones

577.617 ha were mapped and analysed using satellite prediction across five areas in Benin covering **17 communes**

KEY MESSAGES

Drone and satellite mappings have allowed for the **development of large databases** that could not be constructed based on manual observations. The added value of such a digital innovation is **its accuracy, speed, reliability** and **scope**.

- Satellite-assisted mapping has for the first time in the country's history given the government **reliable data on the location** and **state of cashew crops** in Benin, therefore allowing for an overview of current production quantities and potential developments of the sector.

- Drone imagery has for the first time in the country's history made **information available on production practices** and possible improvement in a very large number of plantations.

The dissemination of data collected through a **user-friendly dashboard available on the web** has allowed training services to easily access information on specific plantations and therefore to **tailor their training to smallholder farmers**. For example, they can directly identify that the use of water is not efficient on a plot or village and train the farmers accordingly.

Cashew farmers are not the users of the digital social innovation but are the **beneficiaries**. The dashboard has been used by 1. technicians from the Ministry of Agriculture to inform decision-making based on accurate and timely information 2. training providers and cooperatives to tailor their support to both male and female farmers.

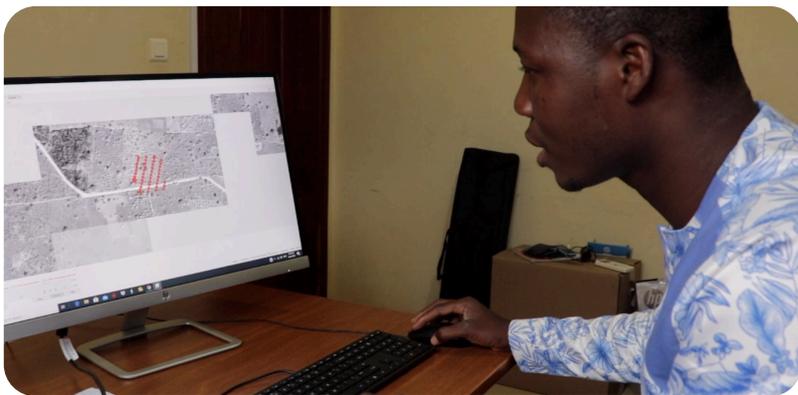


The CajùLab project will allow me to increase my yields and production and will motivate me to take better care of my farm in the future

Sabiwo Tabe,
cashew farmer in the village of Gounin in Parakou

Drone gives us the possibility to see the invisible, as if we had eyes in the sky. It can detect all the problems related to the plantations

Ouriel Hountondji,
chief drone operator at AtlasGIS

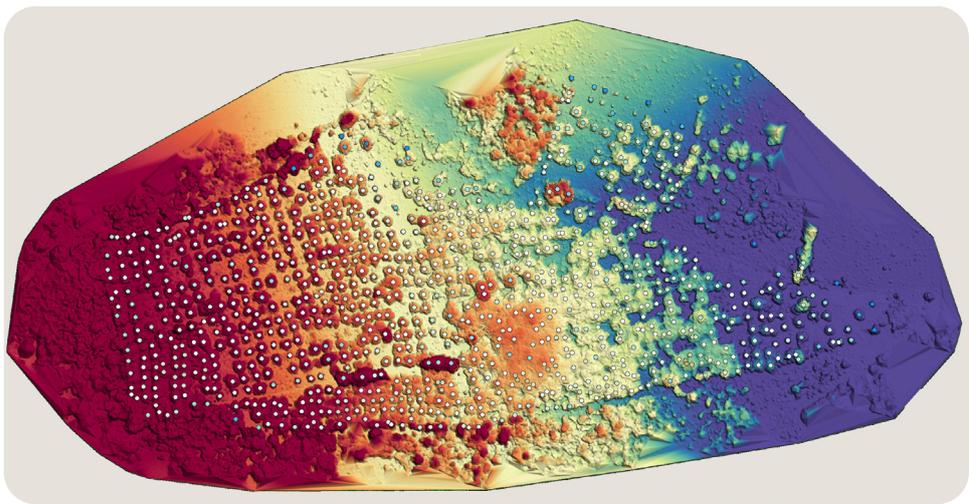


The CajùLab project is welcome in this digital age. I like that it is integrated in the agricultural sector of Benin

Sahadatou Atta Kakayatchi,
farmer and president of the FENAPAB

More stories about the project? 

Want to watch a video? 



LESSONS LEARNED

Inclusion and equity

Projects should be careful about inclusion and representativity while deciding which crops to map. If the identification of crops to map comes from previously existing farmer registries, there is a high risk that **the process will be strongly biased towards male farmers** as these registries often rely on land ownership or – non-gender inclusive – social structures.

The possibility to produce information on a very large number of plantations makes the digital social innovation more **inclusive** than regular, physical mapping that would only focus on top producers and leave most small-scale farmers out.

Stakeholders and users' responsiveness

It is important to address the fact that **appropriation of a new digital tool** may take some time, whether by actors on the ground or in public institutions. A collaborative approach, continuous learning and capacity sharing should be planned from the beginning.

Use of digital tools beyond project's end

The survival of the digital social innovation relies on an **ecosystem of skilled and empowered people** who will be able to continue developing, managing and using the data and dashboard. Engagement of the department of the information system of the Ministry of Agriculture at every step of the development to ensure skills transfer from TechnoServe to state technicians was crucial, as well as continuous training and knowledge sharing among those technicians.

The use of the dashboard by **government actors** and **their buy-in** has been secured by (1) The project's alignment with the Government of Benin's objectives regarding export and digitalisation in the agricultural sector (2) Involvement of the government actors from the beginning and throughout the project

The Action Plan describes the **tools, methodologies and recommendations** on how the digital social innovation can be used to scale climate-smart cashew cultivations in the country. It was developed with, presented and handed over to the Gouvernement of Benin as a guide for using digital tools to expand the cashew nut sector.



PERSPECTIVES

Based on the drone mappings of the plantations, as well as the mobilisation of farmers cooperatives, **10k smallholder cashew farmers were identified** and will receive (semi-) personalised training on plot management and climate-smart agricultural practices in the years to come.

The CajùLab project allowed to identify underlying needs of cashew farmers in **generating land rights**. The drone mapping that was initially aimed at increasing the quality of training services could also be used to allow (female) smallholder farmers to access land titles through plot measurement.

The project has **tested** and **optimised a methodology for drone** and **satellite-assisted mapping** and analysis of cashew crops. This social digital innovation is **replicable for other export crops** like coffee or shea.

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