

# Cocoa Crop Detection - Pest & Disease Prediction for Rainforest Alliance

REGION: Africa; Ghana





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# Enhancing cocoa production & improving pest and disease prediction for cocoa farmers in Ghana

Ghana is the world's second-biggest producer of cocoa. Sadly, the country earns only about 2% of the \$100 billion industry's profit. Most farmers export their cocoa beans to Europe and North America in the raw form, where it is mainly consumed by the chocolate industry. In the cocoa value chain, the 'finished product' is where the profit lies. The reality is that many cocoa farmers in Ghana still live in abject poverty, with a median income below the World Bank poverty line of \$2 per day.

Other crippling factors such as rampant child labor, soil degradation, loss of biodiversity, climatic changes such as prolonged dry seasons, less rainfall, etc., and the appearance of newer pests and diseases affect cocoa yield and quality. This is the bitter truth for many farmers in Ghana today. To tackle these challenges, Rainforest Alliance, an international non-profit organization actively working towards improving the livelihoods of cocoa farmers in Ghana, initiated Sat4Farming. Competing with many international Agtech contenders, Cropin won the Sat4Farming Challenge in 2019.

The digitization project creates individualized digital Farm Development Plans (FDP) that aim to improve farmers' technological know-how to enhance their livelihood through higher productivity. The partners co-developed an artificial intelligence/machine learning (AI/ML) based future-ready solution called 'CocoaSense'. It empowered farmers to manage and monitor their plantations with accurate, affordable, and scalable insights. The Rainforest Alliance-Cropin partnership leveraged Cropin's innovative Agtech platform with a target to triple the average yield of Ghanaian cocoa farmers to 1500 kilograms per annum.





# The top-3 challenges of cocoa production in Ghana

Cocoa production in Ghana poses multi-dimensional challenges for farmers and farming companies alike. The top three challenges identified by Rainforest Alliance are:

- ① Large-scale crop losses due to weather and climate change
- ② Evolution of newer diseases and pests affecting cocoa output, leading to inconsistent yields
- ③ Lack of compliance and certification processes adds complexity to an already overburdened (and outdated) cocoa farming system.





# Rethinking cocoa production in Ghana-with a digital touch

Rainforest Alliance, in partnership with Cropin, launched - **CocoaSense** - for cocoa farmers in Ghana. The objective was to work with these farmers to benchmark **farming practices**, improve the smallholders' **economic sustainability**, and arm farmers with the **scientific know-how** to turn profitable, sustainably.

Cropin and Rainforest Alliance co-developed and perfected 'CocoaSense'. Leveraging Agtech, CocoaSense aimed to provide an **integrated offering** that started with structured data aggregation. The ongoing project extends predictive and prescriptive intelligence, leading to improved, high-quality cocoa production. Pilot programs were conducted to check for viability and drive scale.



## **The cocoa farming process underwent a digital makeover to boost crop yield**

Cropin developed 'CocoaSense' as a cocoa-specific remote sensing data product powered by AI and satellite imagery that helps cocoa farmers manage and monitor crops. Farmers also benefitted from mobile-enabled individualized digital FDPs, which guided them over a seven-year period. The platform was built using a suite of emerging technologies (think Geospatial Imaging, Predictive Modeling, Intuitive SISENSE powered Dashboards and Geo-Tagging). Access to real-time, accurate, and reliable data-driven insights helped smallholder farmers prevent crop diseases, and improve their economic health, farm health, yield outputs, etc., at the plot level.

## Round-the-clock advisory and consulting


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Advisory initiatives extended by CocoaSense empowered farmers during the cocoa farming process. Under this initiative, the Package of Practices (PoPs) was shared with farmers, and the field team provided training on best practices for cocoa crops. Cropin also provided weather-based advisory and promoted climate-smart agriculture. In addition, farmers benefited from timely and dependable pest and disease alerts. The bonus was the platform's voice messages multilingual support in regional languages, ensuring easy adaptability and seamless integration to the local context.

Cropin conducted training programs for the field officers to ensure effortless product adoption. The initiative offered 24x7 assistance to farmers through satellite and weather input-based crop advisory. The solution also enabled seamless two-way communication with the farmers to drive farmer engagement.

The initiative provided field officers with data organization and platform management training to ensure easy access and help them update their activities on the app. Cropin monitored data collection activities to check for activation. Field officers shared regular product feature update alerts and product user manuals to help them share knowledge with cocoa farmers.





## The future-ready farming solution

Cropin supports SAT4Farming's target to achieve:

- **3X** = Growth in average yields of Ghanaian cocoa farmers
- **1500 kg** = Annual production of cocoa by farmers
- Disease prediction - Black Pod disease with 74% accuracy

CocoaSense was built to support SAT4Farming's objective-to empower cocoa farmers in Ghana. Building a remote sensing data product specific to cocoa on top of Cropin's already existing platform interface solved the complexities of smallholder livelihoods in a lean manner. It drove a new reality - one with end-to-end cocoa traceability and a profitable cocoa farming process.

# Cropin Company Profile

Founded in 2010, Cropin is a global Agtech pioneer who has built the world's first purpose-built industry cloud for Agriculture - Cropin Cloud, an Intelligent Agriculture Cloud.

Cropin Cloud enables various stakeholders in the agri-ecosystem to leverage digitization and predictive intelligence to make effective decisions that increase farming efficiency, scale productivity, manage risk and environmental changes and enhance sustainability. Cropin has been instrumental in creating the global Agtech category and bringing advanced technologies together to transform farmers' lives worldwide through partnerships with agri-businesses, governments and development agencies across 56 countries. They helped the ecosystem to eliminate the uncertainties associated with farming and made it predictable, traceable, and sustainable.

Cropin Cloud combines cutting-edge technologies, including artificial intelligence, machine learning, data science, satellite imagery, and remote sensing. It helps derive real-time actionable insights to build a connected and sustainable agri-ecosystem that can benefit farmers, farming companies, agri-input providers, food processing companies, retailers, financial service providers, governments and development agencies.

Cropin has partnered with over **250 B2B customers** and **digitized 16 million acres of farmland, improving the livelihoods of more than 7 million farmers**. Our work over the last decade has enabled us to spearhead a global 'Ag-intelligence' movement with a crop knowledge graph of **488 crops and 10000 crop varieties in 56 countries** that powers the Cropin Cloud. Cropin Cloud's Intelligence platform has already computed and **provided predictive intelligence for over 0.2 billion acres of farmlands** across the globe.



**Website**

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