

## Drones to boost sugarcane production in Côte d'Ivoire



*Cote d'Ivoire Flying Labs drone pilot operating spraying drone*



*Cote d'Ivoire Flying Labs team in drone maintenance*

OVERVIEW	
<b>Flying Labs</b>	Côte d'Ivoire Flying Labs partnered with Investiv
<b>Geographic area</b>	Central and northern Côte d'Ivoire
<b>Date</b>	February - April 2020
<b>Sector program</b>	DevRobotics
<b>Main SDG</b>	Goal 12: Responsible Consumption and Production

SCOPE	
<b>Stakeholders (clients)</b>	Sucrivoire (sugarcane producer and sugar manufacturer)
<b>Challenge</b>	Although sugarcane is an important cash crop in Côte d'Ivoire, changing climatic conditions, soil degradation and aged crops now pose a challenge to ideal production. To address concerns related to crop loss, organizations like Sucrivoire now use growth regulators to optimize sugarcane production and improve its quality. These products are generally applied by helicopter, which, due to their weight and size, must maintain a considerable distance from the crop. This frequently leads to imprecision, overdosing, and other inaccuracies during application.
<b>Scope</b>	The objective of this project was to leverage drone technology to complement existing application methods and improve sugarcane yields on 2 distinct Sucrivoire production sites, Borotou-Koro and Zuénoula, for a total of 2287 hectares of sugarcane. Drones can spray quickly and more efficiently than

	<p>other vehicles. Because of their size and flexibility, they are able to fly much closer to the crops, allowing them to treat surfaces with much more precision and accuracy while using a reduced quantity of a given product.</p>
<p><b>Outcome</b></p>	<p>The project was composed of four distinct phases:</p> <ol style="list-style-type: none"> <li>(1) Preparation of mission and stakeholder meetings to discuss project details, methodology and project timeline,</li> <li>(2) Spraying phase 1: spraying of 1490 hectares of sugarcane in Borotou -Koro (average rate of 29 hectares per day, 6 days per week)</li> <li>(3) Spraying phase 2: spraying of 797 hectares of sugar cane in Zuénoula (average rate of 28 hectares per day, 6 days per week)</li> <li>(4) Synthesis and preparation of deliverables</li> </ol> <p>Throughout the mission, the team experienced challenges related to electromagnetic interference and seasonal climate. Upon initiating the project, the team was made aware of the presence of zones of interference within the activity perimeter which is particularly hazardous during low-altitude flights. To address this, the team first did an additional reconnaissance of the project site to try to identify particularly dangerous zones. For this mission, Investiv used a drone model that was capable of quickly detecting when it was entering a zone of interference. When the drone detected such a zone, the pilot switched into manual mode in order to be able to better regulate the drone's altitude, allowing the team to have better control and avoid the negative consequences of such interference.</p> <p>Further, the initiative took place during an unexpected period of particularly heavy rains. This proved challenging as spraying activities require relatively dry conditions to ensure the effectiveness of the applied product. To mitigate this challenge, the team monitored the weather in order to maximize the chances of ensuring a 3 hour window post product application before the commencement of rains. This ensured that the product would be fully absorbed.</p> <p>Through this initiative, Sucrivoire was able to achieve its objective of applying regulators to sugarcane plantations at a faster rate and more efficiently than they currently do with existing manual and helicopter spraying methods</p>

<b>Next steps</b>	Upon witnessing the various, agricultural, financial and environmental benefits of drones for spraying purposes, as well as its advantages over alternative application methods, Sucrivoire opted to continue deploying this method and has requested that Côte d'Ivoire Flying Labs renew their contract to treat another 450 by mid-April.
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<b>FIELDWORK</b>	
<b>Size of area</b>	2287 ha (22.87 km <sup>2</sup> )
<b>Drone</b>	YUREN 3WDM8-10 and TTA ERA 10X
<b>Payload volume</b>	10 liter
<b>Type of active ingredient</b>	Ethephon
<b>Total volume sprayed</b>	22870 liters (water + chemical)
<b>Flight plan software</b>	DJI MG AG
<b>Flight height</b>	6 meters
<b>Number of flights</b>	2287 flights using 4 drones in total
<b>Time invested in fieldwork</b>	54 days

<b>DATA &amp; OUTPUT</b>	
<b>Analysis tools</b>	DJI MG Assistant, DroneLogbook
<b>Analysis outputs</b>	Flight logs
<b>Final outputs shared with stakeholders</b>	A final report including activity data (hours piloted, an average daily area covered, impact analysis)
<b>Data sharing</b>	Email