



# Exploration of use cases for an ai-based coffee yield estimation tool

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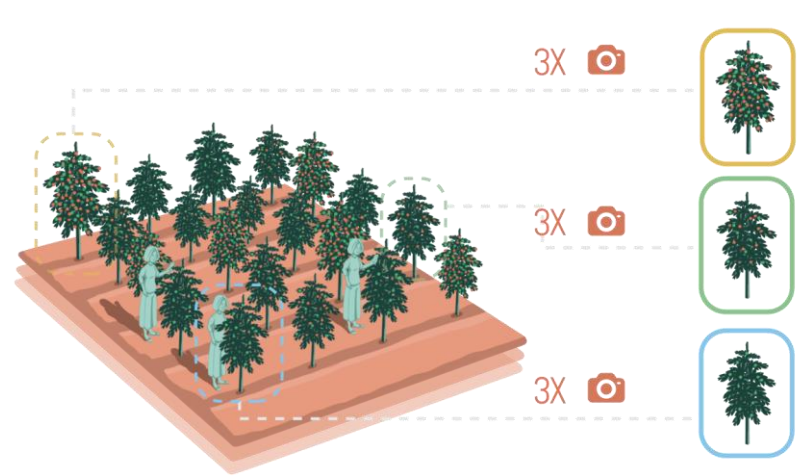


## INTRODUCTION

Increasing climate variability and traceability requirements are driving the need for accurate data to make better decisions throughout the entire coffee supply chain.

Yield estimation is key to agronomic management, financial planning, certification, and marketing.

- **But:** Conventional methods of manually counting cherries are costly, time-consuming, require trained personnel, and are prone to errors.
- **Croppie** uses artificial intelligence to count cherries based on images taken with a smartphone. The tool generates fast, documented, and reproducible estimates.
- Adoption and scaling depend on understanding users, their needs, and value contexts.



## OBJECTIVES

- Identify potential users, needs, and current practices.
- Determine the priority practical applications for a digital crop-estimation tool from the perspective of value chain stakeholders.
- Document the initial findings from preliminary pilot user experiences.



## METHODOLOGY

A qualitative study consisting of two complementary phases in which stakeholders from the coffee value chain in Colombia, Peru, Ecuador, and some African countries participated.

### 1. Exploratory Survey

- 23 stakeholders were consulted during a national coffee industry trade show in Colombia.
- Mapping of needs, perceptions, and experiences with digital tools.

### 2. Semi-structured interviews

- To cooperatives, trade associations, financial institutions, and companies (Colombia, Ecuador, Peru, Kenya and Uganda).
- The stakeholders were identified based on:

Expressed interest, prior contact with Croppie, or strategic relevance.

**The interviews explored needs, frequency, current methods for estimating crop yields, and projected use cases for Croppie.**



## RESULTS

### DIFFERENT NEEDS

The cost and time involved in manual counts are a common challenge, but the urgency and the best way to address it vary by stakeholder.

| Stakeholder Segment                | Need                                                        | Required Channel                  | Primary Use Case                                                           |
|------------------------------------|-------------------------------------------------------------|-----------------------------------|----------------------------------------------------------------------------|
| Cooperatives                       | Speed, cost reduction, and standard protocol                | Standalone mobile app             | Certification, commercial quotas, producer monitoring, agronomic decisions |
| Public organizations               | Accuracy and speed, optimized sampling, transferable method | API integration                   | National harvest forecast                                                  |
| Financial institutions / exporters | Cascade requirements to preferred suppliers                 | Traceability software integration | They do not make harvest estimates for their direct operations             |



## EMERGING USE CASES



- Farm management (EAFIT pilot): Decision support at the farm level, budgeting, and women's inclusion.
- National scale (FNC validation): A less invasive national forecasting method with a lower operational burden; validation in progress.
- Research support: Use of computer vision to measure production yield at the individual-tree level with high precision, which is key to genotypic characterization and plant breeding processes.



## CONCLUSIONS

- No One-Size-Fits-All Solution: Although the cost and time involved in manual counting are a common pain point across the sector, the urgency, the format (API, mobile app), and the way Croppie solves the problem vary depending on the user's profile.
- Strategic Focus: Identifying segments with active needs allows for more precise optimization and targeting of development and scalability efforts.
- Unanticipated impacts and applications in the initial development: The use of Croppie goes beyond commercial management, positioning itself also as a tool for equity and family inclusion on the farm, an agronomic decision-making tool (crop assessment), and a resource for research.



## FURTHER READING

Gautron, R., Seurin, M., Rahn, E., Faye, E., & Bunn, C. (2026). Field-deployable, 13, Article 101901. <https://doi.org/10.1016/j.jatech.2026.101901>. coffee yield estimation from mobile phone images using branch segmentation and occlusion correction. *Smart Agricultural Technology*

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