



VERIGROUND WEATHER SERVICES

RAISE COCOA FARM INCOMES | AID SUSTAINABILITY PROGRAMS

INDUSTRY PROBLEMS

Crop surpluses are low.

Small holder farmer productivity is stagnant.

Crop expansion has come from cleared forest.

Poorly reported weather events drive market.

Price and volatility are high.





FARMER CHALLENGES

Fertilizer and agrochemical timing on rainfed cocoa is critical.

Timing errors waste inputs and reduce yield.

Informed estimates place fertilizer loss at 50% because of timing mistakes*.

Good, localized weather forecasts are not available to African cocoa farmers.



**BETTER FORECASTS
BETTER MESSAGING
BETTER OUTCOMES**

VERIGROUND

Weather station network for accurate forecasts and outreach to every cocoa smallholder.

Incubated by Commodities Risk Analysis (CRA), 45-year advisor to the cocoa industry.

Cocoa farmers want to increase yields.

Industry wants good crops.

*Veriground's network **enables both.***



VERIGROUND TODAY

75 sites in Ghana

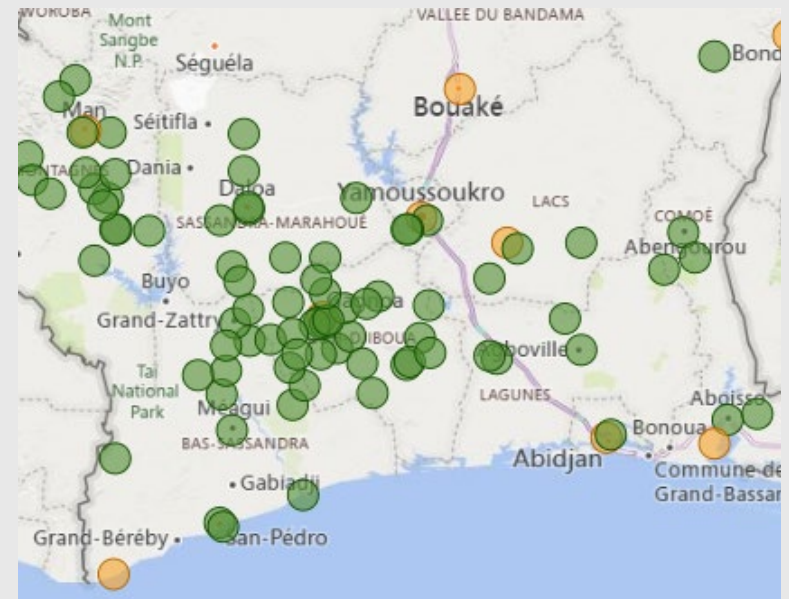
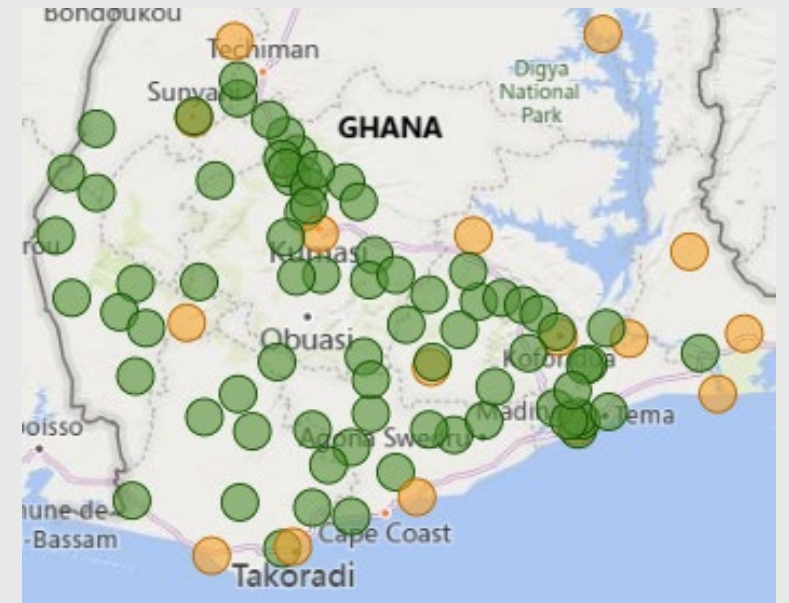
80 sites in Côte d'Ivoire

Some sites in Ecuador

Stations record hourly weather, report during daylight hours.

Generates 7-day forecasts in cooperation with a major forecast provider.

Supports smallholders, cooperatives, governments, 'met' offices and national research organizations.





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RAISE COCOA FARM INCOMES | AID SUSTAINABILITY PROGRAMS

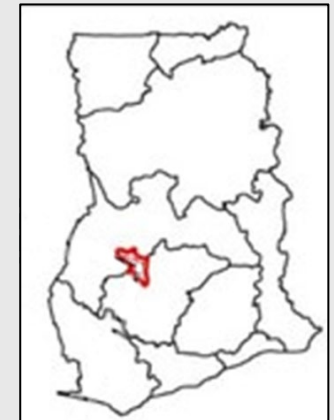
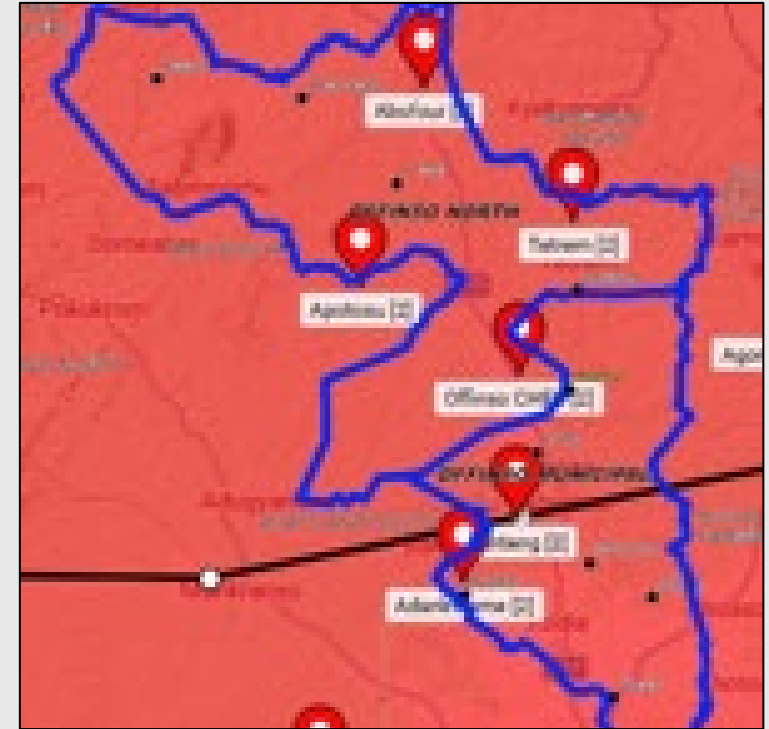
THE OFFINSO EXPERIENCE

Farmers' response

As word of the Veriground forecasts spread, CHED officers were besieged by calls from farmers. The officers created a WhatsApp group with lead farmers to distribute forecasts efficiently.

In 2025, Veriground set up a mobile-phone “short-code” system so farmers can get forecasts directly, free to farmers. *928#160#

CHED officers use Veriground forecasts to time fertilizer and agrochemical applications. Recommendations are sent to lead farmers who forward to their village.

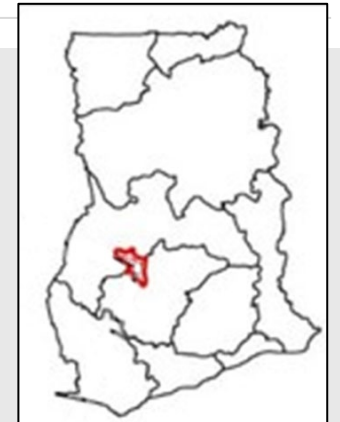
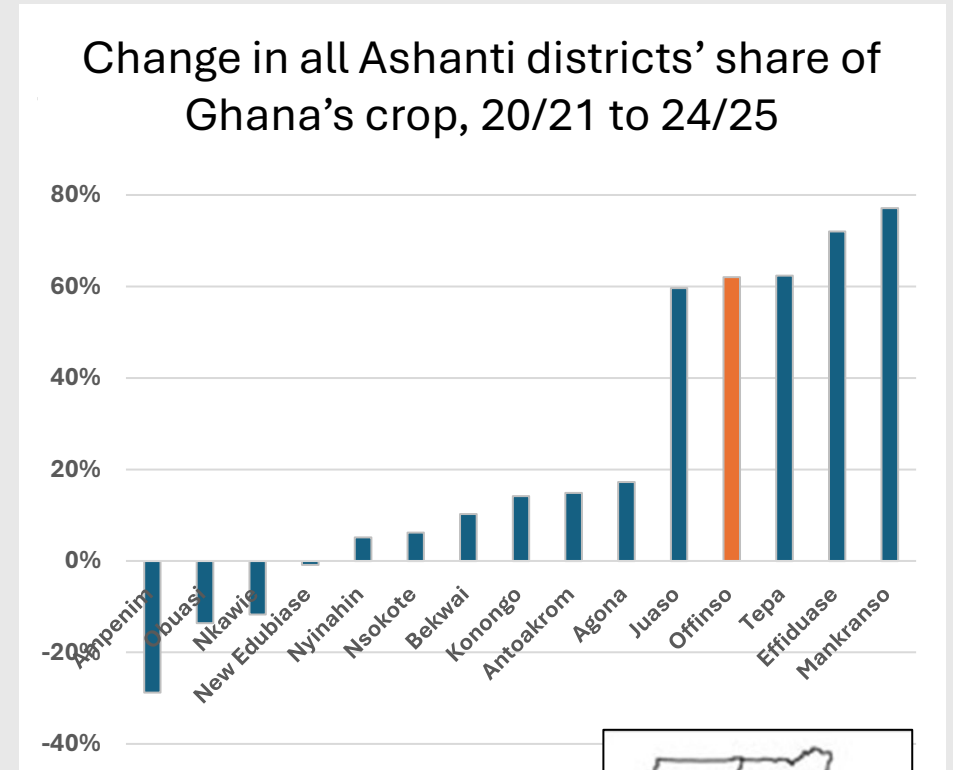


THE OFFINSO EXPERIENCE

Outcome

Offinso's share of Ghana's crop has risen 60%* since the first Veriground stations were installed. Offinso now is among Ashanti's best cocoa districts.

Offinso is in a climate zone that receives less rain than southern districts. Until recently, it produced a smaller share of the Ashanti crop than the top districts. CRIG sees Offinso's 60+% increase as unlikely without precise, time-specific application of fertilizer. CHED officers and other contacts judge that Veriground forecasts have been useful for increasing production and want continued access.





**BETTER FORECASTS
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THE OFFINSO EXPERIENCE

Value of reducing fertilizer waste

Before 24/25, bad timing was the main cause of fertilizer waste, estimated at 50%. 100,000 bags were distributed in Offinso. At \$33/bag about \$1.65 million of waste was avoided.

Extension officers say that 24/25 fertilizer waste was eliminated and that “no” fertilizer was lost that year.*

If fully realized, savings across all 70 cocoa districts could reach \$115 million.

Agrochemical Timing, from extension officers and a CRIG scientist:

Storms may be too heavy or too light for fertilizer application.

A moderate soaking of 6-13 mm immediately after spreading fertilizer is ideal.

A little heavier is okay, though risks of wash away increase with rain volume.

As the time from application to soaking extends, fertilizer efficacy falls.

Fungicide application needs to avoid rain.

THE OFFINSO EXPERIENCE

Value of the larger crop

Offinso realized a 40%* crop increase from 20/21 to 24/25, approximately 2500 mt.

For a stable world market price of \$3000/mt, Offinso's larger crop would add \$7.5 million to Ghana's cocoa earnings, in Offinso alone.

Offinso grows about 1% of Ghana's crop. Scaled across Ghana, the gain would be 250,000 mt and \$750 million.

*Various factors plagued the collection of consistent production quantities during the years studied. Central records were timed based on adjusted season end dates, shortening the season by 2 months for 24/25. Local records based on months rather than seasons showed a 40% increase in production.





**BETTER FORECASTS
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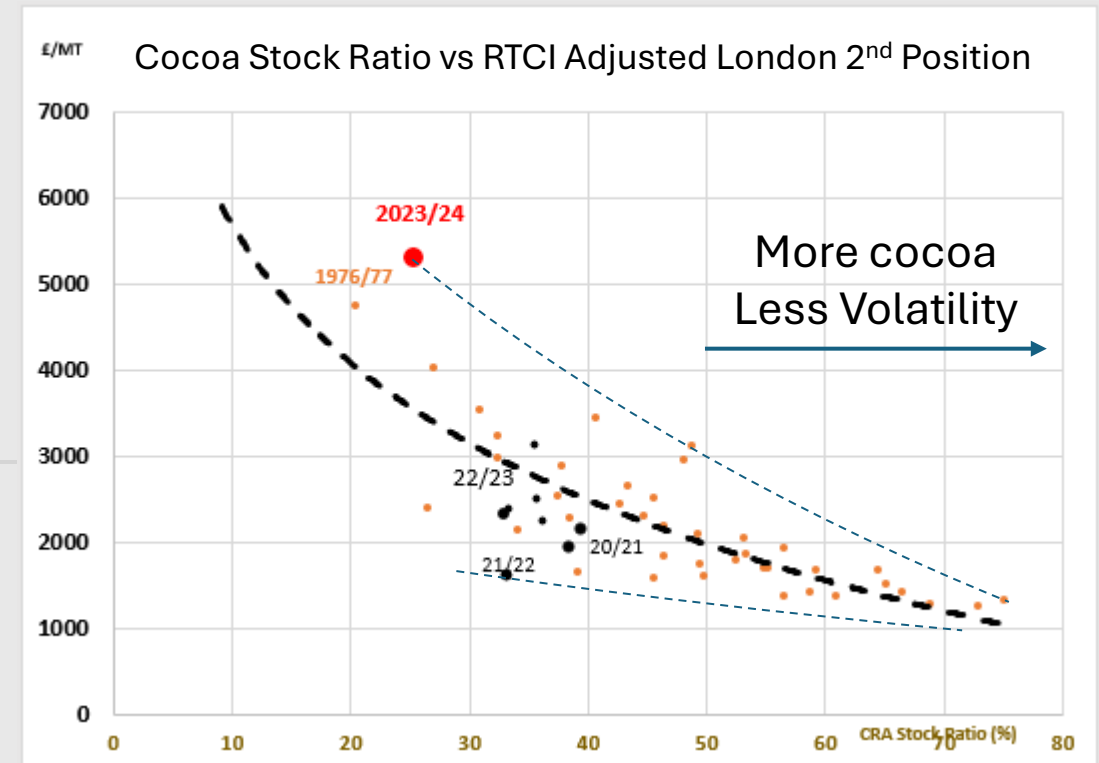
A LARGER GHANA CROP

Stock Ratio vs World Price

A price-to-stock comparison suggests that between 4000 £/mt and 2000 £/mt, every one-point rise in stocks relative to grindings leads to a £65 decrease in cocoa's price.

A 250 tmt rise in Ghana's crop lifts the stocks-grindings ratio 5 points⁽¹⁾ and pushes down the world price 325 £/mt⁽²⁾.

The rise lifts Ghana's revenue £515 million⁽³⁾ and decreases world-wide cocoa users' costs £915⁽⁴⁾. Farm income in Ghana rises £450 per farmer⁽⁵⁾.



Calculated in sterling rather than dollars for convenience. (1) 250,000 mt of 5 million annual tonnes ground is 5% or 5 points. (2) 5 points x £65 = £325/tonne. (3) Approximate. Based on middle price at £3000/mt and crop and rising from 600 to 850 mt. (4) Approximate. Based on same prices and world crop rising from 5000 to 5250 tmt. (5) For 800,000 farmers and farmgate price of 70% of world price.

GOOD FORECASTS

How much are they worth?

Results implied by Offinso:

\$115 million of fertilizer not wasted

250 tmt Ghana crop increase

\$600 additional income per cocoa farmer (avg)

£515/\$695 million Ghana revenue increase

\$1.25 billion cost savings for cocoa industry





**BETTER FORECASTS
BETTER MESSAGING
BETTER OUTCOMES**

GOOD FORECASTS NEED GROUND STATIONS

Stations enable better weather models and forecasts.

Catch local storms missed by satellites.

“Only local measurements achieve higher [forecast] accuracy”. Dr. Karl G. Gutbrod, CEO, MeteoBlue, Basel.

A review of published opinions found that meteorologists broadly agree that blending ground and satellite reports leads to superior forecasts.

Veriground 3-day rain forecast
Created at 8 Apr 2026 00:30 UTC

Côte d'Ivoire

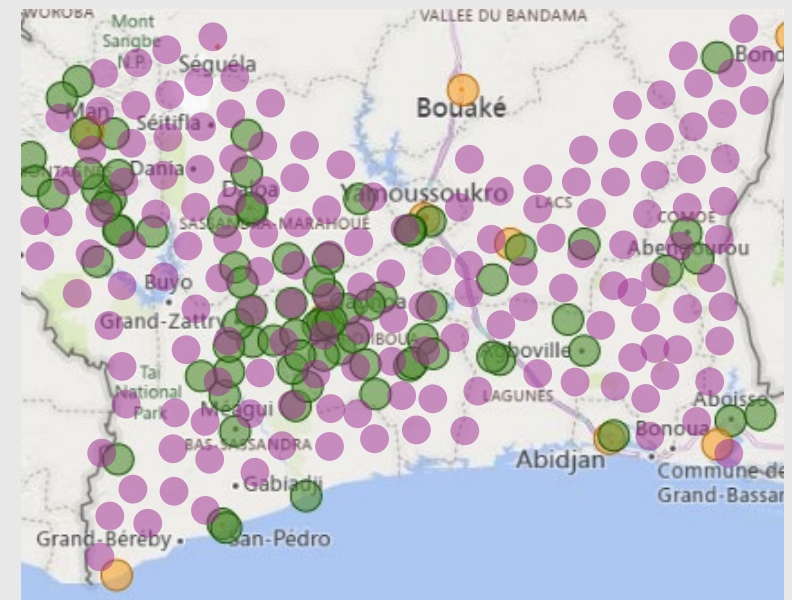
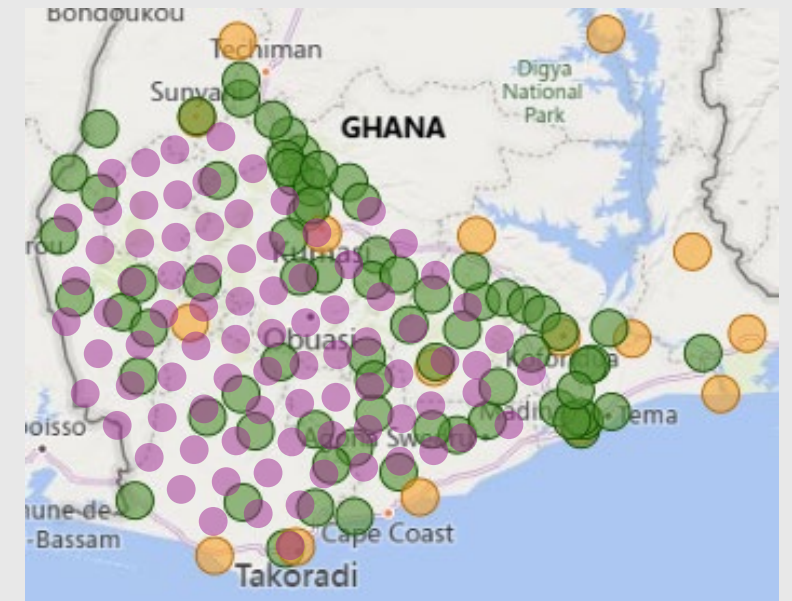
	Wednesday, 8	Thursday, 9	Friday, 10	Saturday, 11	Sunday, 12	Monday, 13
Akridou Laddé	Good rain possible (58%, 4 mms)	Good rain likely (69%, 5.3 mms)	Light rain possible (34%, 0.4 mms)	Rain very unlikely (27%, 0 mms)	Good rain possible (58%, 3.4 mms)	Rain very unlikely (37%, 0 mms)
Amien-Kouasikro	Heavy rain likely (73%, 14.4 mms)	Good rain possible (54%, 8.2 mms)	Good rain possible (38%, 3.2 mms)	Rain very unlikely (25%, 0 mms)	Light rain possible (43%, 1.2 mms)	Light rain possible (38%, 1.5 mms)
Appoisso	Heavy rain likely (71%, 14.5 mms)	Heavy rain possible (50%, 10.4 mms)	Good rain possible (36%, 2.4 mms)	Light rain possible (30%, 0.2 mms)	Light rain possible (45%, 1 mms)	Good rain possible (37%, 2.5 mms)

GOOD FORECASTS NEED MESSAGING

Veriground has developed SMS, USSD, and WhatsApp delivery systems which can keep farmers aware of weather opportunities.

Farmers want messaging.

Sustainability programs can underwrite messaging, deliver updates and reminders targeted by weather station location.



- Simulation of localized forecast support for farmers
- Current Veriground Stations
- Existing National Meteo Stations

FORECAST PUBLICITY SMS – WhatsApp – USSD

SMS/WhatsApp low cost*, USSD free

USSD and SMS support basic phones

To join via SMS and WhatsApp

Text station number to Veriground
Veriground confirms, sends SMS notices as
weather events arrive

To access Forecast via USSD (live in Ghana now)

Send short code, then station number
Repeat as wanted

OBTENEZ LES PRÉVISIONS MÉTÉO LOCALES
GET LOCAL WEATHER FORECASTS

***928#160#**

RÉPONDEZ PAR:
RESPOND WITH

773

POUR/ FOR:

DIVO

Parrainé par : _____

OBTENEZ LES PRÉVISIONS MÉTÉO LOCALES
GET LOCAL WEATHER FORECASTS

12345 +225 1234 5678

ENVOYER
SEND

773

POUR/ FOR:

DIVO

Parrainé par : _____

Spread via co-ops, villages and village radio, sustainability staff, station maintenance staff, etc.

*Carrier messaging and data rates apply. Short code *928#160# is for Ghana.

MESSAGING EXAMPLE

SMS - WhatsApp

SMS/WhatsApp low cost*

To join via SMS, WhatsApp

Message station number to Veriground.

Veriground confirms signup†, sends a forecast, and sends notices as weather events arrive.

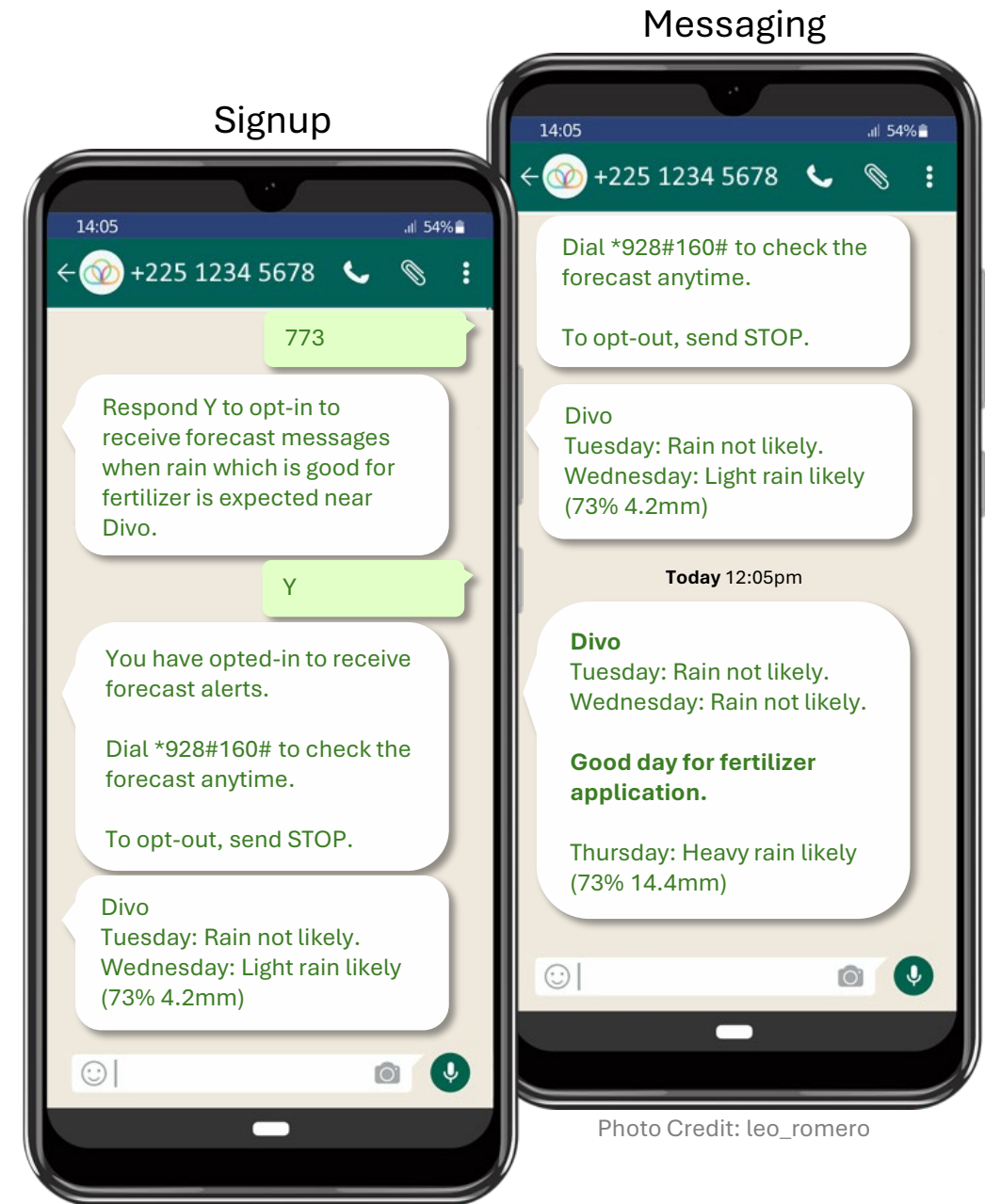


Photo Credit: leo_romero

MESSAGING EXAMPLE USSD

To access Forecast via USSD (live in Ghana now)
Send short code, then station number.
Repeat as wanted.

USING USSD* Short-codes

Farmer

Veriground

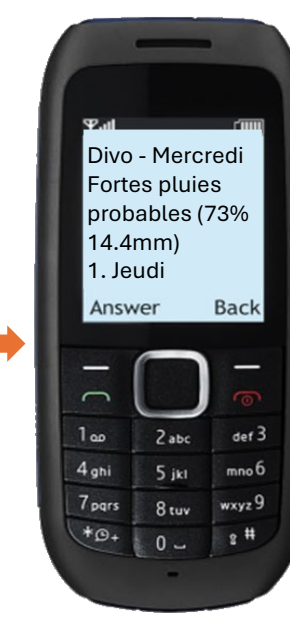
Farmer learns short-code from friend, CHED officer, poster, etc. any feature phone is enough



Phone asks for nearby station number



Farmer gives station number



Forecast appears. Extra days available.



VERIGROUND FORECASTS *PROMOTE SUSTAINABILITY*

Farmers come to Veriground messaging because they want forecasts.

Veriground messages can add sustainability information, suggestions, encouragement: “Good day to prune. Provided by *your program*”.

Veriground has adapted local communication resources to reach smallholder farmers.



HELP FOR SUSTAINABILITY

How much is it worth?

Industry has spent hundreds of millions of dollars per year on sustainability at what ROI?

Veriground attracts farmers because they want its help.

The network creates opportunity to deliver messages to farmers that promote sustainability.

Veriground creates opportunity for cooperation between industry and farmers.



VERIGROUND PROPOSAL: CÔTE D'IVOIRE

500 sites in Côte d'Ivoire.

Three-year rollout.

Publicity campaign about availability of forecasts.

Monitoring welcome.

Industry inclusion and cost sharing through TogetherCocoa, WCF or other vehicle welcome.

Program cost:
€3.0 million per year.

80 now. Veriground performs, arranges and supervises all work and service.

Posters at co-ops, by village radio, cooperation with sustainability programs and CCC representatives.

Enables cost sharing across interested industry. Some benefits restricted to sponsors. Includes full access to Veriground reporting for CIV and other cocoa producing areas.

Rises with number of sponsors and number of local forecast subscribers regardless of whether cocoa farmers or other farmers.

VERIGROUND PROPOSAL: GHANA

400 sites in Ghana.

Two-year rollout.

Publicity campaign about availability of forecasts.

Monitoring welcome.

Industry inclusion and cost sharing through TogetherCocoa, WCF or other vehicle welcome.

Program cost:
€2.0 million per year.

75 now. Veriground performs, arranges and supervises all work and service.

Posters at buying centers, by village radio, visits to durbars, cooperation with sustainability programs and LBCs. Senior CHED officials already use and advertise Veriground.

Enables cost sharing across interested industry. Some benefits restricted to sponsors. Includes full access to Veriground reporting for Ghana and other cocoa producing areas.

Rises with number of sponsors and number of local forecast subscribers regardless of whether cocoa farmers or other farmers.

Forecast Notifications to Farmers

Sent by SMS, WhatsApp, USSD
Supported by dense Local Weather Stations

Messaging channel

Pruning, school and outreach reminders
Sustainability messages

Weather Data to Sponsors

Network maintenance fully managed
Station placement coordination

CÔTE D'IVOIRE

€3.0 million per year

GHANA

€2.0 million per year



THANK YOU