



**CocoaSoils**



# **IMPACT OF TRAINING IN INTEGRATED SOIL FERTILITY MANAGEMENT (ISFM) ON FARM PERFORMANCE AND WELFARE OF COCOA FARMERS: A CASE OF WEST AND CENTRAL AFRICA**

**CocoaSoils Annual Forum**

Silver Moon Hotel, Abidjan

March 20<sup>th</sup> 2024

**MEL TEAM**

- Objectives and approach of CocoaSoils
- System for Monitoring and Evaluation
- Processes for knowledge transfer
- Assessment of Awareness, knowledge and application levels of ISFM practices
- Impact created through knowledge transfer
- Insights and Conclusion



# CocoaSoils Objectives

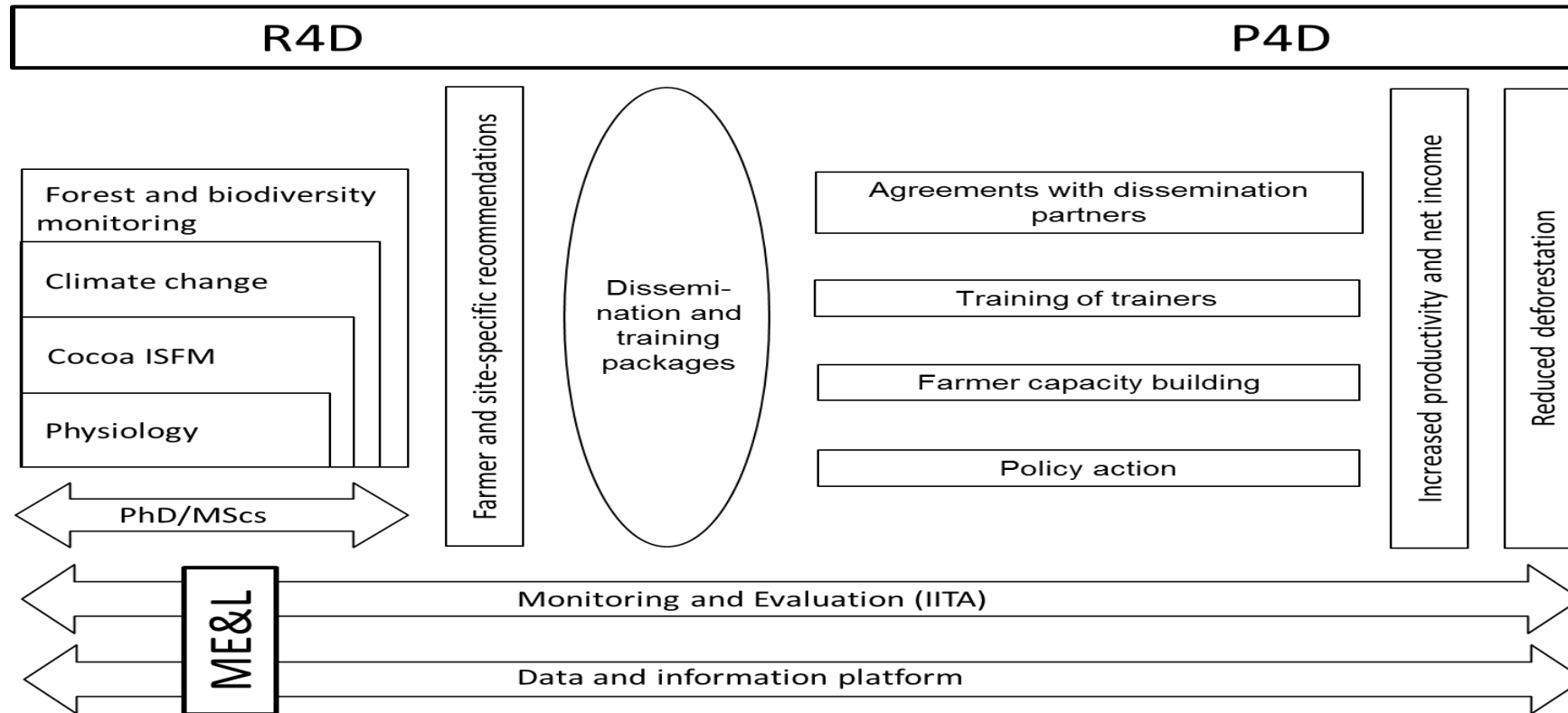


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## Overall Objective:

A sustainable cocoa supply sector with increased productivity of cocoa farms (**25%**), efficient use of agricultural inputs and improved rural livelihoods (**90,000**) while avoiding deforestation

Target Group	Expected Outcome
Smallholder cocoa farmers	Smallholder cocoa farmers will benefit through enhanced cocoa productivity, better income, and improved livelihoods
National research and extension agents	National research and extension agents will have necessary skills and state-of-the art knowledge and tools
Policymakers	Policymakers will be empowered to support the smallholder cocoa sector while protecting the environment

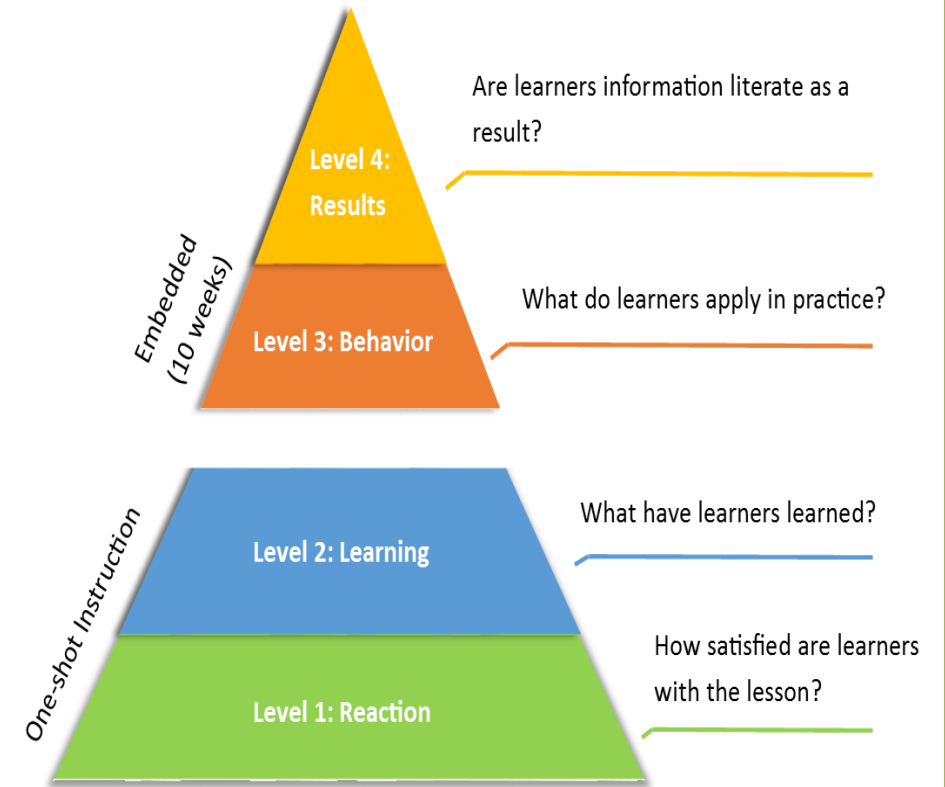
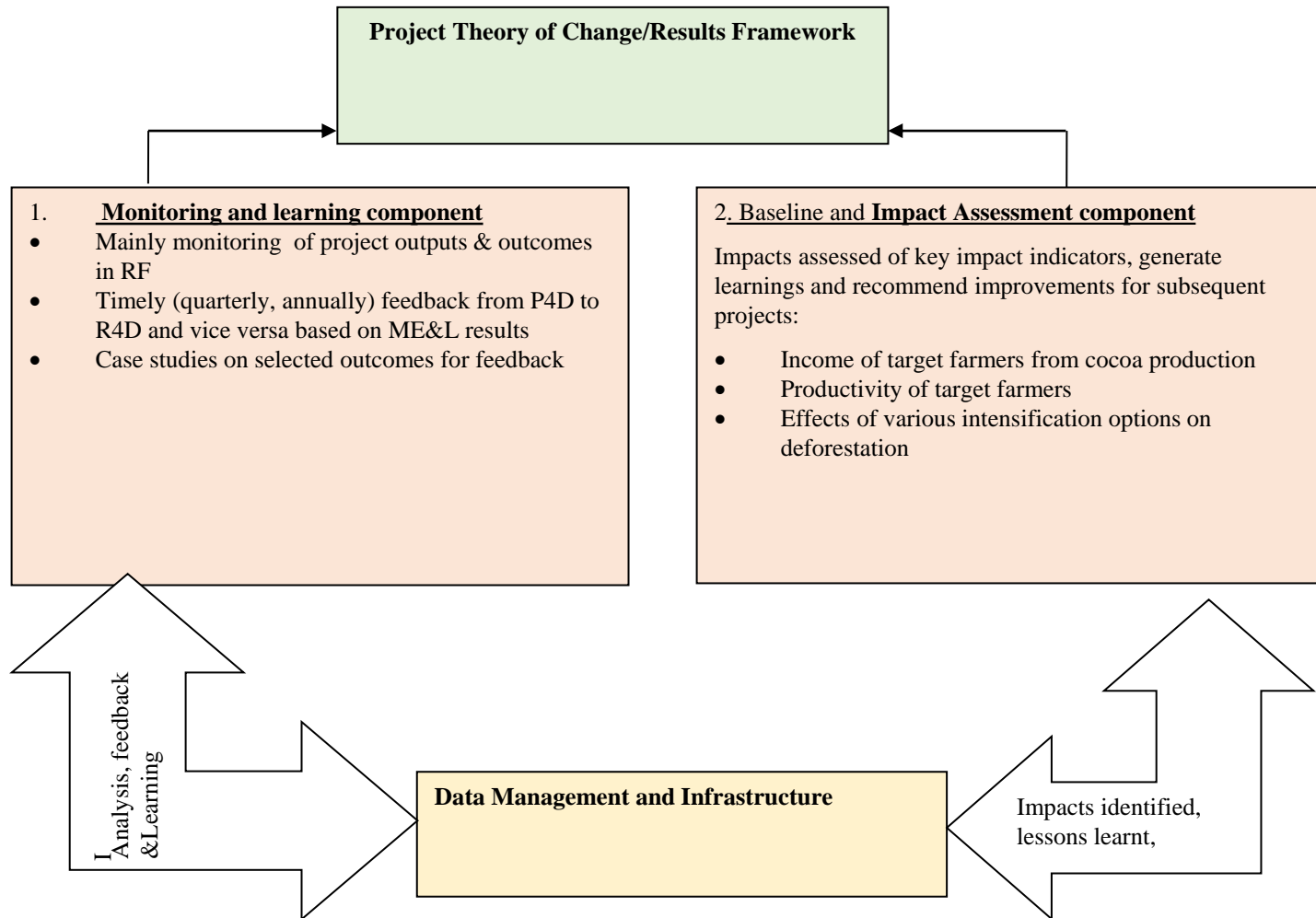


**Schematic overview of the R4D, P4D, and ME&L components of this initiative. The proposed R4D, P4D, and ME&L outputs and their interlinkages are presented**

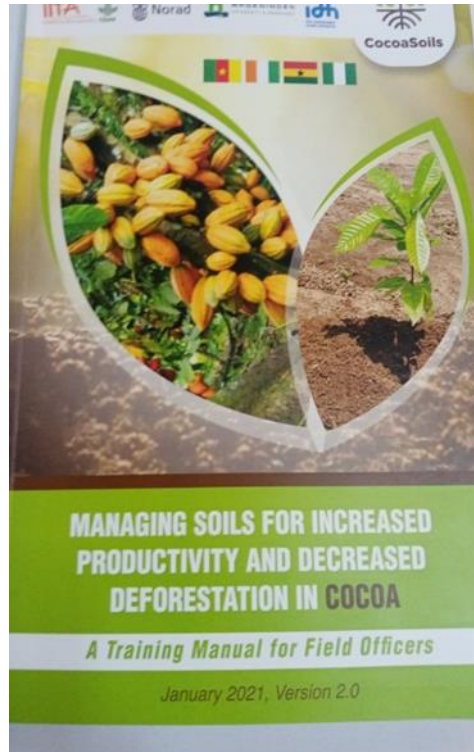
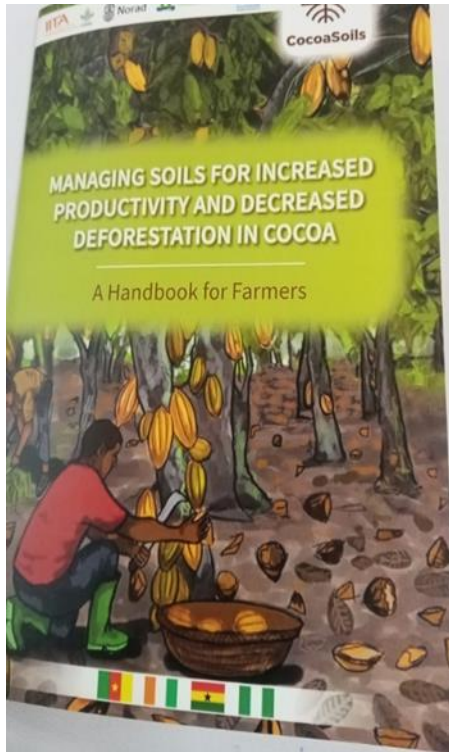


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# System for Monitoring and Evaluation



# **Processes for Knowledge Transfer**



**Manuals for Extension-led Scaling**

## Content of Manual

- Productivity and Deforestation
- GAP to increase productivity
- Pruning for Improved Soil Fertility and Efficient Use of Soil Nutrients
- Weeding for Improved Soil Fertility and Efficient Use of Soil Nutrients
- Pesticides Application (handling and applying)
- Planting Shade Trees to Improve Yields and Preserve Soils
- Soil Fertility Management (compost, organic fertilizer)
- Mineral fertilizer application



**An Extension Agent training a group of farmers**



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# Scaling through Digital platform



**A farmer accessing the digital content on his phone**

## **Digital Content through Interactive Voice Response (IVR)- VIAMO and ANADER**

- Pruning
- Weeding
- Pest and diseases control
- Shade management
- Soil degradation
- Soil fertility Management
- Organic matter application
- Compost preparation
- Application of chemical fertilizers
- Assess productivity of a cocoa farm
- Increase cocoa productivity without deforestation

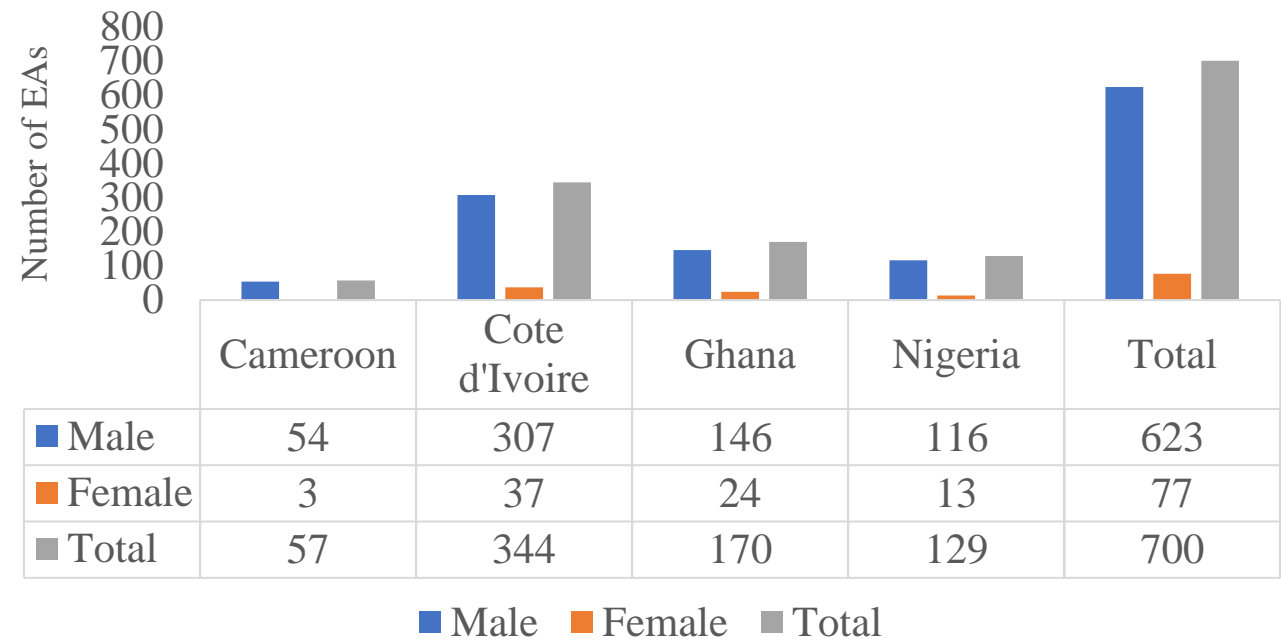


# Extension Agents (EA) trained per country

\*11% Female



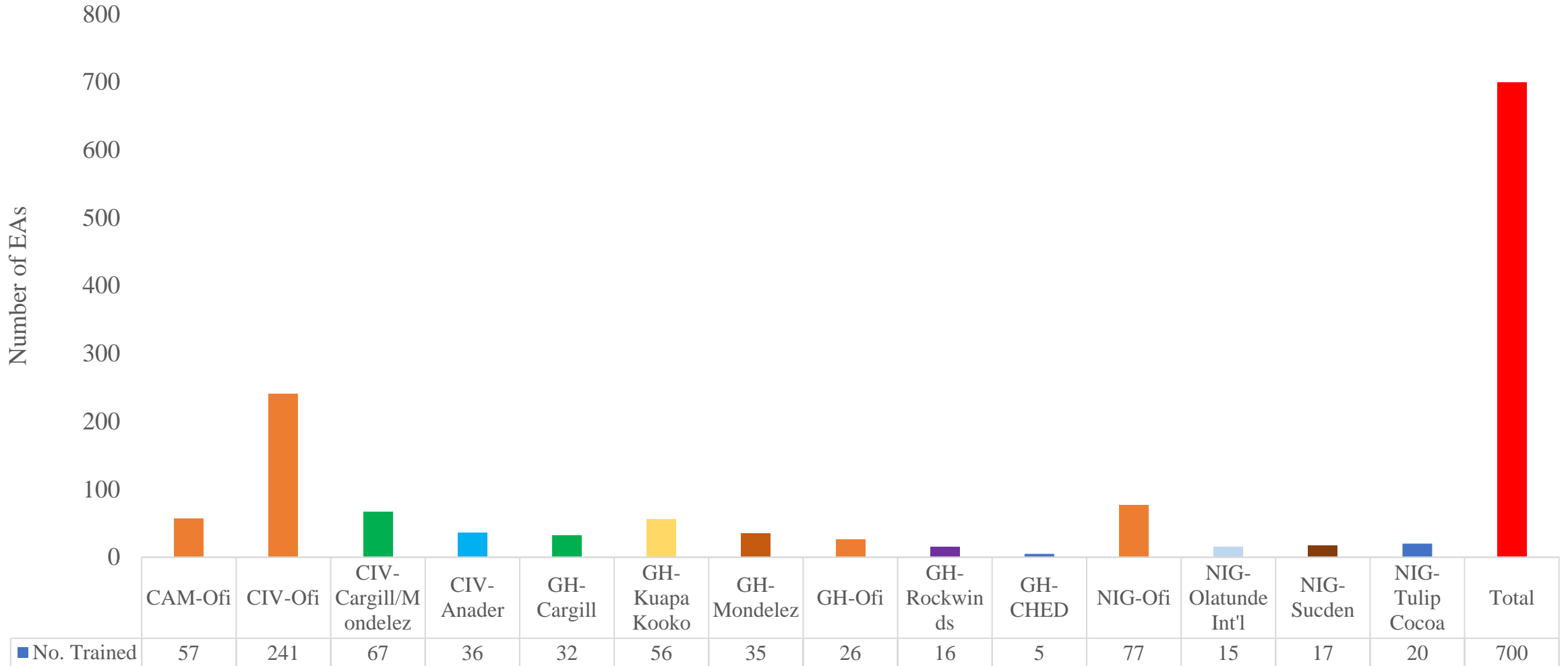
**Extension officers undergoing training**



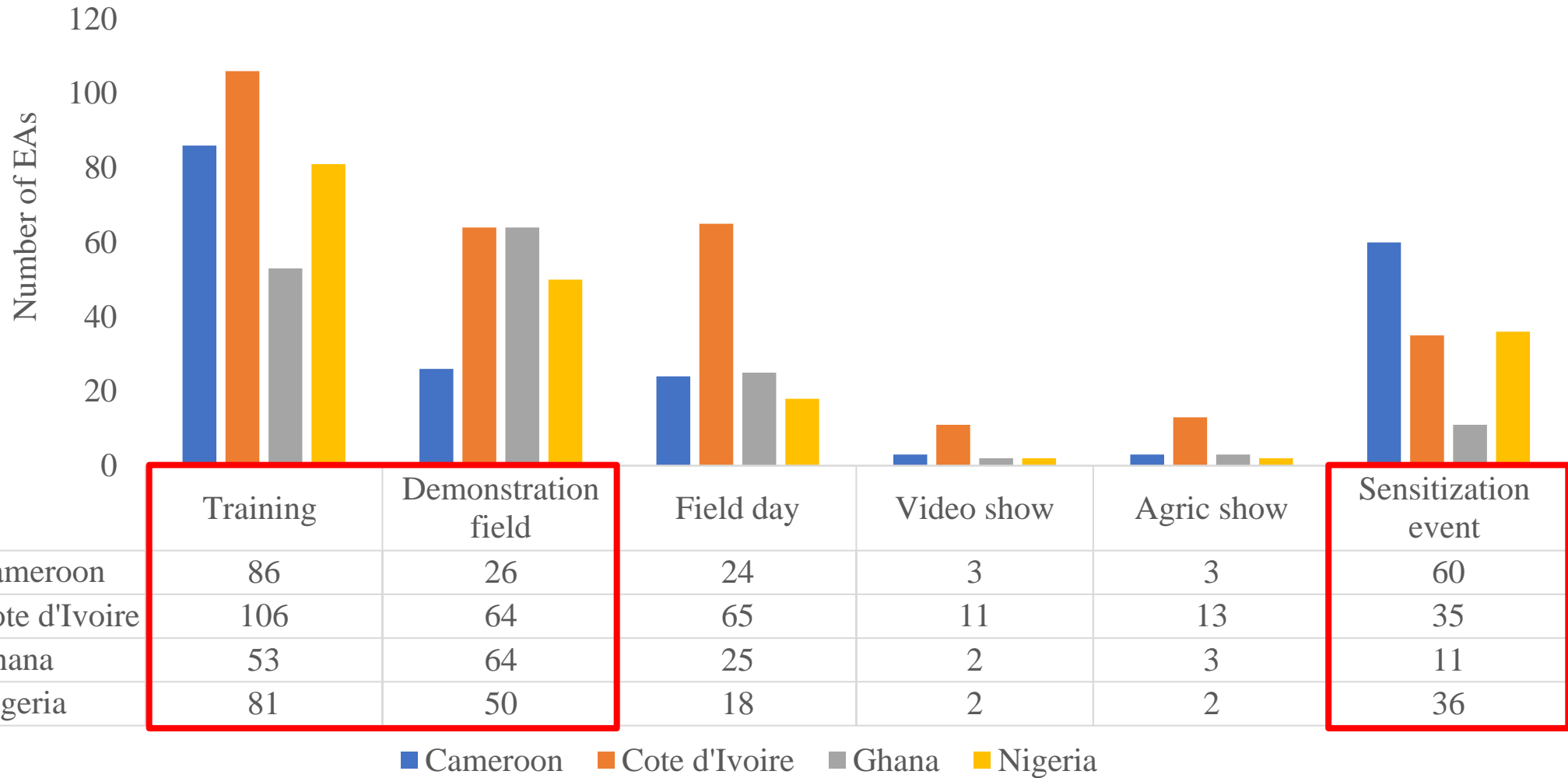


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# Extension Agents (EA) trained per partner



# Methods used by Extension Agents for Dissemination

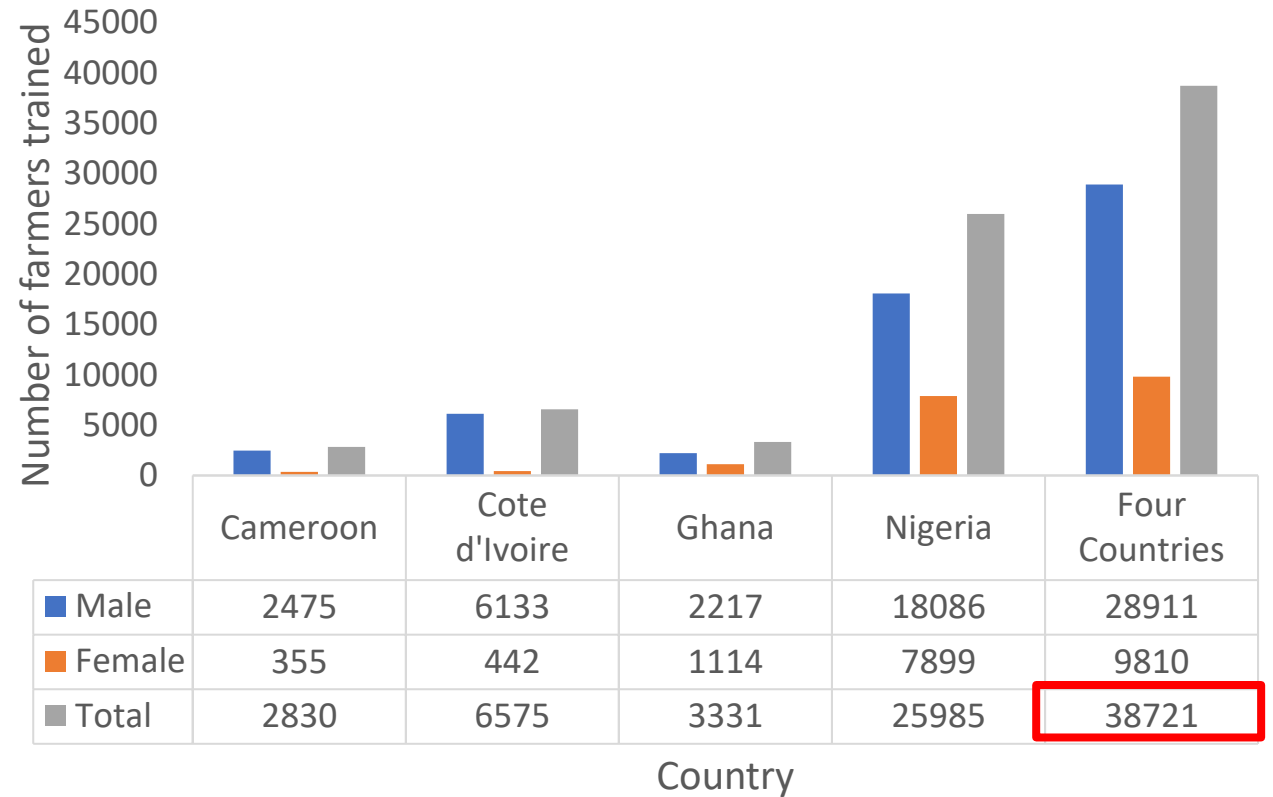


# Farmers trained through direct Extension Agent engagement

\*25% Female



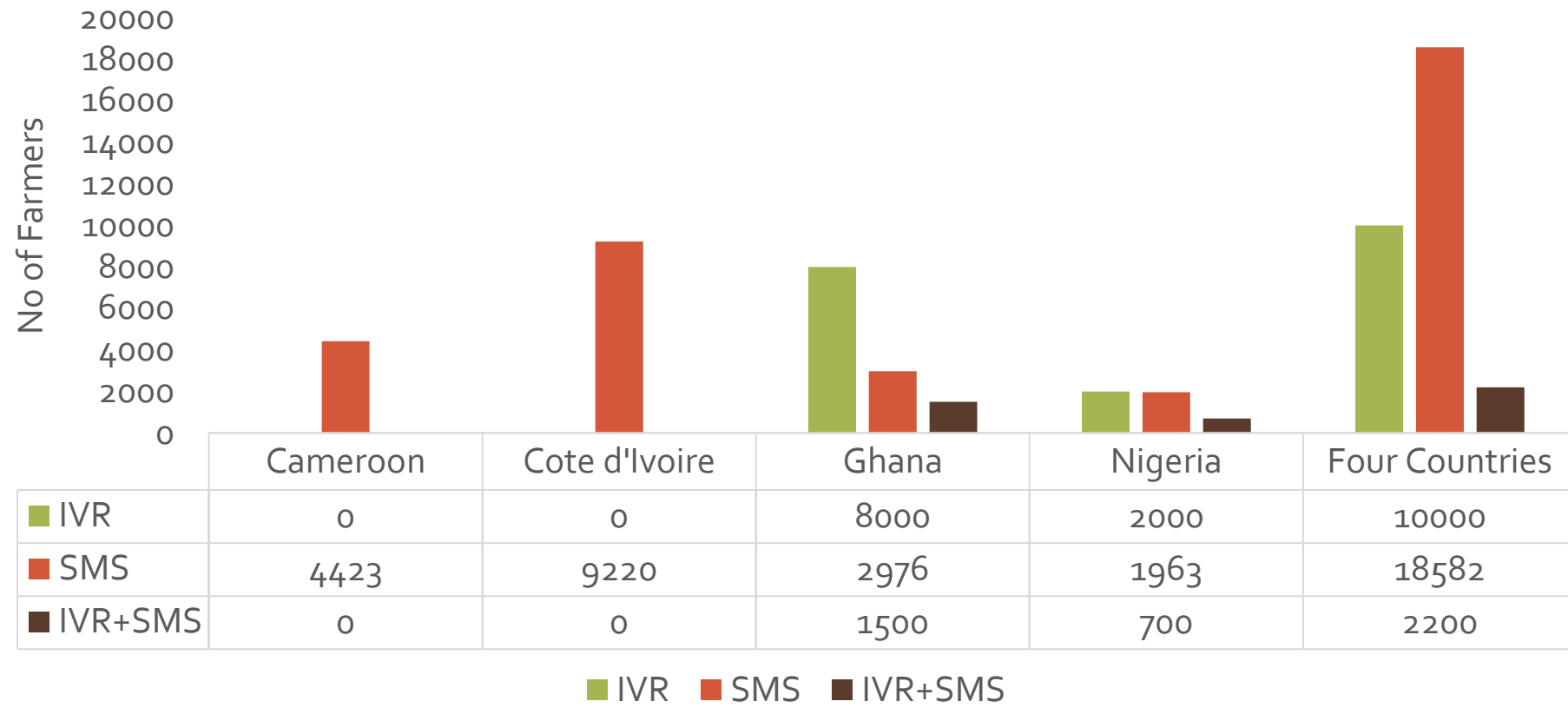
**Extension Officer-led training**



■ Male ■ Female ■ Total

# Methods Used on Digital platform for Dissemination

\*VIAMO IVR in Ghana & Nigeria  
 \*VIAMO SMS in Cameroon, Ghana & Nigeria  
 \*ANADER SMS in Cote d'Ivoire

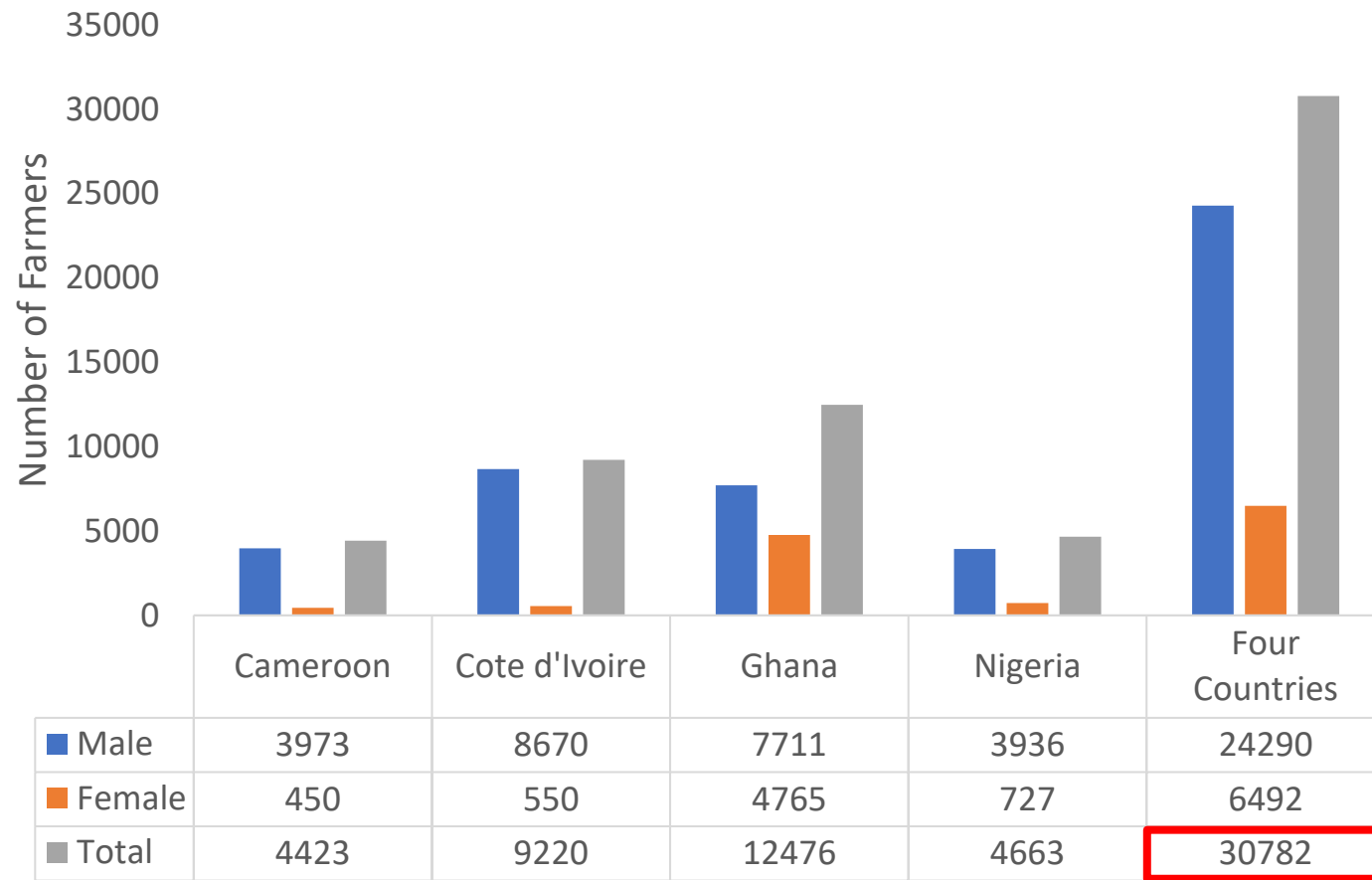


# Number of Farmers trained through digital platform

\*21% Female



**Digital Platform led training**



■ Male ■ Female ■ Total

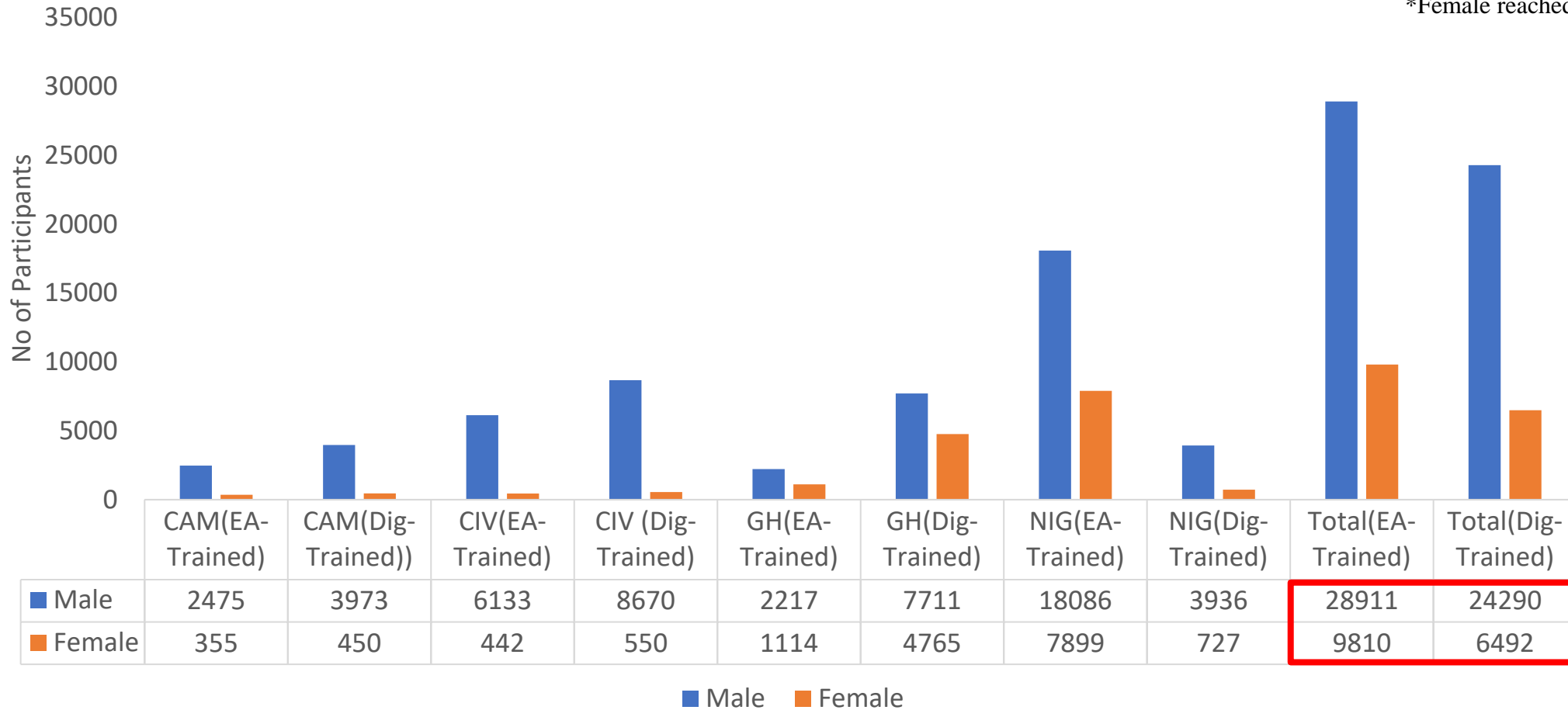


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# Total farmers reached per Country (Extension agents led & Digital led)



\*Total Farmers reached=69503  
\*Female reached= 16302(23%)



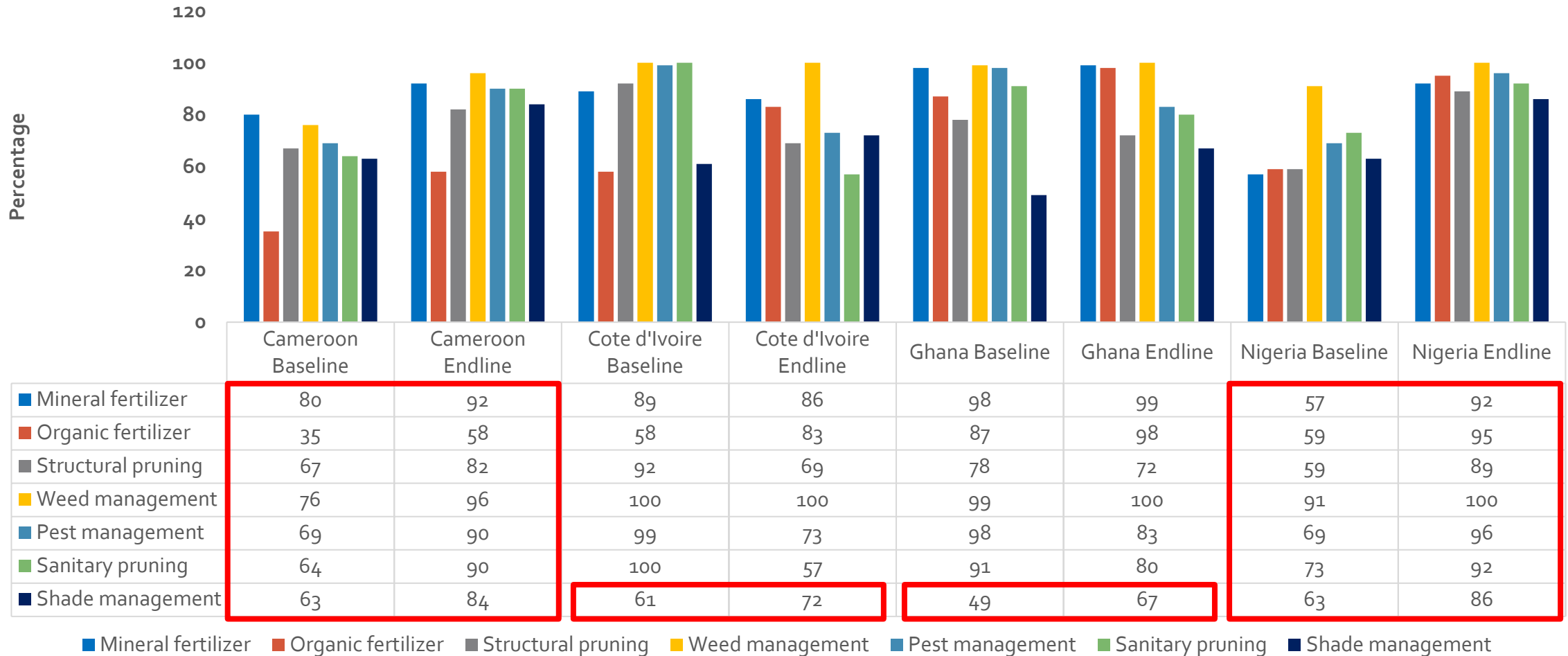
# **Assessment of Awareness, knowledge and application levels of ISFM practices**



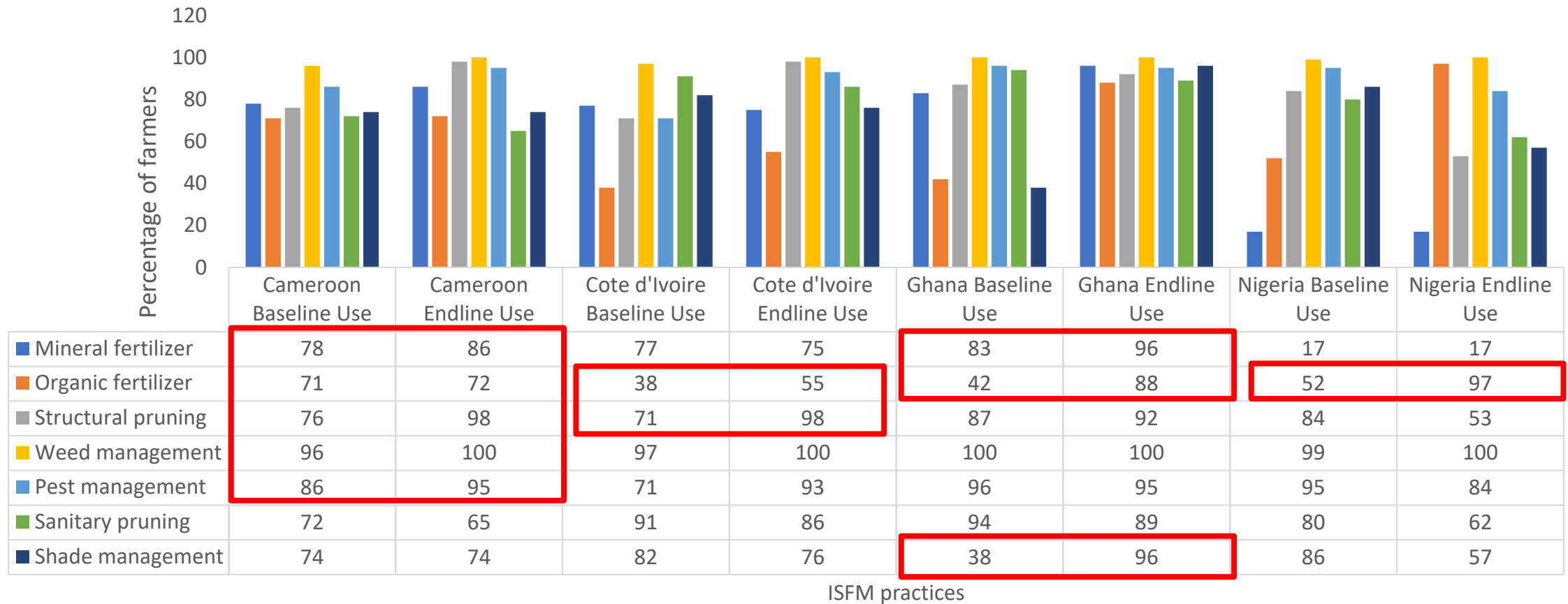


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# Change in farmer Awareness and Knowledge



# Change in farmer practice



■ Mineral fertilizer 
 ■ Organic fertilizer 
 ■ Structural pruning 
 ■ Weed management 
 ■ Pest management 
 ■ Sanitary pruning 
 ■ Shade management

# **Impact created through knowledge transfer**



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# Methodology-Data



- Data was collected from 2,046 CocoaSoils partner farmers who received ISFM trainings both physical and digital
- A total of 455 non-trained farmers were also interviewed during the follow up data collection to serve as control

Country	Trained Respondent	Non-Trained Respondent	Total Respondent
Cameroon	517	108	625
Cote d'Ivoire	506	117	623
Ghana	509	102	611
Nigeria	514	128	642
<b>Total</b>	<b>2046</b>	<b>455</b>	<b>2501</b>



# Socioeconomic characteristics of respondents



Variables	Full sample Mean (S.D.)	Trained Mean (S.D.)	Non-Trained Mean (S.D.)	Differences
Plot size (ha)	3.433(3.276)	3.341(2.917)	3.849(4.532)	-0.508***
Male farmer (dummy)	0.800(0.400)	0.807(0.394)	0.769(0.422)	0.038*
Respondent is in the age category of 18-34 years (dummy)	0.121(0.326)	0.109(0.311)	0.176(0.381)	-0.067***
Respondent is in the age category of 60 years and above (dummy)	0.202(0.402)	0.209(0.406)	0.174(0.379)	0.035*
Chemical fertilizer application (dummy)	0.624(0.484)	0.638(0.481)	0.563(0.497)	0.075***
Organic fertilizer application (dummy)	0.651(0.477)	0.659(0.474)	0.613(0.488)	0.046*
Cocoa yield (kg/ha)	517.670(381.324)	541.895(390.210)	409.812(317.608)	132.083***
Cocoa income per hectare (US\$)	1387.690 (19496.420)	1548.497 (21558.850)	668.477 (979.582)	880.020
Number of observations (N)	2501	2046	455	

# Effects of CocoaSoils Project on Farm Performance and Welfare (Overall)

Indicators	Model 1: OLS	Model 2: IPWRA	Model 3: TELASSO
Cocoa yield (kg/ha)	103.862 ***	109.105***	121.064***
Natural log of cocoa yield	0.220***	0.217***	0.247***
Cocoa income (US\$/ha)	899.088 <sup>+</sup>	851.341*	883.097*
Natural log. Of cocoa income	0.131*	0.109 <sup>+</sup>	0.158**
No. of observation	2501	2501	2501

\*\*\* significant at 1%, \*\* significant at 5%, \* significant at 10%, +significant at 15%

OLS=Ordinary Least Squares, IPWRA= Inverse probability weighted regression adjustment, TELASSO=Treatment effects estimation using lasso



# Effects of CocoaSoils Project on Farm Performance and Welfare



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Indicators	Model 1: OLS				Model 2: IPWRA				Model 3: TELASSO			
	Cam	Civ	Gha	Nig	Cam	Civ	Gha	Nig	Cam	Civ	Gha	Nig
Cocoa yield (kg/ha)	100.81**	18.449	51.358*	222.726**	195.043**	52.251 <sup>+</sup>	34.971	229.643**	180.783**	61.598*	31.826	243.318**
Natural log of cocoa yield	0.135 <sup>+</sup>	-0.058	0.065	0.629***	0.290***	0.057	-0.037	0.592***	0.272***	0.073	-0.020	0.628***
Cocoa income (US\$/ha)	640.766	-25.707	103.486*	1756.501 <sup>+</sup>	585.122 <sup>+</sup>	-48.929	207.945	2618.424	570.957	-29.769	209.960	2687.42 <sup>+</sup>
Natural log. Of cocoa income	-0.123	-0.092	0.056	0.489***	0.050	-0.298	-0.042	0.452***	0.041	-0.139	-0.025	0.505***
No. of observation	625	623	611	642	625	623	611	642	625	623	611	642

\*\*\* significant at 1%, \*\* significant at 5%, \* significant at 10%, +significant at 15%



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# Insights and Conclusion



- Almost equal female participation/reach in both digital and EA-led channels, indicating the importance of both channels in reaching different gender participants
- EA led training helped to reach out to both male and female cocoa farmers, however a combination of EA and digital led channels of dissemination will help reach out to more farmers effectively
- There is increased knowledge in all ISFM components in both Cameroon and Nigeria, however there is increased knowledge in shade management in Cote d'Ivoire and Ghana.
- EA led training contributes most to uptake in all countries however in Cote d'Ivoire, digital dissemination by ANADER is relatively significant in contributing to uptake
- Participation in CocoaSoils project content training led to increased cocoa production and income, however Impacts were more in Cameroon and Nigeria





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## CONTACT

Richard Asare  
r.asare@cgiar.org

Ken Giller  
Ken.giller@wur.nl

Mark De Waard  
dewaard@idhtrade.org

visit our website: [www.cocoasoils.org](http://www.cocoasoils.org)