



Climate Information Services and Extension Systems: Access, Constraints, Impact, and Future Outlook for Rural Cocoa Farmers in Ghana

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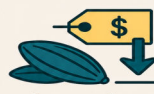
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Introduction

- Ghana is the world's 2nd-largest cocoa producer adding 11.3% to its GDP.
 - Climate variability, extreme weather among others threaten cocoa production (Fig. 1).
 - Timely climate information can improve farm decisions.
 - Extension services help farmers access and use climate information.
- This study examined how COCOBOD-CHED's activities influence CIS access, use, and impact on cocoa yield.



Lack of finance



Low prices



Pests and diseases



Climate change



Lack of extension services



Illegal mining

Fig. 1: Key production risks in cocoa farming

Highlights

- CIS access alone does not guarantee effective use.
- Lack of technology undermines CIS delivery.
- Farmers rely on CIS in making production decisions.
- Climate-resilient cocoa production is needed in Ghana.

Fig. 2: Patterns of knowledge use



Neither: 9

Tab. 1: OLS estimates of factors affecting yield

Cocoa Yield (kg/ha ⁻¹)	Coef.	SE
Extension access	75.04***	21.00
CIS access	-139.36***	29.74
CIS use for production	163.26***	45.78
Traditional Knowledge	-4.93	49.74
CIS * Traditional Knowledge	4.08	53.14

***, ***, * represents significance at 1, 5, and 10%.

Conclusions

- Extension services connects farmers with CIS, interpretation, and application.
- Extension and efficient CIS use enhances cocoa yield.
- Government intervention is needed to strengthen extension and CIS delivery.

Methods

- The study surveyed 320 farmers and 15 extension agents on 2024/25 yields in Kwahu West District.
- Multiple response analysis was used for CIS access, use, types, dissemination pathways, production decisions, reliance barriers, and delivery constraints.
- Multivariate Probit estimated the determinants of the types of CIS accessed and used.
- OLS estimated impact on yield of:
 - extension access,
 - CIS access and use
 - traditional knowledge

Results

- 84% farmers accessed CIS, 70.3% used it, and 55% relied on Traditional practices. Patterns of knowledge use is indicated in Fig. 2.
- Daily, weekly, seasonal, off-season rains, extreme weather, and agro-advisory CIS types were accessed and used.
- CIS was disseminated through peers, extension agents, radio, TV, and mobile phones.

Results

- CIS guides spraying, fertiliser use, harvesting, drying, labour planning, planting, and shade management.
- Barriers to CIS use include false alarms, conflicts with traditional practices, delayed information, and limited extension support.
- CIS delivery constraints are poor network coverage, limited funding, untimely information, and low farmer understanding.
- Impact of extension and CIS access is indicated in Table 1, and determinants of access and use in Tables 1 and 2.

Tab. 2: Determinates of types of CIS accessed (MVP)

Variables	Coef.			
Gender	-0.37 ^s	0.39 ^{of}	-	-
Age	-0.04 ^{***w}	0.03 ^{**of}	-0.023 ^e	-
Education	0.71 ^{***s}	-	-0.60 ^{***a}	-
Family size	0.32 ^{***w}	0.10 ^{**s}	0.27 ^{***e}	0.21 ^{***a}
Mobile Phone	0.65 ^{**w}	-	-	-
Distance to farm	0.10 ^{***d}	0.06 ^{**w}	0.05 ^{**of}	0.12 ^{***a}
Farm Size	-0.60 ^{**d}	-	-	0.07 ^a
Diversify	-0.40 ^{**d}	-	-0.52 ^{**e}	-0.60 ^{***a}
Disaster	-0.44 ^{**w}	0.35 ^s	0.86 ^{***of}	0.34 ^e
Extension	0.856 ^{***d}	1.19 ^{***w}	1.24 ^{***of/e}	1.49 ^{***a}
FBO	0.98 ^{***d}	0.75 ^{***w}	0.61 ^{***s}	0.991 ^{***e/a}
Credit	0.37 ^w	0.99 ^{***s}	1.36 ^{***of}	0.87 ^{***a}

daily^d, weekly^w, seasonal^s, off-season^{of}, extreme^e, agro-advisory^a.

Tab. 3: Determinates of types of CIS used (MVP)

Variables	Coef.			
Gender	-0.48 ^{**d}	-0.53 ^{***w}	-	0.72 ^{***a}
Age	-0.03 ^{**w}	0.03 ^s	-	-0.06 ^{***a}
Education	-0.38 ^{**d}	0.71 ^{***w}	-	-
Family size	-	0.06 ^{**w}	-0.16 ^{***of}	-
Mobile Phone	0.39 ^{**d}	-0.46 ^{**e}	-	-0.74 ^{**a}
Distance to farm	-	0.08 ^{***s}	-	-
Farm Size	-	-	-	-0.08 ^{**a}
Disaster	-	-0.89 ^{***e}	-	-0.56 ^{***a}
Extension	0.52 ^{**d}	0.58 ^{***w}	0.79 ^{***s}	1.38 ^{***a}
FBO	0.97 ^{***d}	0.43 ^{**w}	-0.50 ^{**of}	0.78 ^{***a}
Credit	-	0.43 ^{**w}	0.77 ^{***of}	-

daily^d, weekly^w, seasonal^s, off-season^{of}, extreme^e, agro-advisory^a.