Implications of Galamsey on Rural Poverty and Child Labor in Cocoa Districts of Ghana

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Introduction

- Informal artisanal and small-scale mining often referred to as galamsey has increasingly influenced Ghana's political, economic, and environmental trajectory.
- Galamsey in Ghana represents approximately 60% of workers in the mining sector and about 30% of production (Liege 2021).
- Galamsey appears to have cost the Ghanaian government greatly. One estimate places this amount at 2.3 billion USD in 2016 alone (Liege 2021).

Objective and preview of results

- This paper aims to examine impact of galamsey on cocoa production and its effect on child labor and rural poverty.
- Using coincidence analysis
  - We show that respondents consistently associated galamsey with farmlands and decreased productivity.
  - Respondents saw farmland as being threatened by galamsey through pollution and destruction of water bodies.
- Based on our probit estimation
  - We find that household head's opinions on galamsey effects are largely linked to reduction in child labor in rural Ghana.
- Exploiting the regional differences in galamsey activities and using OLS approach
  - We find positive and significant effect of galamsey on district poverty rate.

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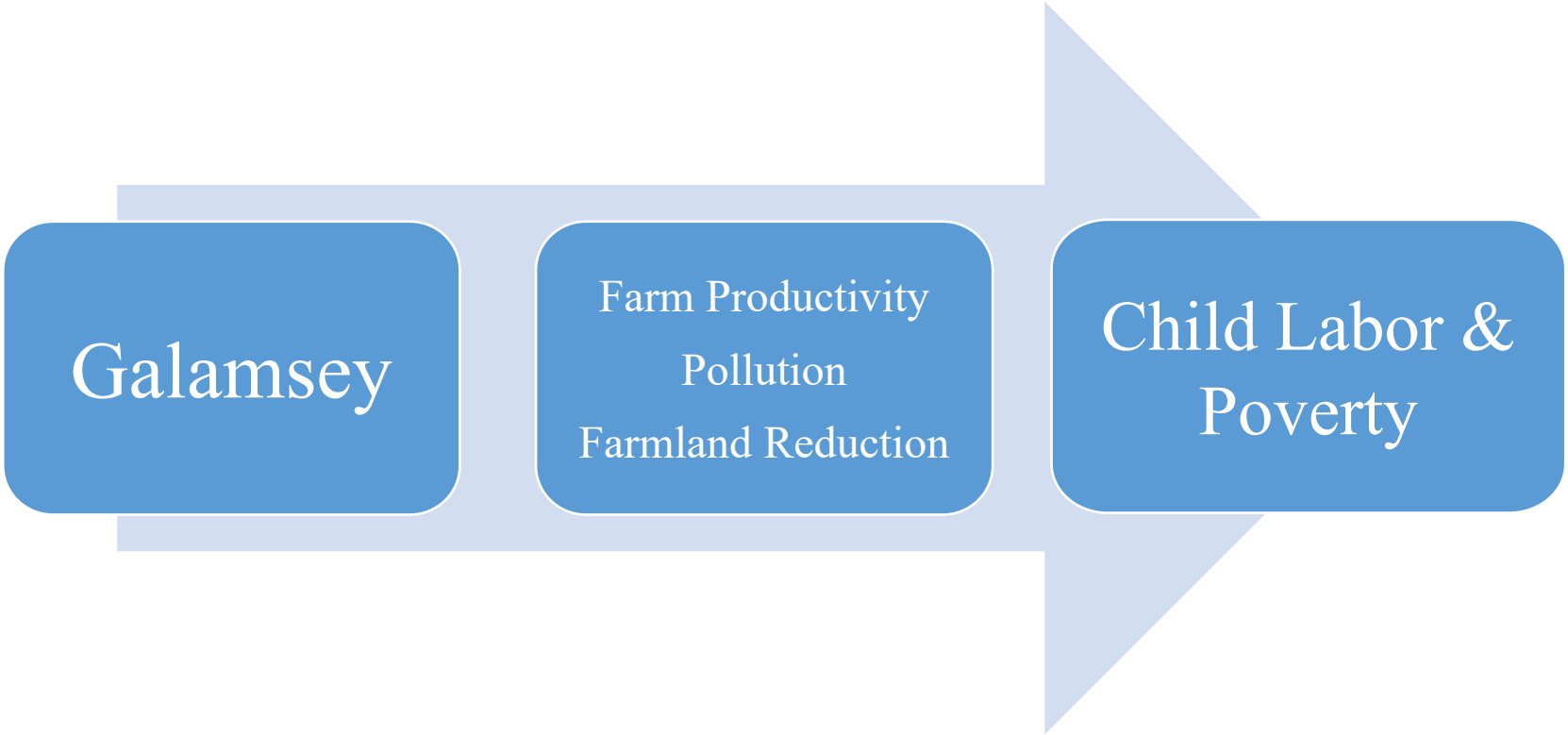
Literature

- Some studies point to the benefits of small-scale mining for funding rural communities (Hilson 2016; Maconachie 2011).
- Others focus more on environmental destruction, land invasions, and resource curse dynamics (Badeeb et. al 2017; Ross 2015; Sachs and Warner 2001).
- Some studies have found that galamsey has a negative impact on cocoa farming in Ghana (Agyei-Manu et al 2020; Boadi et al. 2016; Bryant and Mitchell 2021).

Hypothesis

- H_1: the more farmers perceive a reduction in farm productivity the lower the demand for child labor.
- H_2: the more farmers perceive pollution on their farms the lower the demand for child labor.
- H_3: the more farmers perceive a reduction in farmland the lower the demand for child labor.
- H_4: the more galamsey activities we have in a cocoa growing district the higher the level of poverty

Causal Pathway



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Child Labor Definition

- The ILO provides two indicators for reporting child labor when one takes into consideration Sustainable Development Goals (SDG). These indicators are:
  - Proportion and number of children aged 5-17 years engaged in economic activities at or above age-specific hourly thresholds (SNA production boundary basis), which includes: (a) children aged 5-11 working at least 1 hour per week in economic activity; (b) children aged 12-14 working for at least 14 hours per week in economic activity; and (c) children aged 15-17 working for more than 43 hours per week in economic activity (Child labor 1).
  - Proportion and number of children aged 5-17 years engaged in economic activities and household chores at or above age-specific hourly thresholds (general production boundary basis), which includes: (a) children aged 5-11 working at least 1 hour per week in economic activity and/or involved in unpaid household services for more than 21 hours per week; (b) children aged 12-14 working for at least 14 hours per week in economic activity and/or involved in unpaid household services for more than 21 hours per week; and (c) children aged 15-17 working for more than 43 hours per week in economic activity (Child labor 2).

Empirical Strategy

- Empirical Strategy
  - Coincidence analysis
  - Chi-square test of association
  - Probit
  - OLS
- Equation for child labor

$$pCHL = P(CHL) = \phi(\beta_0 + \beta_1 Gal + \beta_2 Pol + \beta_3 Prod + \beta_4\, Fland + \beta_5 Age + \beta_6 Agesq + \beta_7 Sex + \beta_8 Educ + \beta_9 Mrst + \beta_{10} Fown + \beta_{11} Right + \beta_{12} Cdist + \beta_{13} Reg) \quad (1)$$

- Equation for poverty

$$POVR = \alpha_0 + \gamma_1 CHL + \gamma_2 Gal + \gamma_3 Pol + \gamma_4 Prod + \gamma_5\, Fland + \gamma_6 Age + \gamma_7 Agesq + \gamma_8 Sex + \gamma_9 Educ + \gamma_{10} Mrst + \gamma_{11} Fown + \gamma_{12} Right + \gamma_{13} Cdist + \gamma_{14} Reg \quad (2)$$

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Data

- Household Financial Survey
  - Baseline survey of 360 households
  - Conducted between February, 2020 and January, 2021
- Ghana Statistical Service
  - District poverty rate
- Open-ended Question
  - What is the effect of Galamsey on cocoa production?

- **Findings**

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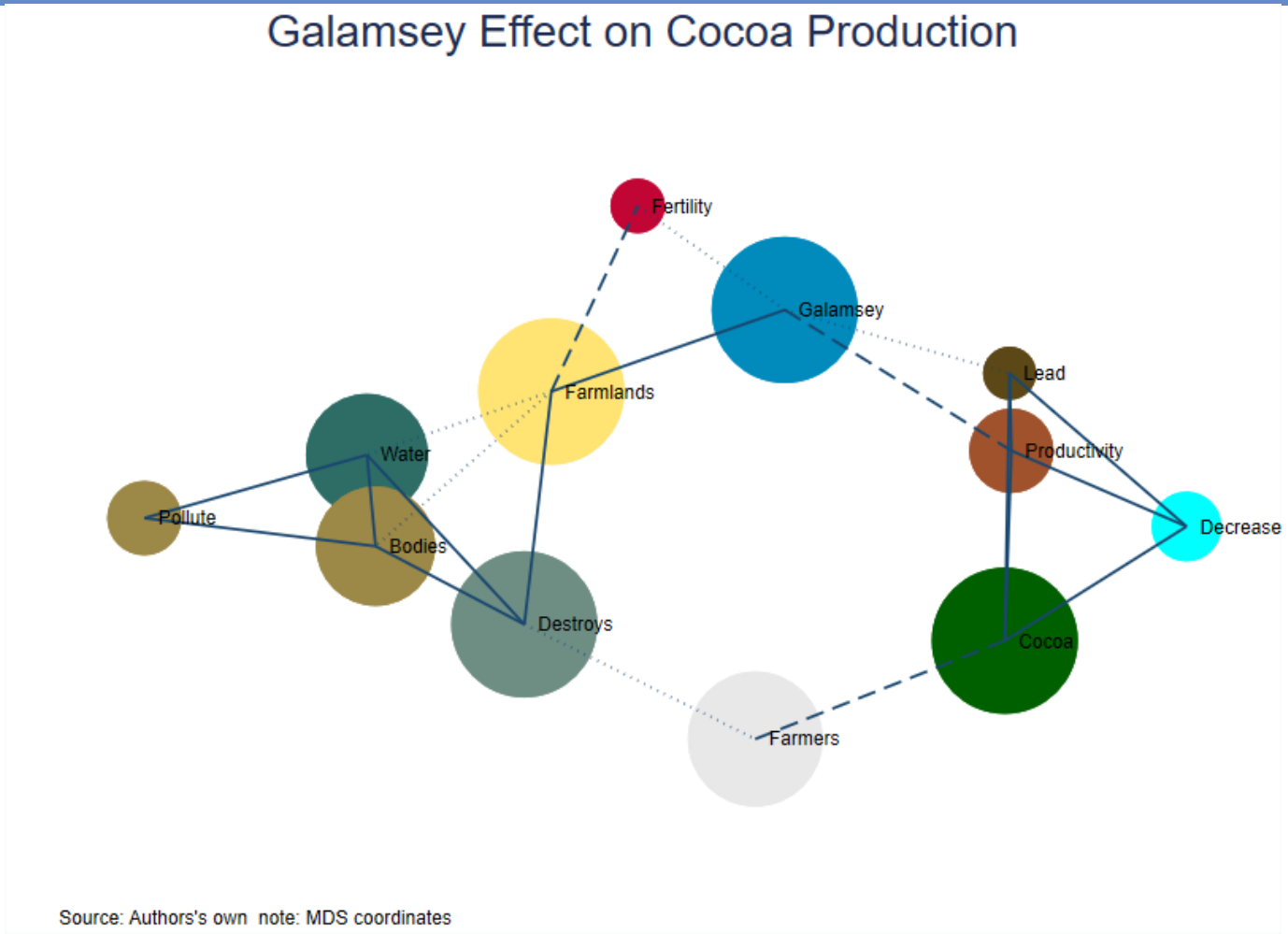
Effect of Galamsey on Cocoa Production



The dotted lines correspond to a $p < 0.05$, the discontinuous lines to $p < 0.01$ and the continuous lines to $p < 0.001$.

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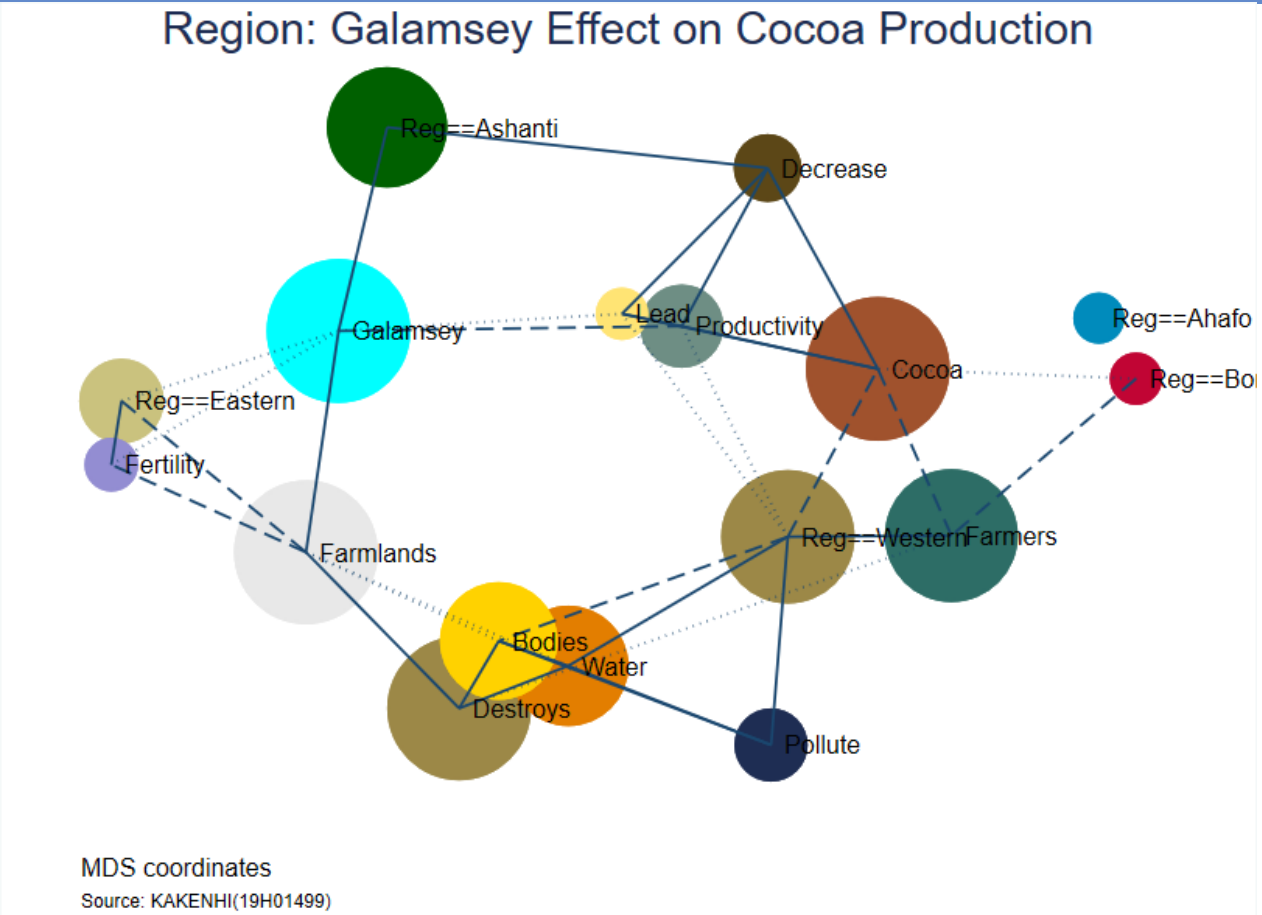
Figure 2: Effect of Galamsey on Cocoa Production by Region



The dotted lines correspond to a $p < 0.05$, the discontinuous lines to $p < 0.01$ and the continuous lines to $p < 0.001$.

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Children's Economic Activities by Region

Variable	Region						
	Ashanti	Brong Ahafo	Central & Eastern	Western	Pearson's $\chi^2(3)$	Cramer's V	Cohen's ω
	38 ($n = 176$)	11 ($n = 55$)	11 ($n = 52$)	38 ($n = 178$)	Test (P)		
Economic Activity							
Wage % (n)	8 (37)				25.81 (0.000)	0.2366	0.4098
	5 (8)	13 (9)	0 (0)	9 (16)			
Domestic % (n)	23 (106)				114.90 (0.000)	0.4992	0.8646
	16 (29)	80 (44)	13 (7)	15 (26)			
Farm % (n)	36 (164)				22.24 (0.000)	0.2196	0.3803
	24 (42)	33 (18)	54 (28)	43 (76)			
Managed Non-Farm	11 (49)				21.13 (0.000)	0.2141	0.3708
	10 (18)	27 (15)	2 (1)	8 (15)			
Non-Farm% (n)	16 (76)				16.69 (0.001)	0.1903	
	15 (28)	32 (18)	4 (2)	16 (28)			
	($n = 186$)	($n = 80$)	($n = 55$)	($n = 188$)			
Child labor 1 % (n)	35 (178)				14.023 (0.003)	0.1660	0.2875
	27 (51)	47 (38)	47 (56)	33 (63)			
Child labor 2 % (n)	25 (126)				11.842 (0.008)	0.1525	0.2641
	20 (38)	17 (14)	40 (22)	28 (52)			
Mean hours of work	17.19 (13.86)	25.58 (14.90)	19.30 (18.13)	21.16 (17.64)			

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Children's Economic Activities by Age Group

Variable	Age Group			Pearson's	Cramer's	Cohen's
	5-11	12-14	15-17	$\chi^2(2)$	V	ω
	$(n = 207)$	$(n = 86)$	$(n = 168)$	Test (P)		
Economic Activity						
Wage % (n)		8 (37)		8.96 (0.011)	0.1394	0.1971
	4 (8)	10 (9)	12 (20)			
Domestic % (n)		23 (106)		6.55 (0.112)	0.1192	0.1686
	20 (42)	31 (41)	19 (23)			
Farm % (n)		36 (164)		23.33 (000)	0.2250	0.3182
	24 (49)	44 (59)	46 (56)			
Managed non-farm		11 (49)		2.00 (0.368)	0.0658	0.0931
	9 (18)	12 (10)	12 (21)			
Non-Farm% (n)		16 (76)		5.64 (0.060)	0.1106	0.1564
	12 (25)	18 (25)	21 (26)			
Child labor 1 % (n)		35 (178)		53.661 (0.000)	0.3247	0.4591
	36 (83)	55 (79)	12 (16)			
Child labor 2 % (n)		25 (126)		38.306 (0.000)	0.2743	0.3879
	21 (48)	43 (62)	12.31 (16)			
	Mean (SD)	Mean (SD)	Mean (SD)			
	$(n = 87)$	$(n = 86)$	$(n = 83)$			
Mean hours of worked	16.30 (13.326)	21.66 (16.415)	23.64 (18.052)			

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Table 4: Galamsey Effect on Child Labor (Probit Marginal Effects)

Independent Variables	(1) Child labor 1	(2) Child labor 1	(3) Child labor 2	(4) Child labor 2
Galamsey	-0.0278	-0.0014	0.0232	0.0085
	(0.0602)	(0.0738)	(0.0552)	(0.0638)
Pollution	-0.2857***	-0.2047**	-0.2115***	-0.1867***
	(0.0624)	(0.0876)	(0.0565)	(0.0649)
Productivity	-0.2409**	-0.1682*	-0.1401**	-0.1054
	(0.0634)	(0.0795)	(0.0624)	(0.0687)
Farmland	-0.1374*	-0.0306	-0.0670	-0.0461
	(0.0621)	(0.0748)	(0.0586)	(0.0.0662)
Education level of head				
Primary		-0.1201		0.0031
		(0.0985)		(0.0954)
Junior high		-0.1170		-0.1088
		(0.0986)		(0.0780)
Middle		-0.1052		-0.0288
		(0.0831)		(0.0725)
Senior secondary or over		-0.2111**		-0.0960
		(0.0926)		(0.0879)
Constant	0.116	0.652	-0.325*	1.231
	(0.170)	(1.201)	(0.176)	(1.186)
Pseudo R^2	0.0665	0.212	0.0360	0.120
Wald Chi^2	24.27	75.31	11.77	38.34
Observations	317	313	317	313

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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Table 5: Galamsey Effect on Poverty (OLS Results)

	(1)	(2)	(3)	(4)
Independent Variables	District Poverty Rate	District Poverty Rate	District Poverty Rate	District Poverty Rate
Galamsey Perceptions				
Galamsey	0.139	0.116**	0.142	0.118**
	(0.0892)	(0.0583)	(0.0893)	(0.0584)
Pollution	0.0232	-0.00708	0.0215	-0.00564
	(0.0975)	(0.0492)	(0.0953)	(0.0495)
Productivity	-0.0302	0.0250	-0.0293	0.0283
	(0.127)	(0.0375)	(0.124)	(0.0370)
Farmland	0.0262	0.0486	0.0273	0.0500
	(0.0937)	(0.0537)	(0.0921)	(0.0539)
Child labor	-0.0386	-0.0443	-0.0597	-0.0303
	(0.0907)	(0.0556)	(0.0990)	(0.0534)
Education level of head				
Primary		-0.0407		-0.0363
		(0.0627)		(0.0630)
Junior high		-0.0382		-0.0371
		(0.0574)		(0.0576)
Middle		0.00755		0.0111
		(0.0589)		(0.0585)
Senior secondary and above		-0.0764		-0.0704
		(0.0792)		(0.0778)
Constant	2.735***	4.256***	2.736***	4.246***
	(0.0926)	(0.251)	(0.0864)	(0.248)
Observations	317	316	317	316
R-squared	0.013	0.811	0.014	0.811

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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Conclusion and future

- Our findings suggest that galamsey activities negatively affect cocoa production, through the pollution of water bodies, destruction of farmlands, decrease in productivity and the forced sale of cocoa farms.
  - Long-term sustainability of cocoa production is threatened by the activities of galamsey operators.
- We find that a high degree of galamsey activities resulting in higher levels of pollution and a decrease productivity of cocoa farmers leads to a lower demand for child labor.
- However, we also find that galamsey increases the district poverty rate.

- Future agenda
  - Examine the effect of galamsey on poverty at the household level

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Thank You!

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