

Community Development in the Long Run

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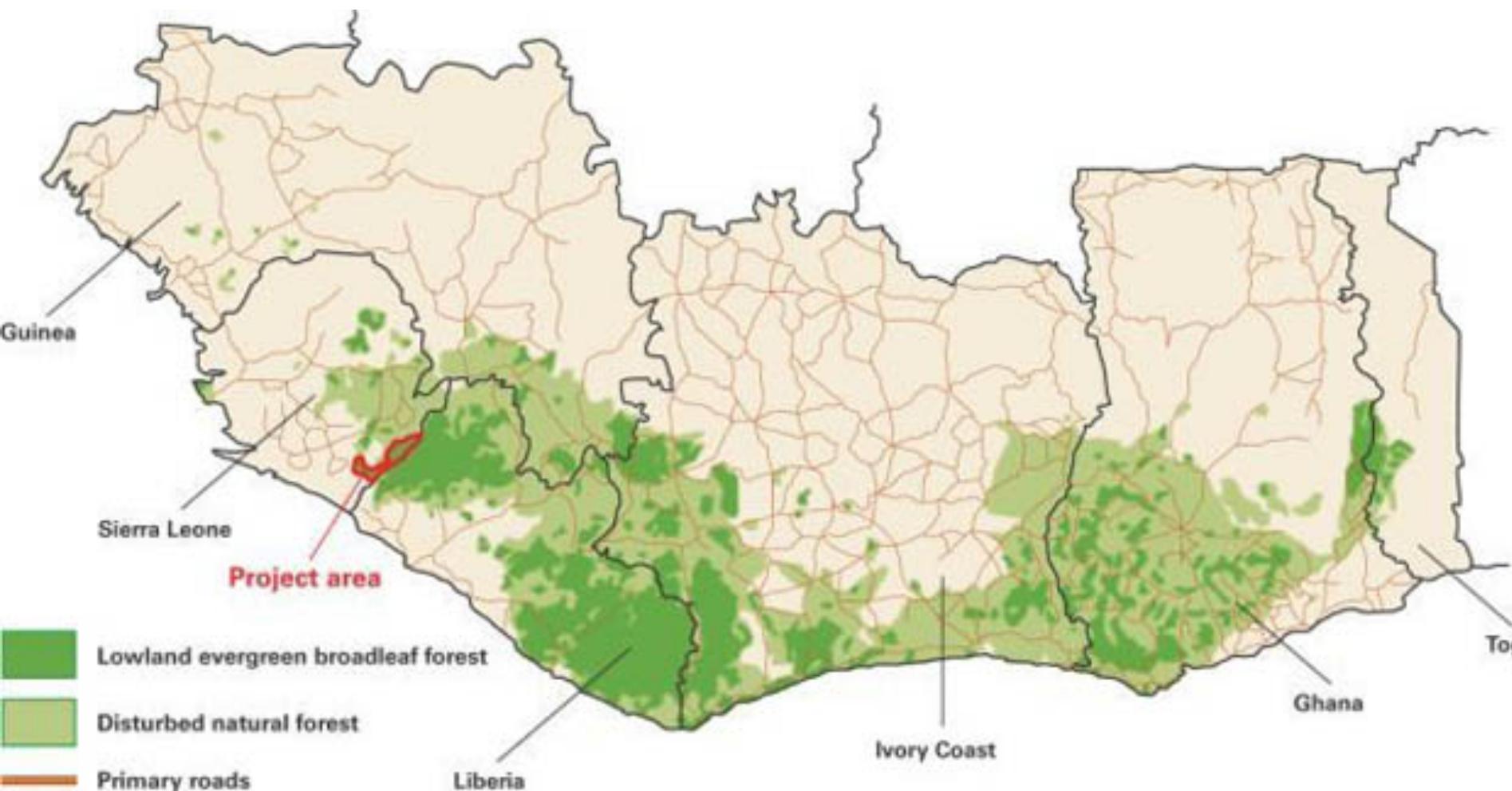
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Gola Rainforest National Park



Chiefs



Visiting America



Theories of Long Run Development

- **Institutional strength is a fundamental determinant of growth**
 - Early institutions matter
 - (Engerman and Sokoloff 1997, Acemoglu, Johnson and Robinson 2001, Banerjee and Iyer 2005)
 - Institutions >> geography and trade integration
 - (Rodrik, Subramanian and Trebbi 2004)
- **Human capital is even *more* fundamental**
 - Human endowments --> GDP growth (Barro 1991)
 - Growth --> institutions (Glaeser et al 2004)
 - Education explains >> geography, culture or institutions (Gennaioli et al 2012)
- Maybe it's both
 - If bad institutions may not utilize available human capital

Institutions and Human Capital in Sierra Leone

- Post-war Sierra Leone weak endowment of both:
 - nearly 30 years of one-party autocracy
 - 70% of adults had zero years of formal schooling
- Reach of the central state limited and does not provide public goods
- Traditional local institutions matter for development
 - Autocratic chiefs underprovide public goods (Acemoglu, Reed and Robinson, 2014)
 - Disrupt if sidelined (Voors et al 2015)
 - But are more effective in crisis (van der Windt and Voors)
- Key CDD question:

What can be done to strengthen local institutions and promote growth?

The Policy Response

- The apparent failure of decades of “big D” development—centrally provided infrastructure—led to the ascendance of “small d” approaches that emphasize local participation in the 1990s (White 1999)
- This shift in development policy coincides with the “third wave” of democratization (Huntington 1991) that peaked at 120 countries in 2000 (Freedom House)
- *Community Driven Development*
- Idea is that local participation and political voice generate stronger incentives for government performance and deliver intrinsic benefits

The Policy Response - CDD

“Experience demonstrates that by directly relying on poor people to drive development activities, CDD [community driven development] has the potential to make poverty reduction efforts more responsive to demands, more inclusive, more sustainable, and more cost-effective than traditional centrally led programs...achieving immediate and lasting results at the grassroots level.” – Dongier et al. (2003), World Bank



The Policy Response - CDD

- Donors operationalize this mission via community driven development
 - Big business: World Bank spent \$85 Billion in 10 years (Mansuri and Rao 2012)
- Key elements:
 - block grants to communities for public infrastructure
 - with intensive social facilitation to promote participation and accountability

The Problem: CDD delivers only half of its mission

- Meta-analysis shows gains in public goods and living standards (Casey 2017)

Study	Local Public Goods		Economic Welfare	
	ATE	S.E.	ATE	S.E.
Afghanistan	0.123	(0.043)	0.015	(0.024)
DRC	0.013	(0.085)	-0.090	(0.060)
Liberia	-0.027	(0.058)	0.089	(0.032)
Sierra Leone	0.204	(0.039)	0.376	(0.047)
Precision weighted meta-analysis	0.119	(0.025)	0.075	(0.017)

- ... but no detectable impact on collective action, as proxied by trust

Study	ATE	S.E.	Measures of Trust
Afghanistan	0.026	(0.012)	Share males would ask non-family member to collect money
DRC	0.010	(0.010)	Share would lend another villager money to go to market
Liberia	0.120	(0.040)	Share say town leaders more trustworthy than those nearby
Sierra Leone	0.009	(0.009)	Share would entrust non-household member to buy item
Sudan	-0.030	(0.100)	Sudanese pounds sent by investor in trust lab game
Meta-analysis	0.005	(0.006)	standard deviation units

What We Do in This Paper

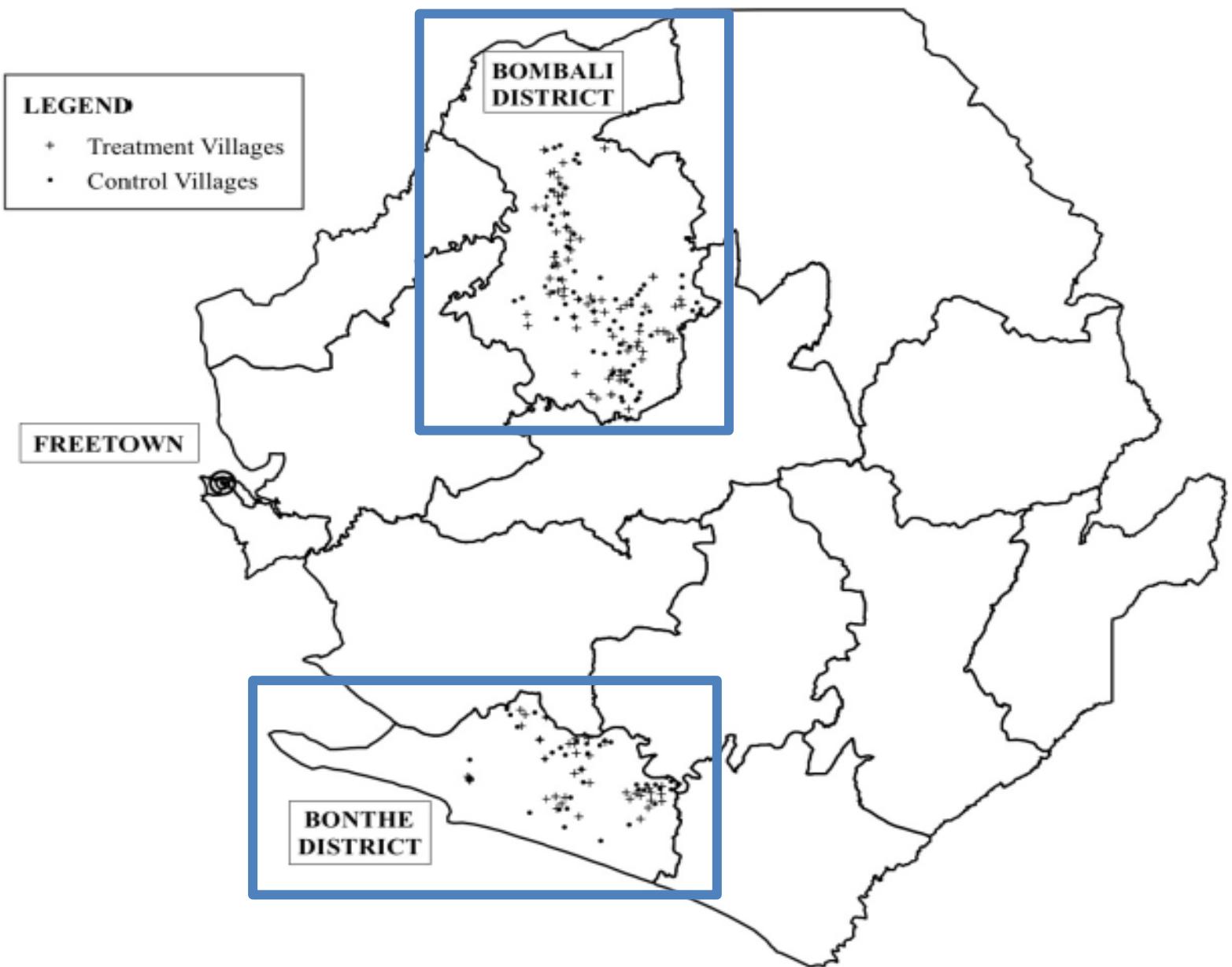
1. Estimate long run (~10 years) follow up effects of CDD in Sierra Leone, pre-specifying our analysis
 - Very scarce in experimental work (we should learn from LR panel surveys)
 2. Before doing so, we collected the prior beliefs of experts (following DellaVigna and Pope, forthcoming), and then estimate their realized accuracy and variation across policy and academia
 - Often accumulation of evidence lags policy choices
 3. Explore the link between local institutions and human capital
 - Test for a failure of local authority to fully leverage available human capital
 - Test whether technocratic selection methods and basic management training can harness untapped human capital to avail of development opportunities
- Today focus on 1 and 2

What We Find

1. Long Run effects
 - Are substantial for local public goods and economic welfare.
 - (very) small positive effects on institutions, statistically significant but of little real world import.
2. Priors
 - Academic experts, including us, underestimated these effects.
 - Policy makers were more accurate (!).
 - Experts in Sierra Leone were overly optimistic.
3. We find evidence for substantial untapped human capital located outside the traditional elite.
 - Moreover, light touch, technocratic support to identify and train high competence managers worked better than relying on traditional chiefs for a real world development opportunity.
 - Helps us think about what other margins matter (compared to changing institutions)

Long Run Effects of CDD

Appendix D: Location of Research Communities



NOT INTENDED FOR PUBLICATION

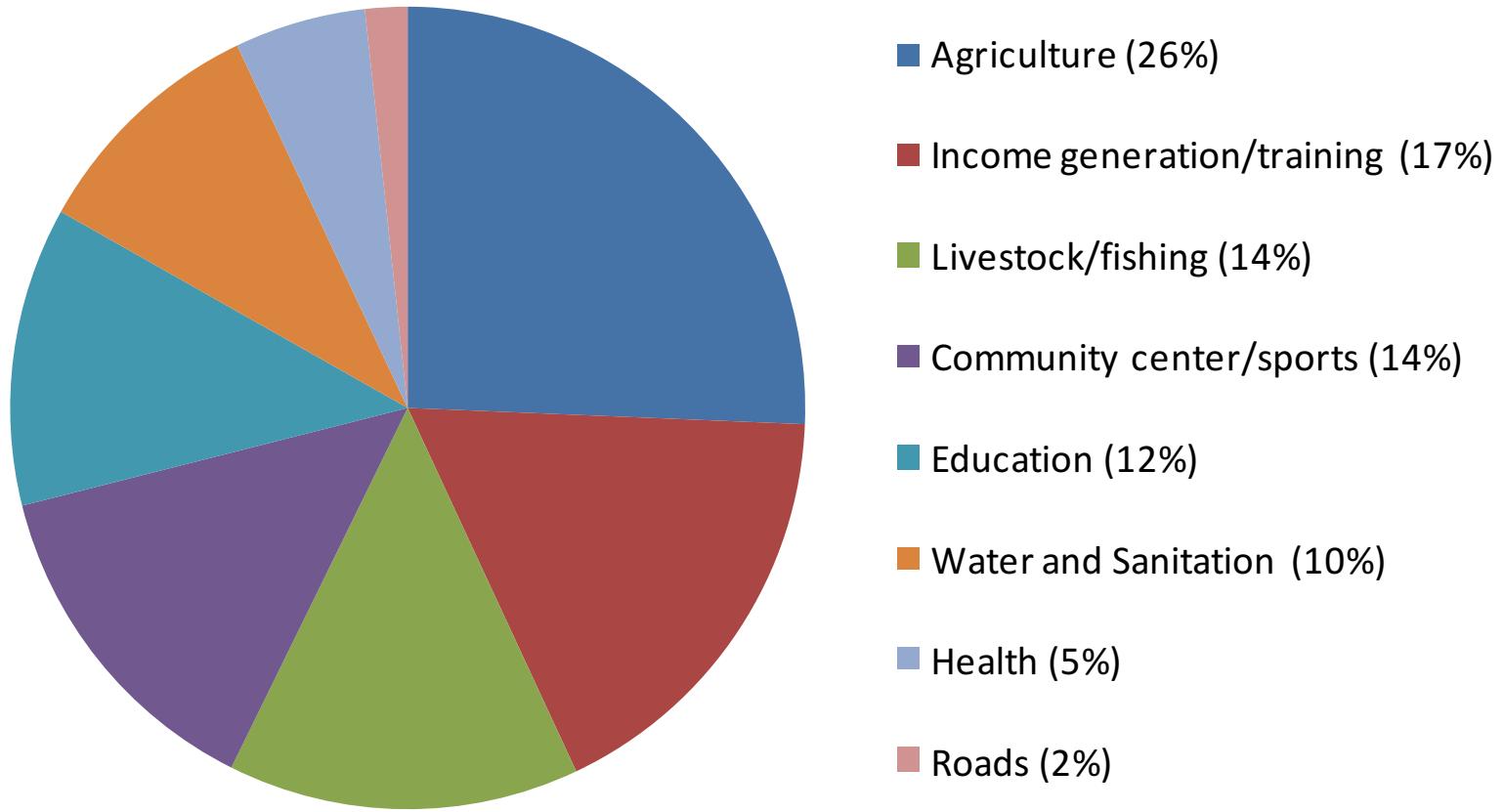
Appendix B: Project and Research Timeline

10-Oct-05	↓	<i>Hypothesis document drafted</i>	Jan-08	
Nov-05		Baseline Survey	Feb-08	
Dec-05	↓		Mar-08	↓
Jan-06			Apr-08	
Feb-06		Ward Facilitator Training	May-08	↓
Mar-06			Jun-08	
Apr-06	↓		Jul-08	
May-06		Development Planning	Aug-08	↓
Jun-06			Sep-08	
Jul-06			Oct-08	↓
Aug-06		Ward Development Committee Approval	Nov-08	
Sep-06			Dec-08	
Oct-06			Jan-09	
Nov-06		Delays	Feb-09	
Dec-06	↓		Mar-09	
Jan-07			Apr-09	↓
Feb-07		Ward Development Committee Approval	May-09	↓
Mar-07	↓		Jun-09	
Apr-07			Jul-09	↓
May-07		Delays	21-Aug-09	
Jun-07				↓
Jul-07			<i>Pre-Analysis Plan archived with the Jameel Poverty Action Lab</i>	
Aug-07		Delays	Sep-09	↓
Sep-07			Oct-09	
Nov-07			Nov-09	↓
Dec-07	↓	Delays	04-Mar-10	
			<i>Plan Supplement covering second follow-up survey archived</i>	
				↓

- **Financial grants** for local public goods, small enterprise development
 - The "GoBifo" Project ("Move Forward") we study in Sierra Leone gave \$4,667 to communities in 3 tranches (~\$100 per household)
- **Training and facilitation** to build durable local collective action capacity (6 months of intensive contact spread out over 4 years)
 - Forms a representative Village Development Committee to promote democratic decision-making
 - Establishes bank accounts and transparent accounting procedures
- Requirements to **increase participation of marginalized groups**
 - Women were co-signatories on the community bank accounts
 - Women and youths managed own projects, e.g. labor groups

Distribution of sub-projects by type

Figure 2: Distribution of Sub-Projects by Type



Hypothesis – PAP 2009

- Hardware
 - H1: Project implementation
 - H2: Participation in GoBifo improves the quality of local public services infrastructure.
 - H3: Participation in GoBifo improves general economic welfare.
- Software
 - H4: Participation in GoBifo increases collective action and contribution to local public goods.
 - H5: GoBifo increases inclusion and participation in community planning and implementation, especially for poor and vulnerable groups; GoBifo norms spill over into other types of community decisions, making them more inclusive, transparent and accountable.
 - H6: GoBifo changes local systems of authority, including the roles and public perception of traditional leaders (chiefs) versus elected local government. (*Note that this is not an explicit objective of the GoBifo project leadership itself, but it is a plausible research hypothesis.)
 - H7: Participation in GoBifo increases trust
 - H8: Participation in GoBifo builds and strengthens community groups and networks.
 - H9: Participation in GoBifo increases access to information about local governance.
 - H10: GoBifo increases public participation in local governance.
 - H11. By increasing trust, GoBifo reduces crime and conflict in community.
 - H12: GoBifo changes political and social attitudes, making individuals more liberal towards women, more accepting of other ethnic groups and “strangers”, and less tolerant of corruption and violence. (*Note that this was not part of the original program hypotheses document but relates closely to GoBifo project objectives.)

- Earlier, (Casey, Glennerster and Miguel 2012) found medium run effects for public goods and economic returns, and no detectable effects on institutions

GoBIFO TREATMENT EFFECTS BY RESEARCH HYPOTHESIS

	(1) GoBifo mean treatment effect endex	(2) Naive <i>p</i> -value	(3) FWER-adjusted <i>p</i> -value for all 12 hypos	(4) FWER-adjusted <i>p</i> -value for 11 hypos in 2009 PAP
Hypotheses by family				
Family A: Development infrastructure or “hardware” effects				
Mean effect for family A (Hypotheses 1–3; 39 unique outcomes)	0.298** (0.031)	0.000		
H1: GoBifo project implementation (7 outcomes)	0.703** (0.055)	0.000	0.000	
H2: Participation in GoBifo improves the quality of local public services infrastructure (18 outcomes)	0.204** (0.039)	0.000	0.000	0.000
H3: Participation in GoBifo improves general economic welfare (15 outcomes)	0.376** (0.047)	0.000	0.000	0.000

TABLE 1
GoBIFO TREATMENT EFFECTS BY RESEARCH HYPOTHESIS

	(1) GoBifo mean treatment effect endex	(2) Naive <i>p</i> -value	(3) FWER-adjusted <i>p</i> -value for all 12 hypos	(4) FWER-adjusted <i>p</i> -value for 11 hypos in 2009 PAP
Hypotheses by family				
Family B: Institutional and social change or “software” effects				
Mean effect for family B (Hypotheses 4–12; 155 unique outcomes)	0.028 (0.020)	0.155		
H4: Participation in GoBifo increases collective action and contributions to local public goods (15 outcomes)	0.012 (0.037)	0.738	0.980	0.981
H5: GoBifo increases inclusion and participation in community planning and implementation, especially for poor and vulnerable groups; GoBifo norms spill over into other types of community decisions, making them more inclusive, transparent, and accountable (47 outcomes)	0.002 (0.032)	0.944	0.980	0.981
H6: GoBifo changes local systems of authority, including the roles and public perception of traditional leaders (chiefs)	0.056 (0.037)	0.134	0.664	0.667
H7: Participation in GoBifo increases trust (12 outcomes)	0.042 (0.046)	0.360	0.913	0.914
H8: Participation in GoBifo builds and strengthens community groups and networks (15 outcomes)	0.028 (0.037)	0.450	0.913	0.914
H9: Participation in GoBifo increases access to information about local governance (17 outcomes)	0.038 (0.037)	0.301	0.913	0.913
H10: GoBifo increases public participation in local governance (18 outcomes)	0.090* (0.045)	0.045	0.315	0.322
H11: By increasing trust, GoBifo reduces crime and conflict in the community (8 outcomes)	0.010 (0.043)	0.816	0.980	0.981
H12: GoBifo changes political and social attitudes, making individuals more liberal toward women, more accepting of other ethnic groups and “strangers,” and less tolerant of corruption and violence (9 outcomes)	0.041 (0.043)	0.348	0.913	0.914

- We now turn to the **long run**: do the economic gains persist?
 - Are there any late onset, or slow burn, institutional changes (see critique in Woolcock 2013)
- Data on long run effects was collected 12 (8) years after the main program launched (ended) late 2016.
 - Sixty of the 118 treatment communities received an additional \$1,300 for youth empowerment activities in 2010.

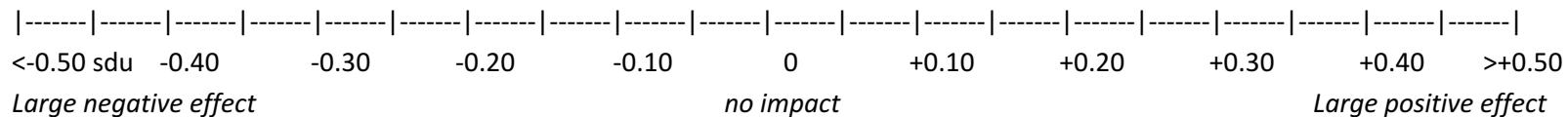
Expert Prior Elicitation

- Before returning to the field, we collected beliefs about the long run treatment effects from a variety of experts (126 in total):
 - Policymakers working in multilateral aid agencies (N=12)
 - Policymakers in Sierra Leone with knowledge of GoBifo (N=13)
 - Economics undergraduate students in Sierra Leone (N=17)
 - Economics graduate students in OECD countries (N=61)
 - Faculty, most directly involved in evaluating CDD projects (N=23)
- We asked experts to predict point estimates in standard deviation units and their level of certainty for each of 12 hypotheses (DellaVigna and Pope forthcoming).
 - We group the hypotheses into two families, A and B.
 - We used two versions of the survey: one that listed the medium run results and one that did not

Expert survey - example

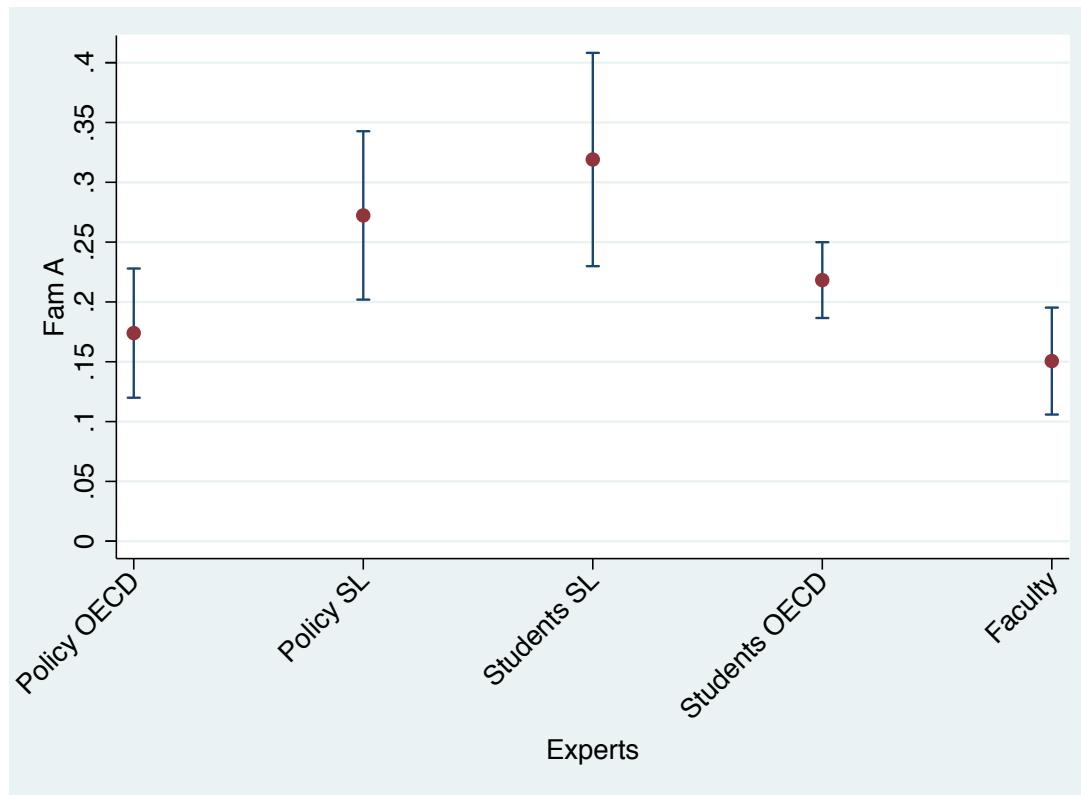
Hypothesis 1: GoBifo Project Implementation.

Examples of indicators include the presence of a village development committee and formal bank account for village project expenses.



What do the experts think?

- The first set of hypotheses, or Family A, concerns project implementation, local public goods and economic welfare.
 - On average, experts predicted a long run effect of 0.218 (0.126) sdus, or 73% of the medium run estimates, with substantial heterogeneity by type.



Family A: Long Run Estimates

Table 1: Family A Long Run Treatment Effects

	Treatment effect	Standard error	Naïve p-value	FDR adjusted q-value
Family A overall	0.204***	0.040	<0.01	0.001
Project implementation	0.253***	0.068	<0.01	0.001
Local public goods	0.228***	0.046	<0.01	0.001
Economic welfare	0.240***	0.056	<0.01	0.001
Observations	236 communities			

*Note: significance levels based on FDR-adjusted q-values and indicated by + q<0.10, * q<0.05, **q<0.01.*

From the regression:

$$Y_c^L = \beta_0 + \beta_1 T_c + X'_c \Gamma + W'_c \Pi + \varepsilon_c$$

where Y_c^L is the mean outcome index for community c ; T_c indicates GoBifo; X_c is two balancing variables from the randomization; W_c contain ward-level stratification bins; and ε_c is the usual idiosyncratic error term.

Family A: Estimated Decay Over Time

- Roughly one third of the treatment effect has decayed since 2009, leaving two thirds still detectable 7 years later

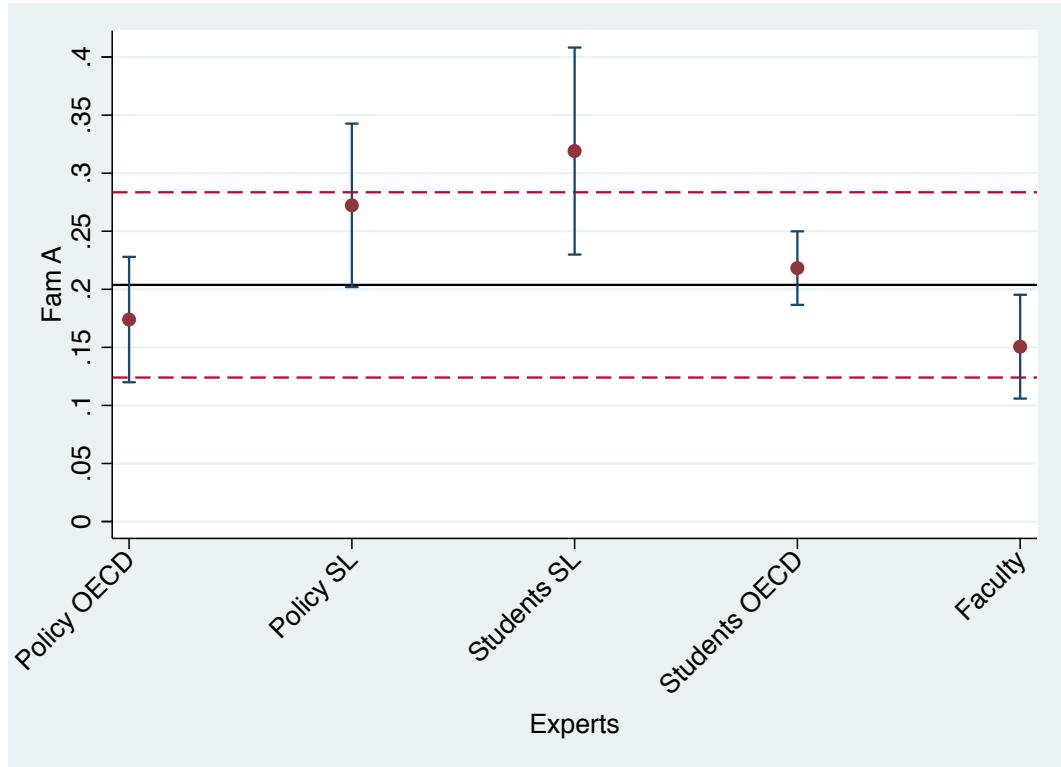
Table 2: Decay in Family A Effects

	Treatment effect 2016	Treatment effect 2009	Decay over time
Family A overall	0.204*** (0.040)	0.298*** (0.031)	-0.094*** (0.036)
Project implementation	0.253*** (0.068)	0.703*** (0.055)	-0.450*** (0.081)
Local public goods	0.228*** (0.046)	0.204*** (0.039)	0.024 (0.041)
Economic welfare	0.240*** (0.056)	0.376*** (0.047)	-0.136** (0.062)
Observations	236 communities		

*Note: significance levels based on naive p-values and indicated by * $p<0.10$, ** $p<0.05$, *** $p<0.01$.*

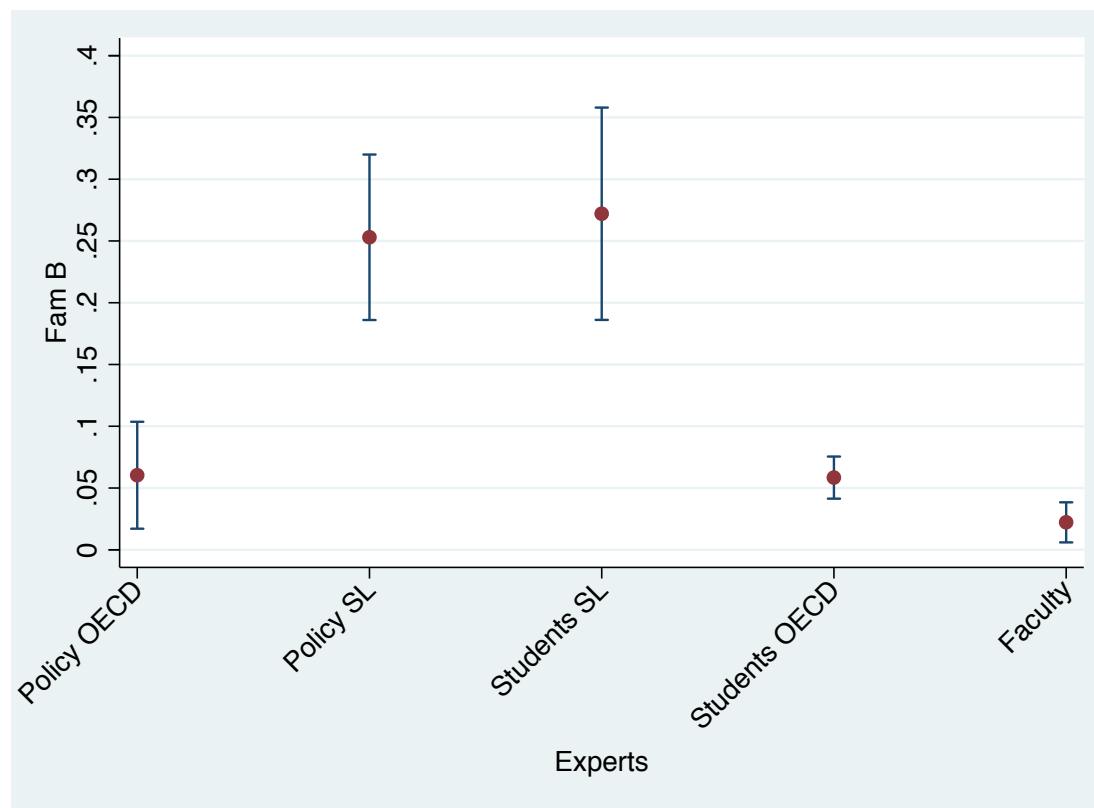
Family A: Who was right?

- Experts overall had accurate priors: we cannot reject equivalence of the expected and measured long run effects
- Point estimates of OECD policymakers and students were closer than academics, but we cannot reject that all groups' predictions equal the actual effect



Family B: Institutional Outcomes

- Family B covers 9 hypotheses about how CDD might transform local institutions.
 - Experts on average predicted effects that exceeded the medium run estimates (0.098 versus 0.028 sdus), again with variation.



Family B: Long Run Effects

Table 4: Family B Long Run Treatment Effects

	Treatment effect	Standard error	Naïve p-value	FDR adjusted q-value
Family B	0.066***	0.025	<0.01	<0.01
Collective action	0.098	0.050	0.049	0.235
Inclusion	0.033	0.036	0.350	0.539
Local authority	-0.035	0.068	0.604	0.632
Trust	0.107	0.057	0.063	0.235
Groups and networks	0.149	0.071	0.037	0.235
Access to information	-0.036	0.067	0.590	0.632
Participation in governance	0.079	0.060	0.190	0.348
Crime and conflict	-0.002	0.063	0.971	0.759
Political and social attitudes	0.154	0.124	0.215	0.348
Observations	236 communities			

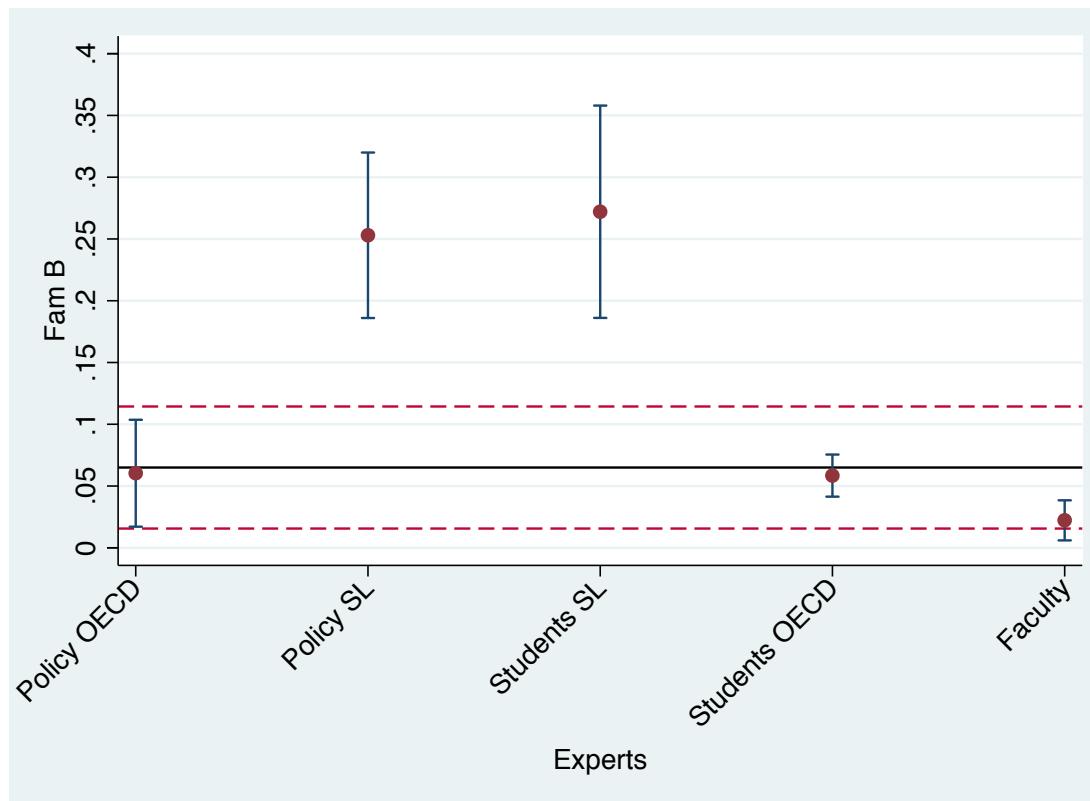
*Note: significance levels based on FDR-adjusted q-values and indicated by *q<0.10, **q<0.05, ***q<0.01.*

Family B: Observed Behavior

- If we focus on our best measures, those that capture real world behaviors, we find no evidence of treatment effects
- **New opportunity:** CDD communities do not use more democratic processes when confronted with a concrete collective decision
 - A new SCA/FFE (as in 2009 data collection)
 - In 2016, we asked a focus group to identify five community members with a specific set of skills to nominate for a new leadership position
 - Enumerators observed the deliberation and CDD communities were no more likely to: vote, have women or youth speak up, or prevent the chief from deciding without input. Overall treatment effect: **0.035 sdu's (s.e. 0.044)**
- **A crisis:** project institutions were not mobilized in response to Ebola
 - Ebola epidemic hit Sierra Leone in 2014. Across several measures of preparedness and response, CDD communities fared no better: **0.046 (0.044)**

Family B: Who was right?

- Academics were overly pessimistic and Sierra Leoneans overly optimistic



One Final Test: Managerial capital

- CDD did not fundamentally alter local institutions
- But hardware effects remain
- Perhaps, learning by doing experience in successfully implementing public goods has persistent effects on *their ability to replicate project processes?*

One Final Test: Managerial capital

- In 2016, the local governments ran a development project challenge competition to award twenty \$2,500 implementation grants.
 - Entry required a detailed project proposal and budget, fairly similar to GoBifo.
- We publicized the competition in all 236 study villages:
 - Explained the application document and associated skills to be successful
 - Asked communities to nominate five individuals who are strong in these skills
 - Administered a simple managerial capital test (literacy, numeracy, project budgeting exercise) to the nominees
- We anonymized all applications that were submitted
- And had them evaluated by independent experts, and tracked which communities won the grants

Results: CDD and Managerial Capital

- There is no evidence that nominees in GoBifo villages had more managerial capital, submitted higher quality proposals, or were more likely to be awarded a grant by the government selection committee

Table 5 Long Run Effect in Managerial Capital

	Manager Test Score	Proposal technical quality	Proposal won a grant
GoBifo	0.001 (0.156)	-0.006 (0.136)	-0.011 (0.037)
Observations	236	232	232

*Note: significance levels based on naive * p<0.10, ** p<0.05, ***p<0.01.*

- GoBifo villages were also no more likely to put a women forward as one of the 5 high skill nominees (21% were women across the board)

A Technocratic Alternative

Why A Technocratic Alternative Might Be Attractive

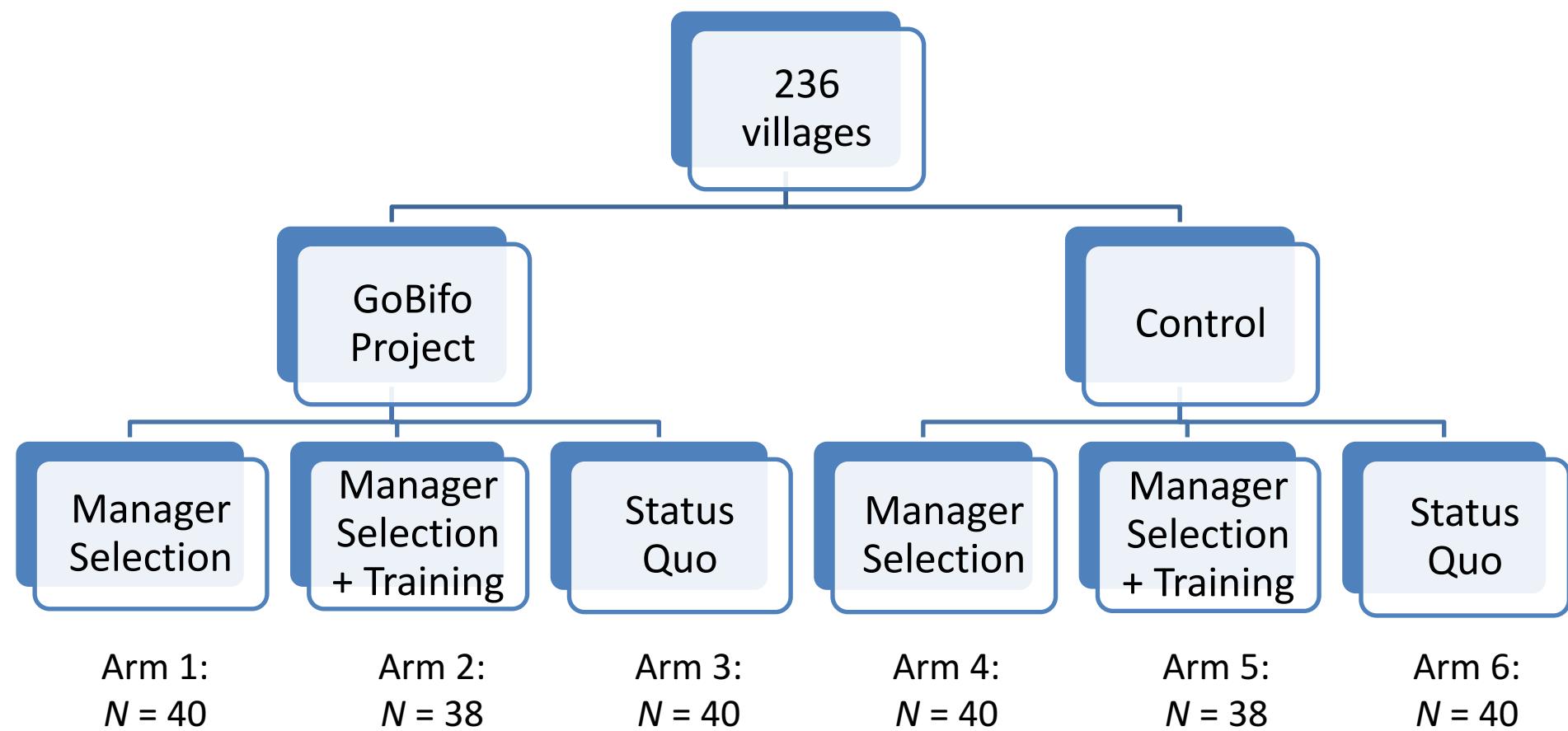
- CDD emphasizes broad based participation and consensus at every stage
 - *Inclusion* is prioritized over technical expertise
 - Heavy *participation quotas* impose costs on poor people's time
 - Yet, facilitation is expensive: for every dollar spent on block grants, 63 cents was spent on facilitation (if you add MnE its 1:1)
 - It does not change institutions, perhaps because >50% VDC are chiefly officials
- Delegating the work of community development to *local technocrats* might be preferable
 - It is socially optimal to *delegate* tasks to independent bureaucrats instead of elected politicians if the task is difficult, politician capability to execute is uncertain, or monitoring requires expertise (Alesina and Tabellini 2007, 2008)
 - The project challenge is technical, and chiefs have low education
 - Emerging empirical literature suggests that *management practices* matter for public agencies (Rasul and Rogger forthcoming) and NGO-sponsored projects (Voors et al 2017)
 - Basic processes make a difference, training could work

Why Identifying Technocrats Might Not Work

- **Delegation:**
 - If there is no information asymmetry, then traditional authorities might already be delegating efficiently
 - .. implying that there is no underutilized managerial capital in villages
- **Authority:**
 - Competent managers may lack the authority of traditional leaders.
 - For example, gains from massive education expansion over the past decade accrue to younger people outside the traditional elite, but may be unable to mobilize labor and financial contributions.
- **Sabotage:**
 - Chiefs might see high capital managers as a threat and sideline them (Acemoglu, Reed and Robinson 2014, Voors et al 2017)

- Recall that in all 236 villages, we publicized the project challenge competition and asked communities to nominate 5 people—plus the headman—who were strong on requisite skills, and tested all 6 nominees
- **Manager Selection (MS):** Before administering the tests, we announced that an on-site lottery would determine whether the highest scorer or the village headman (status quo) would lead the project challenge proposal
 - H: assignment of task to bureaucrat vs politician matters for performance
- **Assignment:** Enumerators graded the tests and reconvened the focus group to unlock the lottery. There was encouragement but no obligation to follow the lottery: enumerators wrote the assigned name on the application and gave that person a transport voucher to submit it
- **Training (TR):** In half the MS communities, we subsidized travel to a one day training in project management skills offered by the district council
 - H: management practices matter

Research Design



Technocratic Selection and Training

- We estimate:

$$P_c = \delta_0 + \delta_1 MS_c + \delta_2 TR_c + W'_c \Psi + \zeta_c$$

where outcome P (i.e. proposal quality) is measured for community c ; MS is an indicator variable equal to one for assignment to the manager selection process; TR is an indicator for assignment to training (*marginal effect beyond MS*); W_c is a stratification fixed effect for geographic wards; and ζ_c the idiosyncratic error term

- To evaluate three hypotheses:

- There is underutilized managerial capital within the village ($\delta_1 > 0$ test scores)
- Leveraging this underutilized capital enhances ability to take advantage of the project challenge opportunity ($\delta_1 > 0$ on proposal quality)
- Lack of management skills constrains the ability to take advantage of new opportunities ($\delta_2 > 0$ on proposal quality)

Results: Latent Managerial Capital

- Individuals nominated by the community based on technocratic skills vastly outperform local headmen in tests of managerial capital

Table 6: Latent Managerial Capital

	Management test score
Manager Selection	1.709*** (0.140)
Training	-0.027 (0.133)
Observations	236
F-stat (MS & TR)	87.8
p-value	<0.01

*Note: significance levels based on naive * $p<0.10$, ** $p<0.05$, *** $p<0.01$.*

Scale 0-120, chief control mean = 59 points, technocrat = +163%

Distribution of Managerial Capital

- Would the chief have been better off delegating to a nominee?

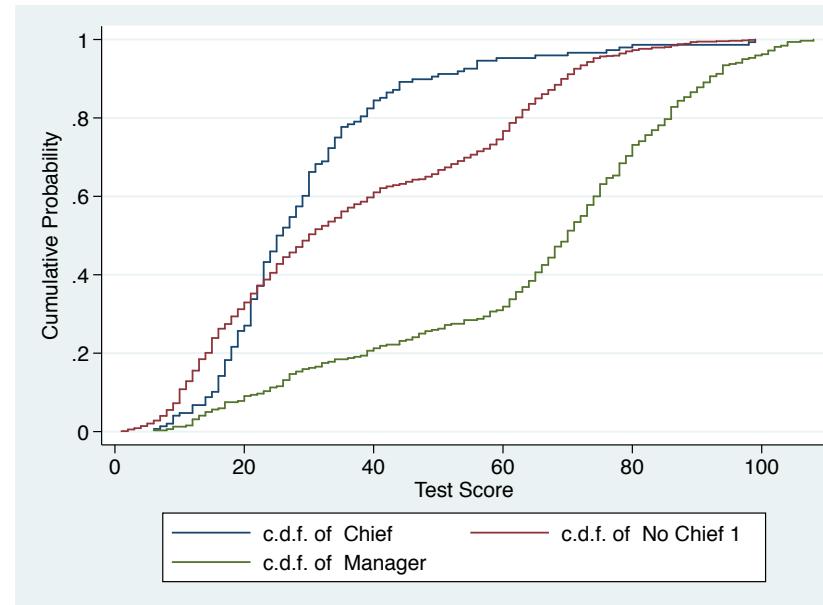


Table 7: Management Test Scores by Group

	Mean	Std. dev.	Min	Max
Village chief	31.47	18.61	6	104
Average of 5 nominees	44.56	26.76	1	108
Highest scorer	64.05	25.14	6	108

Who gets selected?

Table 8: Characteristics of Technocrats versus Chiefs

	Technocrats		Chiefs		Different?
	Mean	Std. dev.	Mean	Std. dev.	p-value
Age	37.77	11.83	58.04	13.46	0.00
Proportion male	0.95	0.22	0.98	0.15	0.09
Any education	0.98	0.13	0.35	0.48	0.00
Born in village	0.75	0.44	0.95	0.22	0.00
Occupation					
farmer	0.31	0.46	0.88	0.33	0.00
teacher	0.43	0.50	0.01	0.09	0.00
business	0.05	0.22	0.04	0.20	0.69

Does the management process differ?

Table 9: Allocation of Project Proposal Tasks Across Village Residents

	Who chose the project?		Who wrote the description?		Who did the budget?		Who made the timeline?	
	SQ	MS	SQ	MS	SQ	MS	SQ	MS
Chief	0.77	0.33	0.07	0.03	0.08	0.03	0.10	0.03
Village Secretary	0.06	0.09	0.27	0.16	0.25	0.14	0.25	0.15
Teacher	0.06	0.29	0.42	0.42	0.38	0.41	0.38	0.43
Youth leader	0.15	0.19	0.08	0.11	0.07	0.12	0.08	0.11
Women's leader	0.12	0.11	0.00	0.01	0.00	0.01	0.00	0.01

Results: Performance in the Competition

- Technocrats strongly outperform chiefs in the quality of the proposals submitted to the competition. Training further bolsters their performance

Table 10: Performance of Technocrats versus Chiefs

	Proposal Score (index) (1)	Technical Score (2)	Expert Score (3)	Gov't Score (4)	Won a Grant (5)
Manager Selection	0.289** (0.1370)	0.422** (0.163)	0.278* (0.144)	0.163 (0.159)	0.064 (0.046)
Training	0.260* (0.135)	0.294* (0.161)	0.458*** (0.135)	0.356** (0.159)	-0.015 (0.050)
Observations	232	232	232	232	232
F-stat (MS & TR)	9.8	10.8	14.8	6.3	1.3
p-value	<0.01	<0.01	<0.01	<0.01	0.29

*Note: significance levels based on naive p-values and indicated by * p<0.10, ** p<0.05, ***p<0.01*

Discussion

- Changing institutions seems infeasible
- Building human capital, may not be sufficient
- Matching skills to tasks is a “halfway house” then
- Identifying the right people for the right job draws parallels to selection issues in personnel economics applied to public sector jobs
 - Match quality can compensate for low powered incentives (Besley and Ghatak 2005)
 - Higher pay attracts higher competence workers to the public sector (Dal Bo, Finan, Rossi 2013) and bringing in more competent teachers increases student learning (Alva et al. 2017)
 - Even without pay differentials, the way jobs are advertised attracts different types of applicants (Ashraf, Bandiera and Lee, 2015; Deserranno, 2016, One Health Program in Sierra Leone)

Conclusion

- The public goods and economic impacts of community driven development (CDD) are remarkably persistent
- We find positive long run effects of CDD on institutional measures, however they are too small in magnitude to be of much real world import
- Experts overall were quite accurate in predicting the persistence of economic effects. Policy experts were overly optimistic about the potential for slow onset institutional change, while academics were overly pessimistic
- We find evidence for substantial human capital that is underutilized by traditional authority. This gap is large, and it may be possible to bridge with a focus on meritocratic selection methods.

Annex

Sidebar: Treatment Effect Heterogeneity

- Anderson and Magruder (2017) reanalyze our 2012 data with new hybrid split sample-PAP econometric techniques and find that CDD was less effective in larger villages.
- Specifically, they point to heterogeneous effects for public goods (Family A), as well as access to information and participation in local governance (Family B). The long run data provides an opportunity for a fresh test.
- In the long run data, we find similar and substantial heterogeneity for Family A. Regarding interpretation, this could reflect greater coordination challenges for larger groups (consistent with Olson 1965), and/or lower per capita grants in larger communities.
- For Family B, we also find negative effects for the same information and participation hypotheses, however they are only marginally significant.

Results: Heterogeneous Effects by Village Size

Table 3: Heterogeneity by Village Size

	Treatment effect 2016	Inter. w/ village size	Standard error	Inter. scaled to mean size
Family A	0.357***	-0.003**	(0.002)	-0.141
H1 - Implementation	0.537***	-0.006**	(0.002)	-0.282
H2 - Local Public Infrastructure	0.400***	-0.004**	(0.001)	-0.188
H3 - Economic welfare	0.293**	-0.001	(0.002)	-0.047
Family B	0.126***	-0.001	(0.001)	-0.047
H4 - Collective action	0.170*	-0.002	(0.002)	-0.094
H5 - Inclusion	0.003	0.001	(0.001)	0.047
H6 - Systems of authority	-0.103	0.001	(0.002)	0.047
H7 - Trust	0.190*	-0.002	(0.002)	-0.094
H8 - Groups and networks	0.224*	-0.002	(0.002)	-0.094
H9 - Information	0.235*	-0.006*	(0.003)	-0.282
H10 - Participation	0.294**	-0.005*	(0.003)	-0.235
H11 - Crime and conflict	-0.078	0.002	(0.002)	0.094
H12 - Attitudes	0.622**	-0.010**	(0.004)	-0.470

Note: significance levels based on naive p-values and indicated by * $p<0.10$, ** $p<0.05$, *** $p<0.01$.