

# Earned versus Unearned Aid: A Field Experiment in Sierra Leone

Maarten Voors

Wageningen University

with Ty Turley, Erwin Bulte, Andreas Kontoleon and John List

Santiago 7 May 2016, Research presentation  
EGAP learning days





# AFRICA CONGO

WEDNESDAY

16TH JANUARY

9 PM BBC 1

REPEATED SUNDAY 20TH JANUARY

5:35 PM BBC 1

NARRATED BY SIR DAVID ATTENBOROUGH

PRODUCER - VERITY WHITE

SERIES PRODUCER - JAMES HONEYBORNE

EXECUTIVE PRODUCER - MICHEAL GUNTON

BBC.CO.UK/AFRICANATURE

**bbc one**

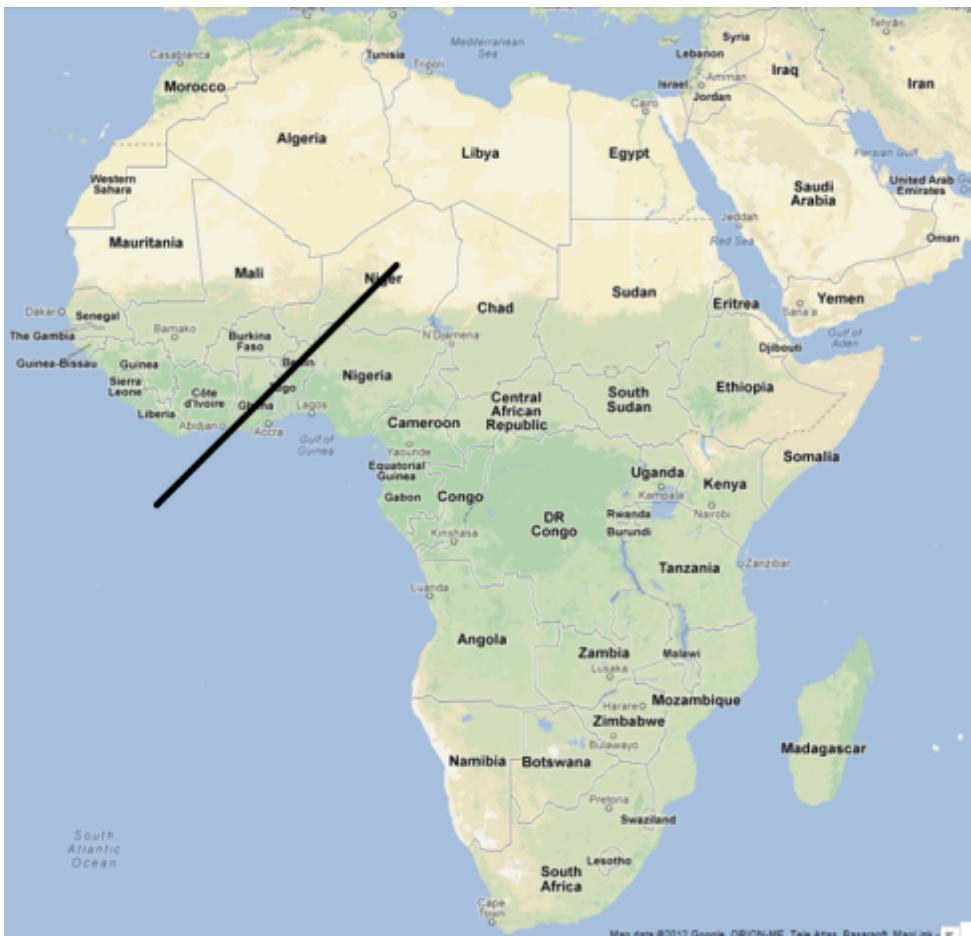
- Via The Middle East
- Via Spain — Morocco
- Via Italy — Tunisia





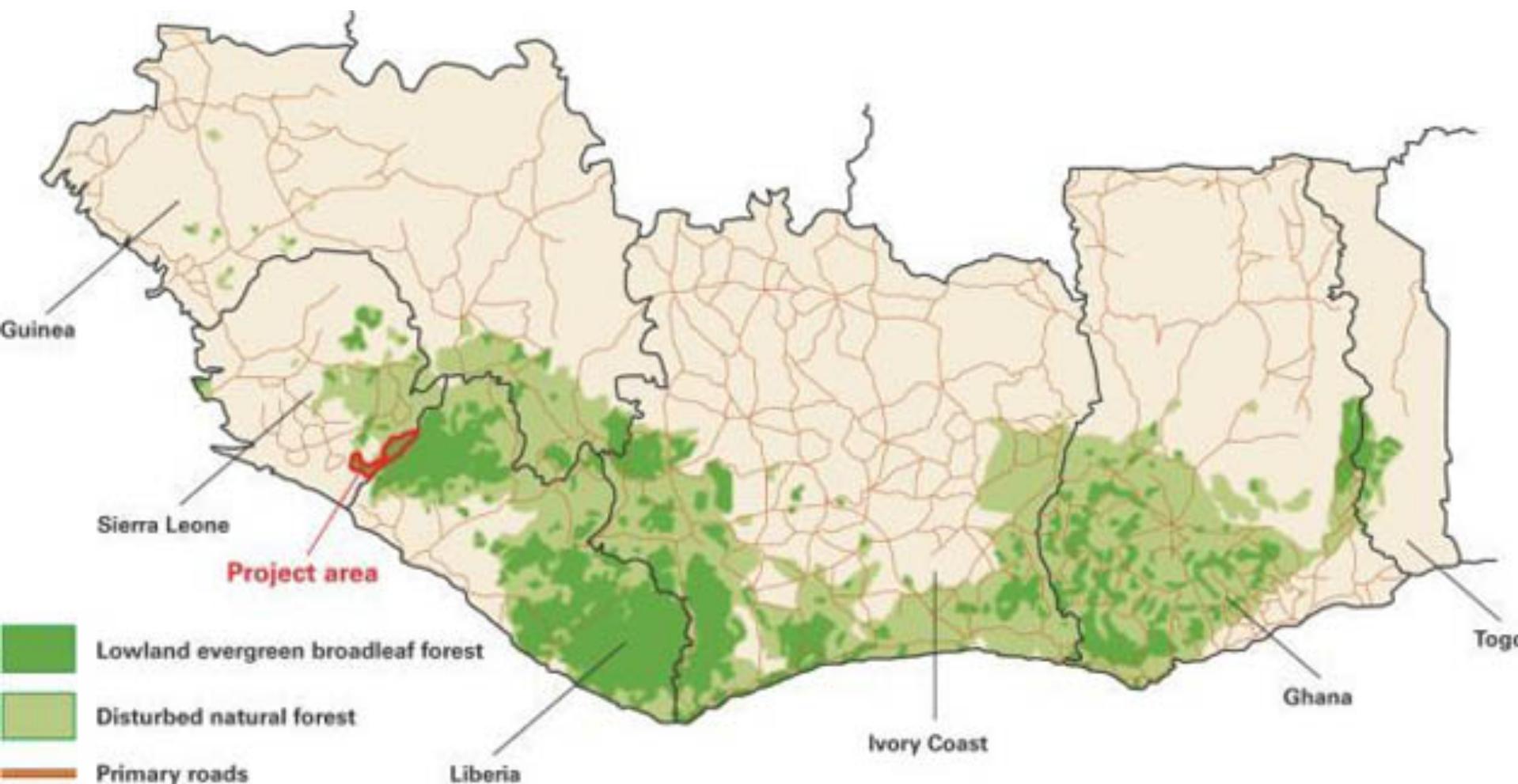
1. *Picathartes oreas* Rohw

2. *Picathartes gymnocephalus* (Temm)



Map data ©2012 Google, ORION-ME, Tele Atlas, Basemsoft, MapLink - R

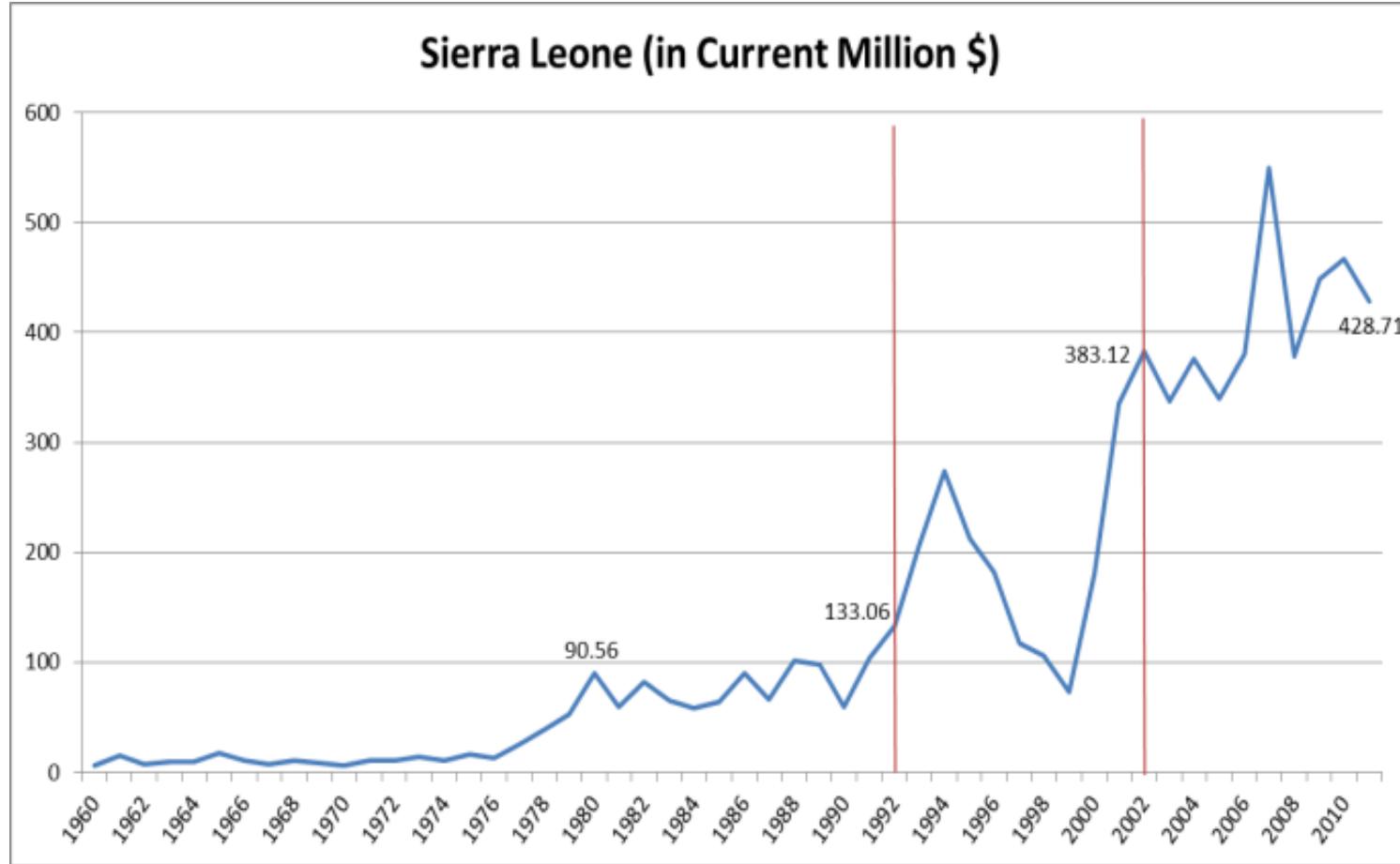
# West Africa



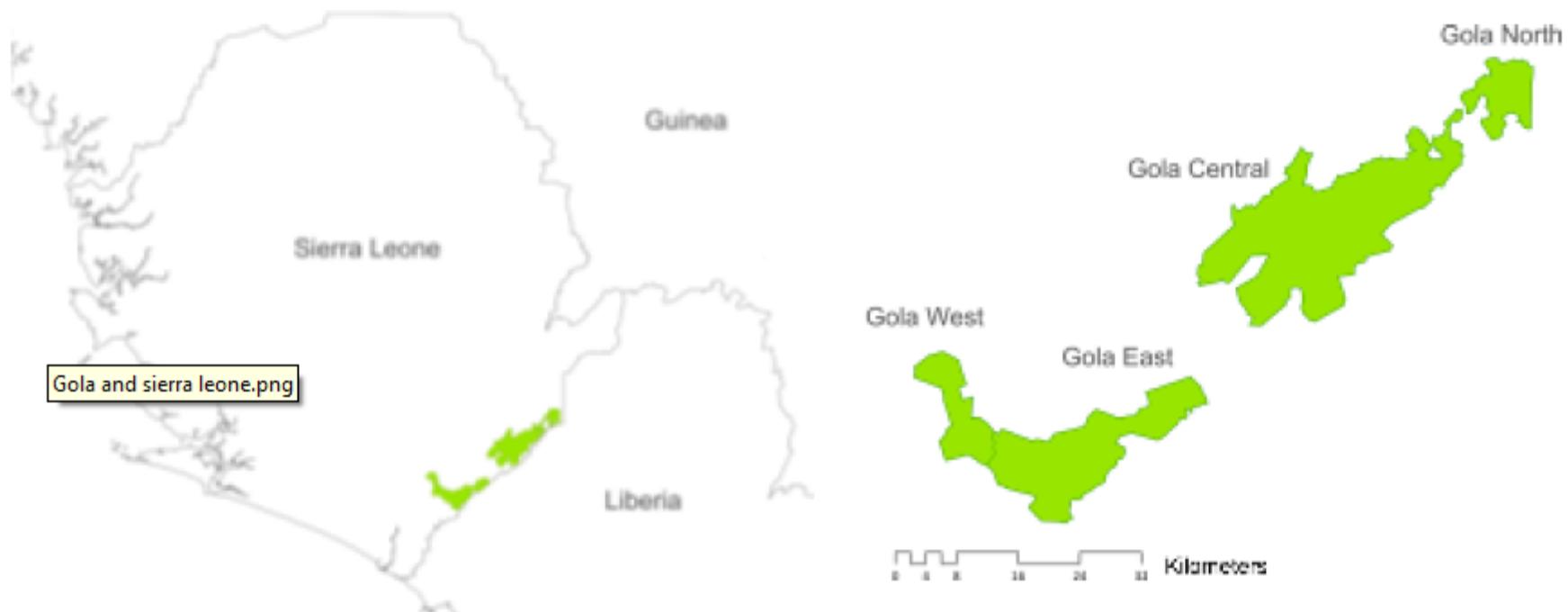
# Sierra Leone

- A small country the size of Ireland with 6 million people (2011)
- One of the poorest in the world
  - PC income about \$1/day.
  - 90% dependent on subsistence agriculture
  - Ranks 180 out of 187 on Human Development Index
- Civil war 1991-2002
- Receives significant levels of aid
  - USD 31 Million in 2011 from USAID
  - GBP 15 Million in 2011 from DFID
  - USD 24 Million in 2012 from World Bank

# Aid to Sierra Leone



# Gola Rainforest National Park





# Gola Forest



# The setting

- **No**
  - Hunting
  - Mining
  - Logging
- **Conservation and Livelihood Program in Sierra Leone**
- **Researchers**
  - Wageningen (NL)
  - Njala (SL)
  - Cambridge (UK)
  - Economists, anthropologists and ecologists

# Chiefdom Development Fund

- Policy motivation
  - How to create community **buy-in for** conservation?
  - How do we make people **better off**
  - What are the **unintended consequences** of aid?
- Two dominant aid distribution models:
  - unconditional aid (aid as a gift) vs.
  - aid-for-work programs

Question 1: does aid **work?** [does X cause Y]

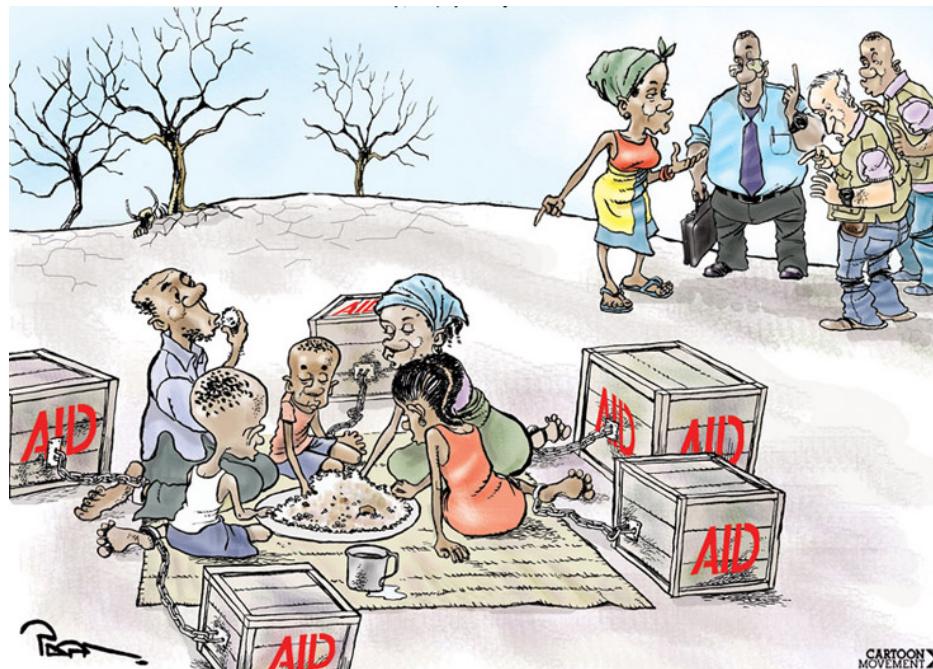
Question 2: **which type** of aid works best? [does X cause Y]

# Motivation

- Conservation impacts
  - No clear overall hypothesis
- Indirectly via
  - Enhancing goodwill & reciprocity (+) winning the hearts and minds
  - Relax binding constraints (-) chainsaws (+) off farm labour
  - Land use changes (+) if land sparing investments, (-) is labour sparing investments, so dependent on aid use

# Motivation

- Economic and social impacts
  - Any aid (windfalls, transfers, and resources) *should* boost development (+)
  - *But* there might be detrimental **social** effects of aid (-):



# Motivation

- Economic and social impacts
  - Any aid (windfalls, transfers, and resources) *should* boost development
  - *But* there might be detrimental social effects of aid:
  - ...increase conflicts as competition for resources increase
- Windfalls
  - Entitlement. Windfalls are taxable for public good (less property rights)
  - Consumed rather than invested ('wasteful use of aid' and undermining future consumption)

# Motivation

- Most evidence at macro level
- Little evidence of how windfalls impact individual behavior
  - See Paler (2012) and Caselli and Michaels (2013) for micro evidence
- In this study we look at economic, social and conservation impacts using micro-level experimental data.

# Forging partnerships

- Lots of discussions
- Expert input
- Qualitative investigations
- Piloting and testing



# Chosing the method

- How do we tackle this?
- How do we create the counterfactual?
- Upto recently: insights from marco models or other projects
  - Correlation and causation?
  - Cross country comparisons?
  - Local policy?
- Interest is at the micro level and as a pilot
- Field experiment?
- No!, maybe, *can we not do a guided randomization?*, well if...., yes!

# Design: RCT

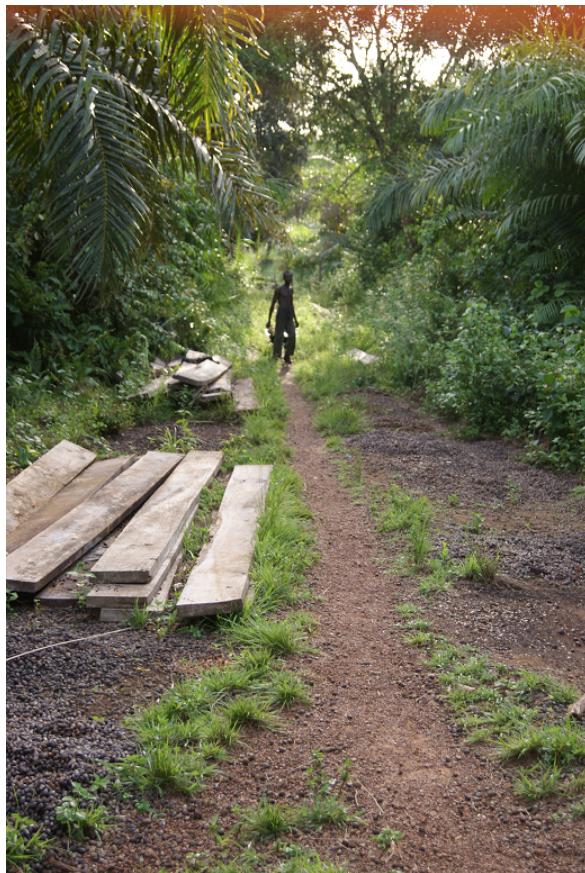
- Randomization unit?
  - Here the village level, through public lottery
- Measurement at village and household level
- $j = 1, \dots, 67$  [villages]
- $i = 1, \dots, 1650$  [respondents]
- Power issues?

# Design

- Community Development Fund

<p><b><i>“Windfall Aid”</i></b> <b>Aid Given to Households</b></p>	Treatment 1
<p><b><i>Earned Aid”</i></b> <b>Aid Given Conditional on Work</b></p>	Treatment 2
<p><b>Control group</b></p>	No aid

# Experimental Design: Aid-for-Work



# Design: vouchers

- Six vouchers per household in treatment villages
- Each voucher worth 10,000 Leones (USD 2.5)
  - USD 15/hh. Not a trivial amount of cash for our respondents
  - Aid for work: 6 days of full-time work (road improvement).

# Experimental Design: Goods

## MENU

	Description of goods		Price (Le)
<b>01</b>	<b>PALM OIL (PINT)</b>		1,200
<b>02</b>	<b>SALT (BUTTER CUP)</b>		500
<b>03</b>	<b>SUGAR (BUTTER CUP)</b>		1,500
<b>04</b>	<b>MAGGI (PKT)</b>		12,500
<b>05</b>	<b>MAMPO - SANDEGE (PKT)</b>		6,500
<b>06</b>	<b>RICE (BUTTERCUP)</b>		800
<b>07</b>	<b>RADIO</b>		75,000
<b>08</b>	<b>RUBBER BOWL (MEDIUM)</b>		12,000
<b>09</b>	<b>HOE (BIG)</b>		15,000
<b>10</b>	<b>HOE (SMALL)</b>		5,000
<b>11</b>	<b>BRUSHING KNIFE</b>		5,000

<b>14</b>	<b>IVS SEED RICE (BUSHEL)</b>		60,000
<b>15</b>	<b>CASSAVA STICKS - IMPROVED (BUNDLE, 30)</b>		10,000
<b>16</b>	<b>COFFEE SEEDLING</b>		2,500
<b>17</b>	<b>CACAO SEEDLING</b>		2,500
<b>18</b>	<b>OIL PALM SEEDLING - IMPROVED</b>		10,000
<b>19</b>	<b>GOAT HAMMER</b>		8,000
<b>20</b>	<b>FERTILIZER NPK 15/15 FOR RICE (BAG)</b>		115,000
<b>34</b>	<b>PVC ELBOW/ T</b>		12,000
<b>35</b>	<b>ROOFING NAIL (PKT)</b>		25,000
<b>36</b>	<b>NAILS 4" (PKT)</b>		9,000
<b>37</b>	<b>NAILS 3" (PKT)</b>		9,000
<b>38</b>	<b>WATER TANK (1000 L.)</b>		1,300,000
<b>39</b>	<b>WATER TANK (500 L.)</b>		800,000

# How to measure impact?

- Outcomes -> voucher survey, project survey
  - Consumption, investments
  - Individual, group
- Impact -> household survey and AFEs
  - Economic variables
    - income, savings, effort, etc
  - Social variables
    - cooperation, altruism, conflicts, etc
  - Conservation / support for NGO
    - stated behaviour, attitudes, actual behaviour, land use

<b>Village Record Sheet</b>					Village Name				
Team code					Village Code				
Enumerator	Name	C	O	D	E	Date	Day	Month	Year

1.1	Year the village was founded				
-----	------------------------------	--	--	--	--

**1.2 Village Chief Characteristics**

1.2.1	Name				
-------	------	--	--	--	--

1.2.2	Tribe [see codes]				
-------	-------------------	--	--	--	--

1 = Mende, 2 = Gola, 3 = Other (specify)

1.2.3	Year elected				
-------	--------------	--	--	--	--

1.2.4	Age				
-------	-----	--	--	--	--

1.2.5	Years of Education				
-------	--------------------	--	--	--	--

Codes

1 = none 6 = some SS

2 = some primary school 7 = completed SS

3 = completed primary school 8 = some college

4 = some JSS 9 = completed college

5 = completed JSS 10 = Arabic education

11 = other, specify

1.2.6	Land farmed	acres
-------	-------------	-------

1.2.7	Number of Wives	
-------	-----------------	--

1.5.4	Thatch	%
-------	--------	---

**1.6 Wall Materials (% of houses)**

1.6.1	Mud walls	%
-------	-----------	---

1.6.2	Mud block	%
-------	-----------	---

1.6.3	Cement	%
-------	--------	---

**1.7 What activities does the chief organize?**

1.7.1	Brushing the road	
-------	-------------------	--

1.7.2	Cleaning the well	
-------	-------------------	--

1.7.3	Community farm plot	
-------	---------------------	--

1.7.4	Other (describe)	
-------	------------------	--

**1.8 NGO projects in the past 5 years**

NGO Name	Type of activity
----------	------------------

1.8.1	
-------	--

1.8.2	
-------	--

1.8.3	
-------	--

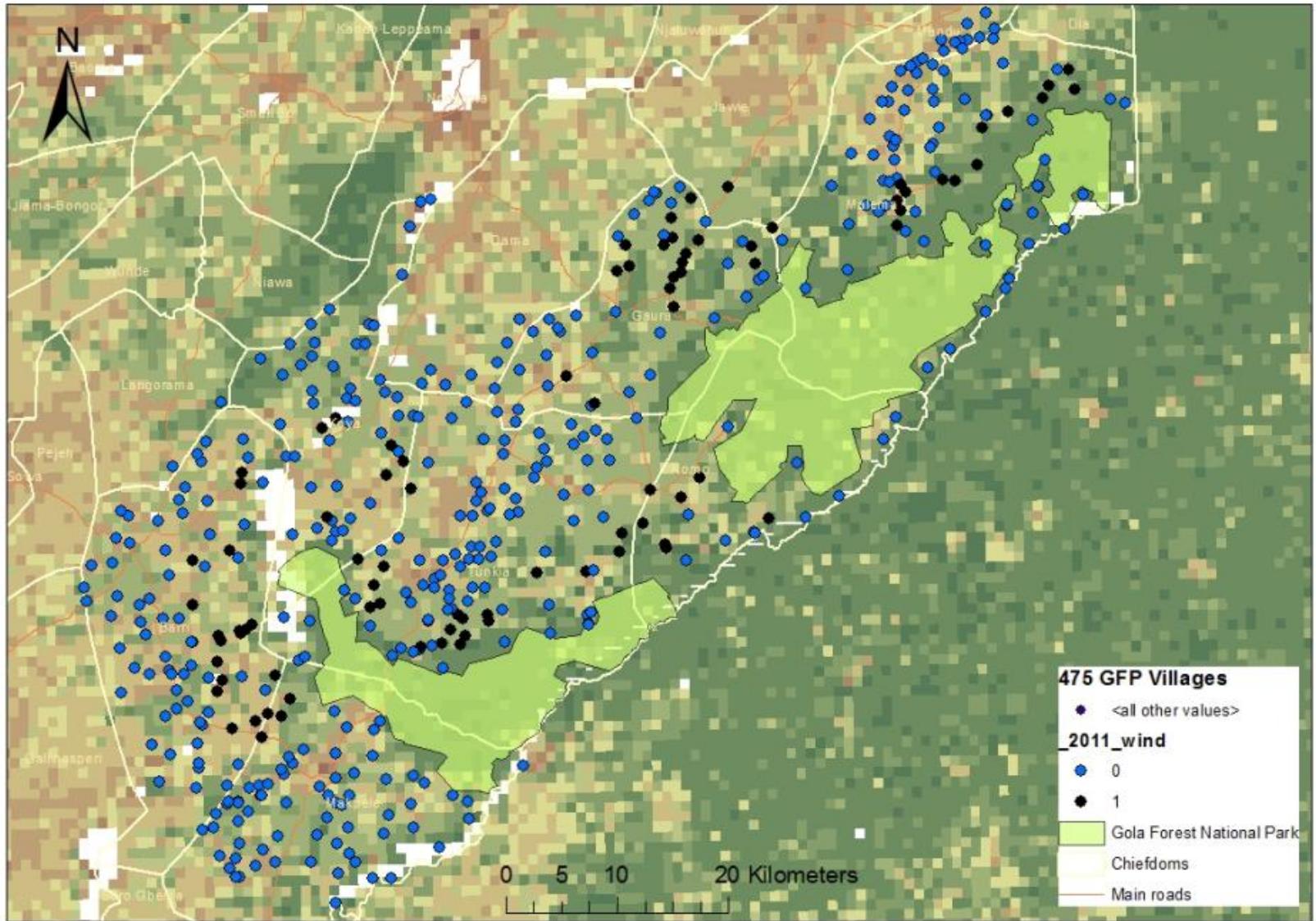
1.8.4	
-------	--

## Behavioural experiments

- Social preferences / inequality aversion

Activity #3				
<i>Please choose between the following two options, how you want money to be allocated to you and somebody else in the village:</i>				
	Option A		Option B	
	You get:	Other gets:	You get:	Other gets:
1	1,000 Le	1,000 Le	1,000 Le	2,000 Le
2	2,000 Le	0 Le	1,000 Le	1,000 Le
3	1,000 Le	0 Le	1,000 Le	1,000 Le
4	2,000 Le	3,000 Le	1,000 Le	1,000 Le
	Die roll (mark one):		Payout to this HH (one line only):	Payout to other HH (one line only):

67 study villages (22-23 villages in each group)



# Field work









# Community Development Program

- RSPB:

*“This program will dramatically reduce poverty and build strong support for conservation”*

# Timeline



January-March 2011:

1. Baseline survey
2. Explanation of intervention
  - Aid-for-Work program
  - Distribution of vouchers
3. Orders received
4. Goods delivered
5. Midline Survey
6. Endline Survey

November 2011:

May-June 2013:

# Balance

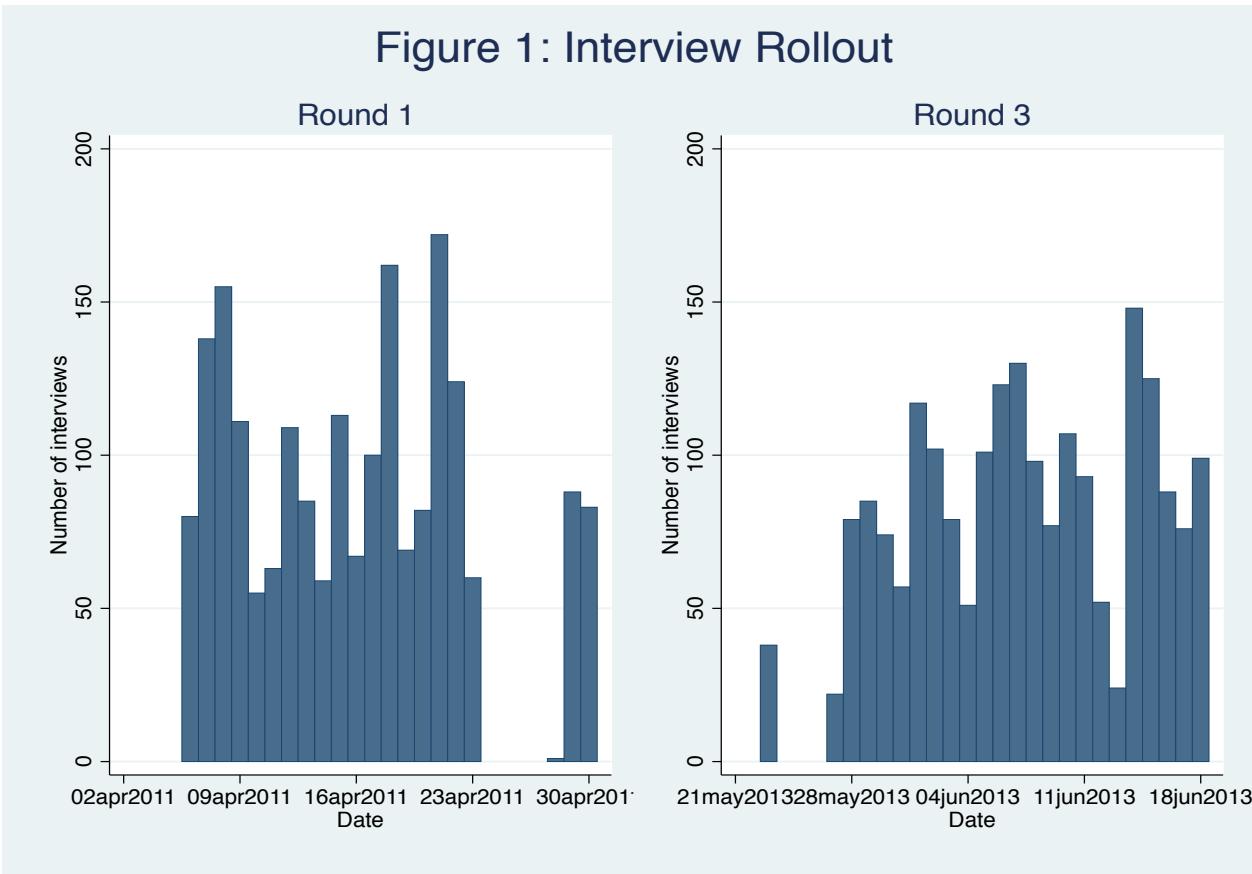
Table I. Balance Statistics

	Control		T1: Windfall Aid		T2: Aid for Work		p values		
	mean	se	mean	se	mean	se	C - T1	C - T2	T1 - T2
Age (years)	39.95	0.61	38.31	0.60	39.31	0.61	0.08	0.49	0.32
Male	0.66	0.02	0.60	0.02	0.58	0.02	0.14	0.02	0.43
Work (hours per day)	5.69	0.09	5.95	0.09	5.94	0.10	0.20	0.19	0.97
Farm size (bushels)	5.30	0.23	5.44	0.22	5.17	0.25	0.81	0.84	0.65
People are honest	0.89	0.01	0.92	0.01	0.93	0.01	0.18	0.12	0.82
Distance to HQ	5.28	0.05	4.71	0.06	4.82	0.06	0.17	0.23	0.80
Village size (hh)	49.49	1.02	40.24	0.98	43.70	1.23	0.22	0.50	0.68

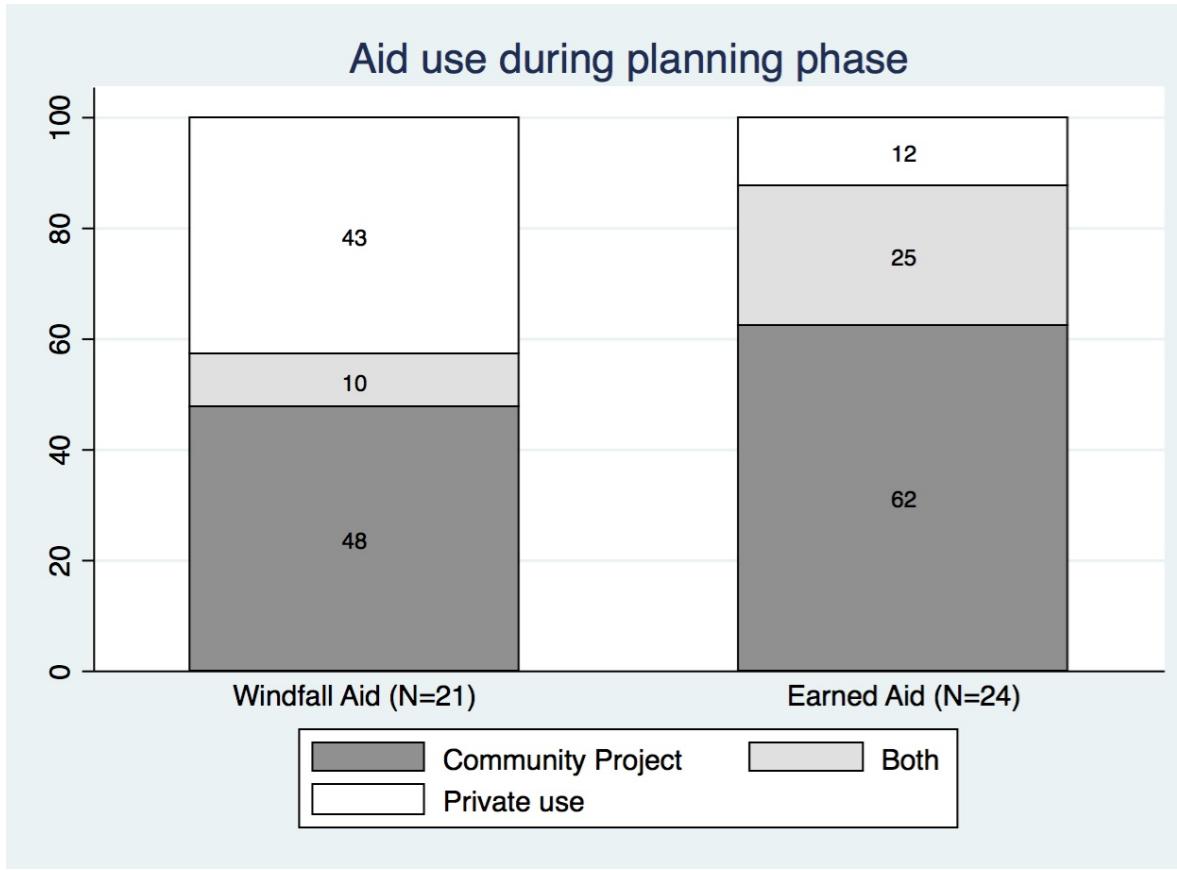
Note: Baseline data 2011. Control, n=22, 578; Windfall Aid n=22, 553; Aid for Work, n=24, 591

# Timeline

Figure 1: Interview Rollout

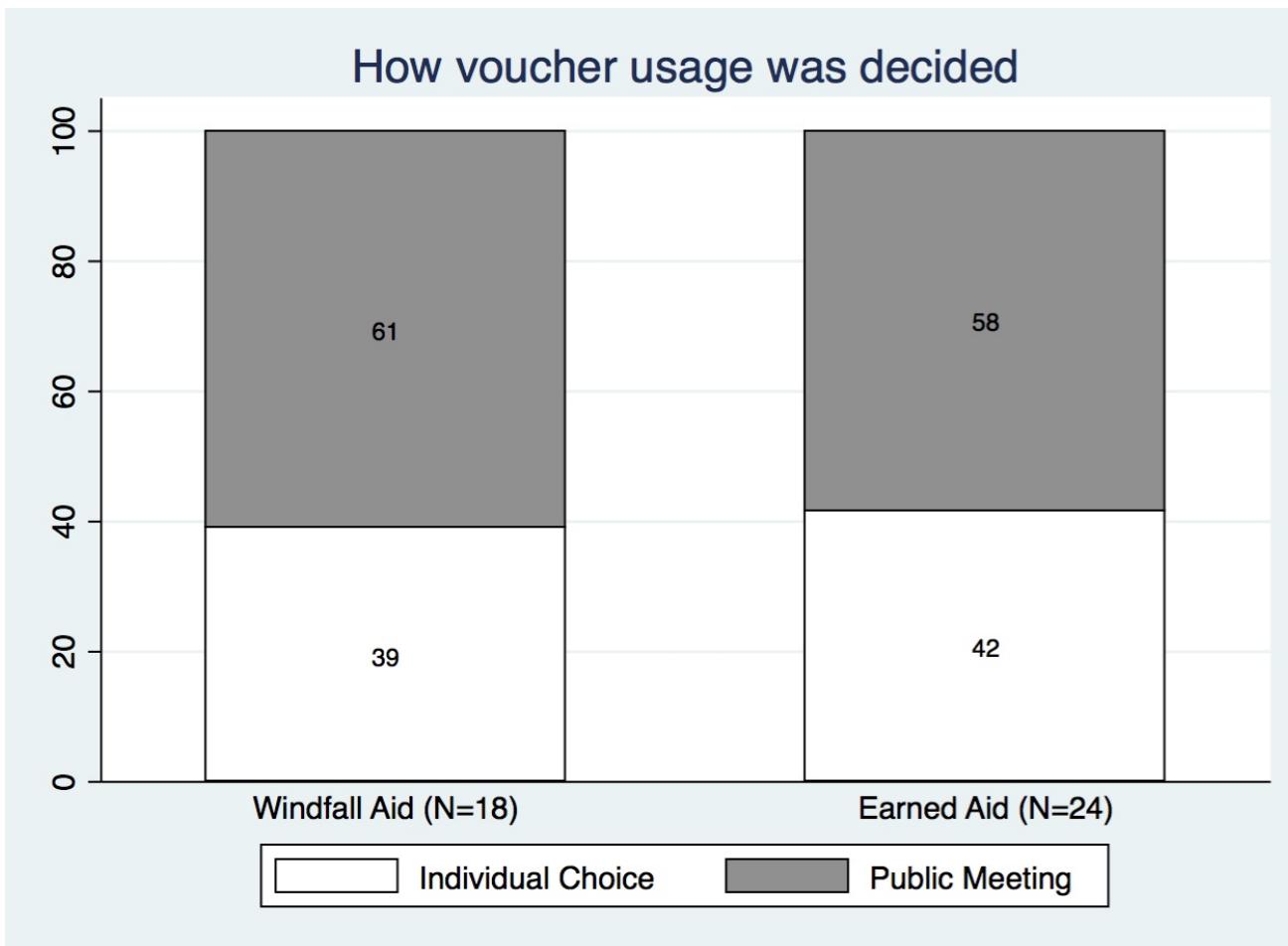


# Aid use (planned vouchers)

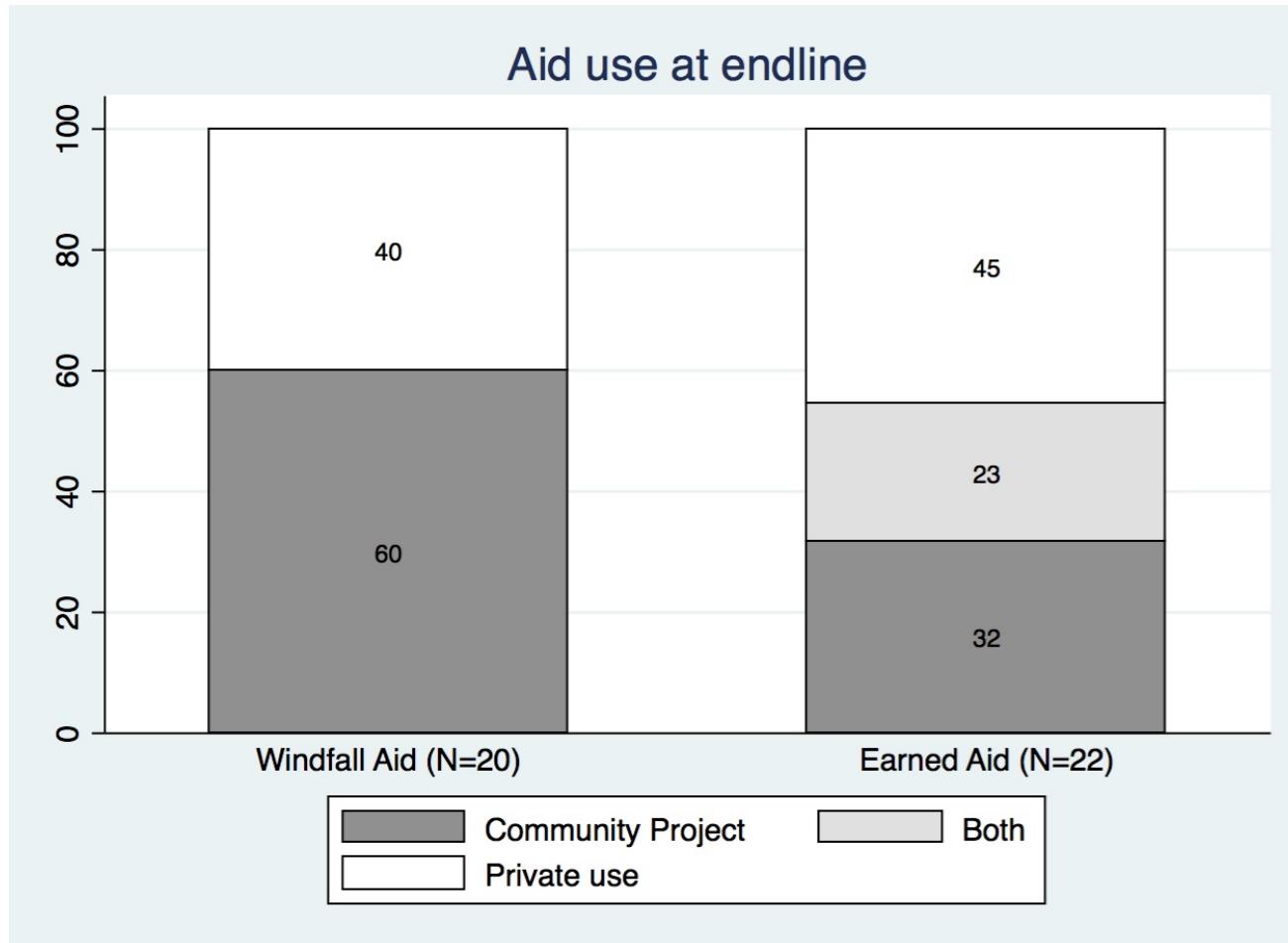


- High allocation to community goods
- No difference across treatments

# Coordination



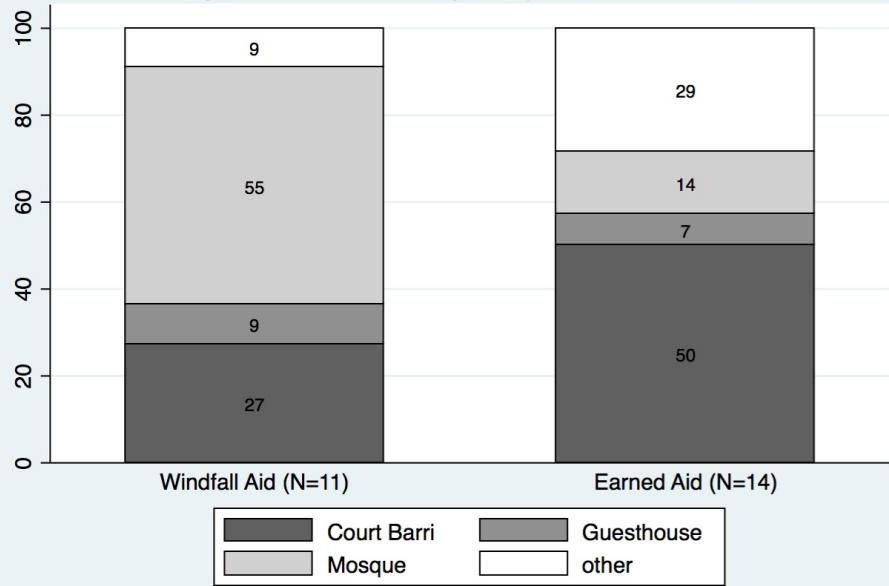
# Aid use (recall)



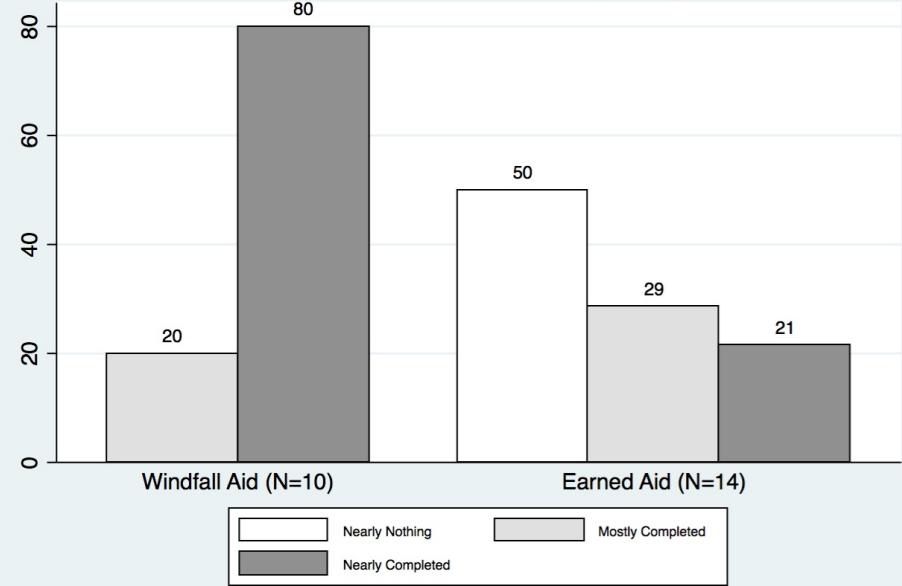
social dynamics vs “property rights” hypothesis for aid for work treatment

# Community projects

Type of Community Project (at Endline)

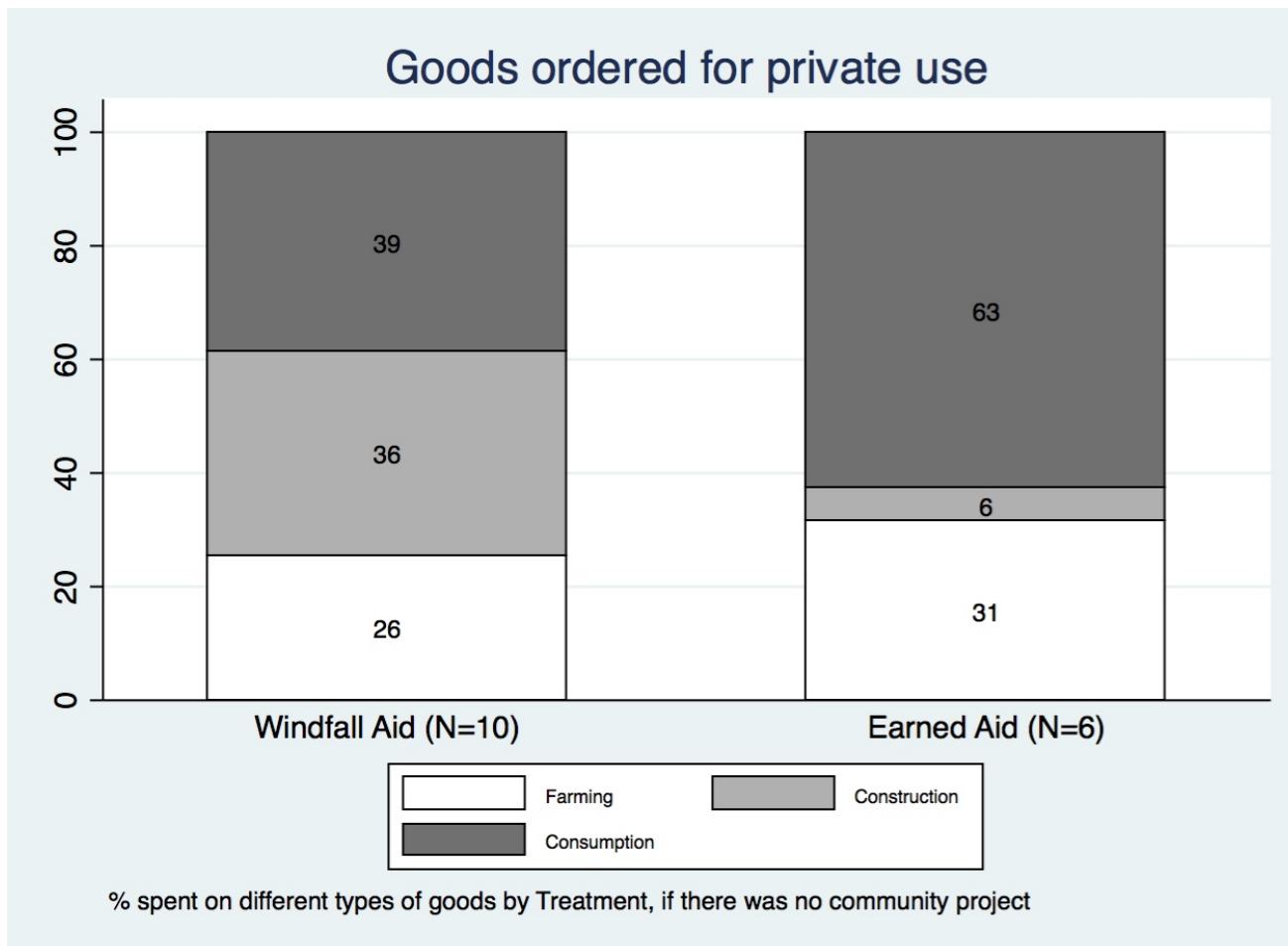


Completion of Community Project



Under windfall aid, more likely community project are (almost) finished

# Private



No support for wasteful spending of windfall

# How do we measure impact?

- Household survey and behavioural games/AFEs
  - Before and after the project
  - 1600+ respondents in 67 villages
- Survey
  - Individual variables: age, gender, education, income, ..
  - Community variables: population, inequality, market access, etc

# Outcome measures

## Outcome group A: Economic effects

- : Income effects flows (13 outcomes):
- : Income effects stock (8 outcomes):
- : Discounting AFE (1 outcome)
- : Effort (1 outcome)
- : Effort vs Leisure AFE (1 outcome)

Define groups / families

Summary of multiple outcomes within each family, using Kling et al. (2007)

## Outcome group B: Social effects

- : Honesty (3 outcomes)
- : Honesty AFE (1 outcome)
- : Sharing (2 outcomes)
- : Social capital AFE (1 outcome)
  - Inequality averse / Generous / Selfish
- : Public good provision (3 outcomes)
- : Coordination AFE (1 outcome)
- : Conflicts (4 outcomes)

- Redefine outcomes (more is better)
- Normalize (relative to control group)
- Take standardized average of multiple outcome scores
- Outcomes on control group have mean = 0, SD = 1

Coefficients represent standard deviations changes relative to control group

## Outcome group C: Attitude towards donor

- : Aid expectations (1 outcome)
- : Attitude to NGO AFE (1 outcome)
- : Attitude to NGO (8 outcomes)
- : FFE conservation behavior (3 outcomes)

# Aid impact

- Hardly any...

# Total Effects

	(1) Economic Outcomes	(2) Social Outcomes	(3) Conservation Outcomes
Windfall aid	0.030 (0.085)	0.076 (0.081)	0.108 (0.121)
Earned aid	-0.106 (0.075)	0.060 (0.076)	-0.188* (0.096)
p-value T1 vs T2	0.148	0.875	0.018
N	2251	2251	2251
# clusters	67	67	67

# Economic Outcomes

Table I. Economic Outcomes Part 1

	(1) Farm income	(2) Work income	(3) Other income	(4) Productive assets	(5) Other assets	(6) Farm size	(7) Farm productivity	(8) Hours work	(9) Effort AFE
Windfall Aid	0.007	-0.074	0.069	0.094	0.081	-0.072	0.151	-0.129*	0.069
	(0.077)	(0.086)	(0.080)	(0.060)	(0.127)	(0.080)	(0.126)	(0.071)	(0.085)
Earned Aid	-0.045	-0.014	-0.073	-0.082	-0.027	-0.144*	0.087	-0.079	-0.076
	(0.075)	(0.066)	(0.072)	(0.070)	(0.109)	(0.077)	(0.101)	(0.066)	(0.084)
p value T1 vs T2	0.512	0.480	0.059	0.008	0.316	0.226	0.642	0.413	0.069
N	1588	1588	1612	1617	1617	1605	1529	1611	1507

Robust standard errors in parentheses clustered at village level. Chiefdom dummies included. \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01.

# Economic Outcomes

Table I. Economic Outcomes Part 2

	(1) Agricultural loan	(2) Consumption loan	(3) Saving	(4) Myopic AFE	(5) Change in Inequality
Windfall Aid	-0.094 (0.069)	-0.096 (0.061)	0.111 (0.082)	-0.060 (0.074)	0.086 (0.145)
Earned Aid	-0.109 (0.066)	0.017 (0.069)	0.090 (0.083)	-0.087 (0.075)	0.123 (0.152)
p value T1 vs T2	0.821	0.091	0.803	0.736	0.789
N	1617	1617	1613	1517	1611

Robust standard errors in parentheses clustered at village level. Chiefdom dummies included. \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01.

# Social Outcomes

Table II. Social Outcomes

	(1) Trust	(2) Food sharing	(3) Honesty perception	(4) Village level: Honesty AFE	(5) Contribution to Public Goods	(6) Chief Quality	(7) Number of conflicts	(8) Respondent Selfish, based on AFE
Windfall Aid	0.061 (0.103)	0.038 (0.125)	0.085 (0.070)	0.311 (0.345)	0.060 (0.186)	0.021 (0.114)	-0.068 (0.109)	0.036 (0.140)
Earned Aid	0.085 (0.089)	0.114 (0.135)	0.116* (0.065)	0.555 (0.348)	0.138 (0.126)	-0.089 (0.117)	-0.102 (0.115)	-0.032 (0.131)
p value T1 vs T2	0.817	0.522	0.612	0.529	0.700	0.302	0.655	0.609
N	1615	1613	1616	66	1616	1551	1567	1548

Robust standard errors in parentheses clustered at village level. \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01.

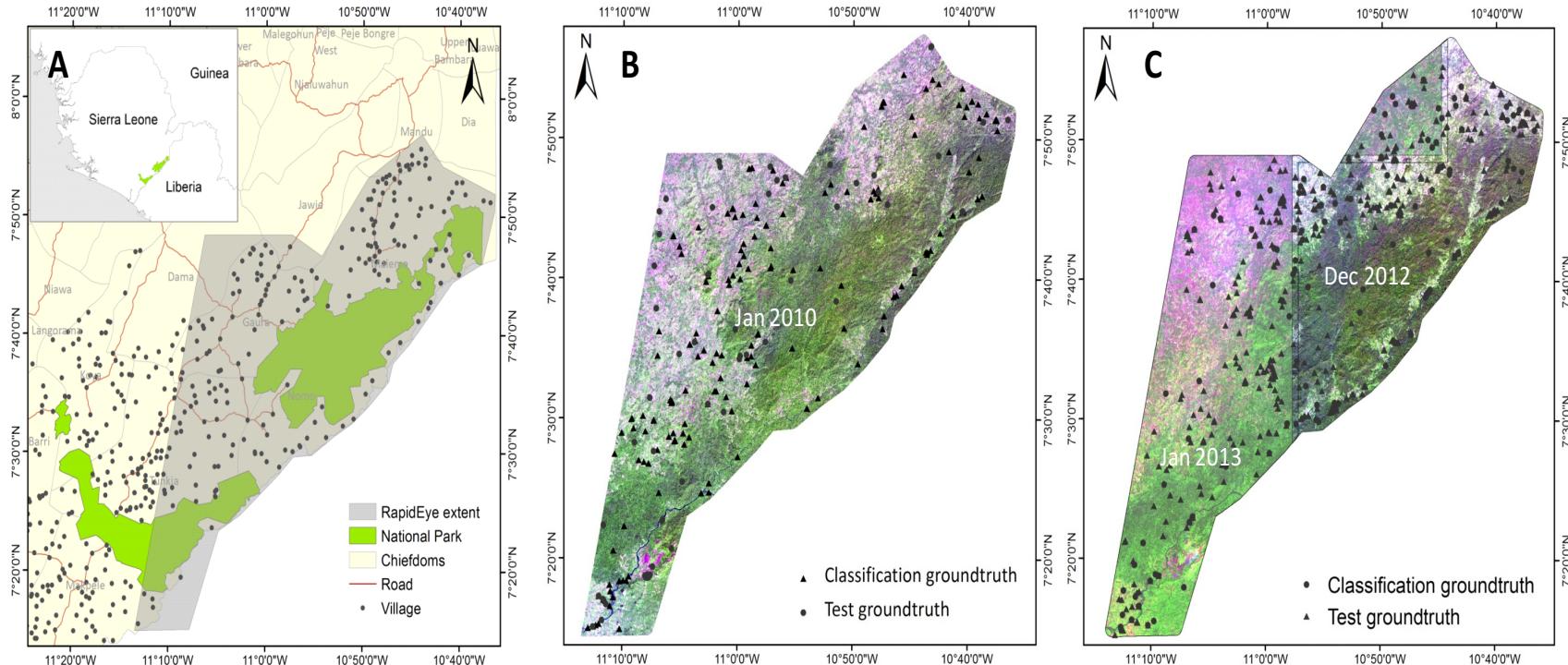
# Conservation Outcomes

Table IV. Conservation Outcomes

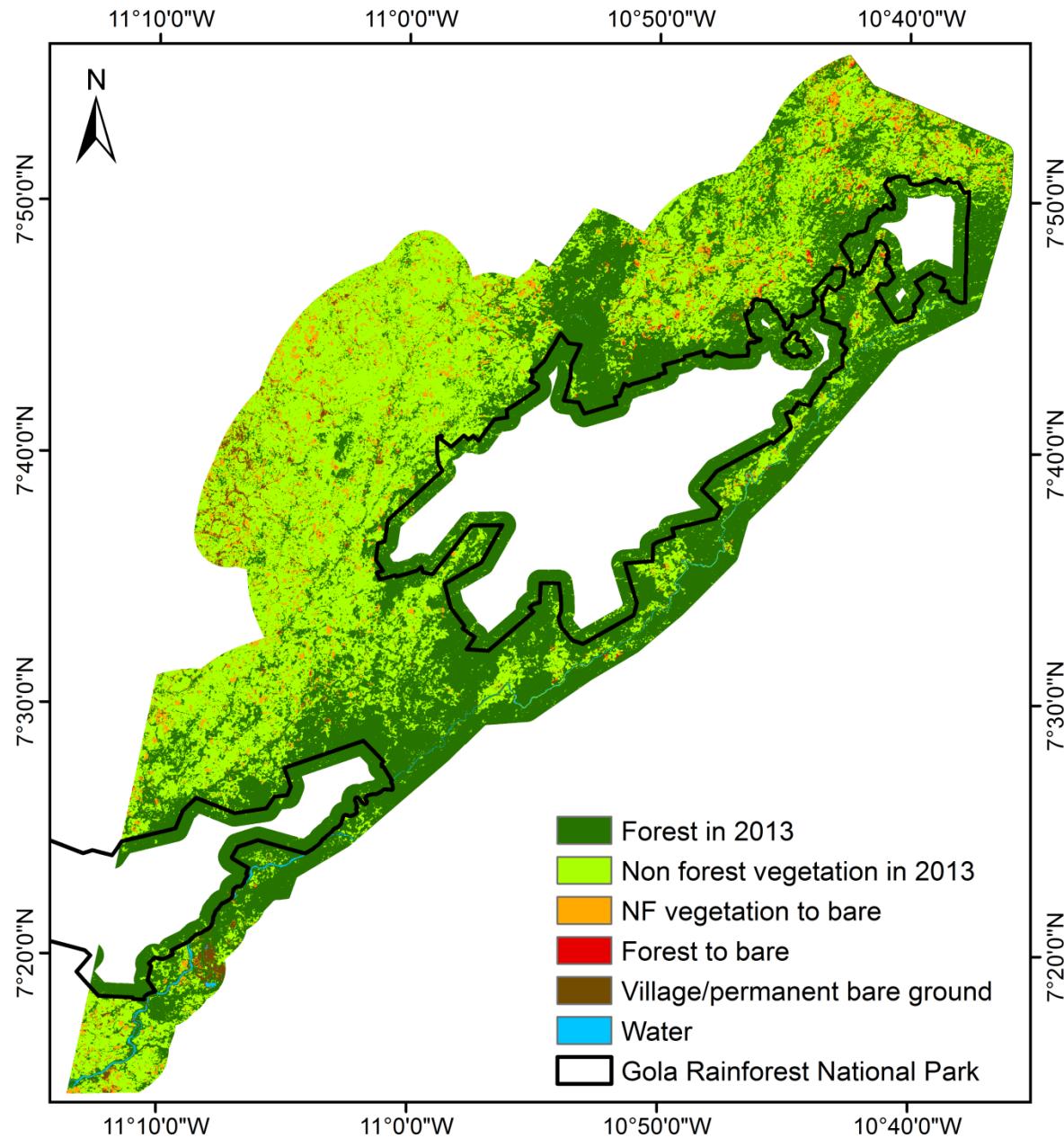
	(1) Hunting, Logging and Mining in Community Forest	(2) Allow Illegal activities in GRNP	(3) Should have conservati on association in village	(4) Healthy Community Forest is important	(5) Healthy GRNP is important	(6) I like the GRNP	(7) Dictator game GRNP	(8) Quality of land for FFE
Windfall Aid	0.276 (0.245)	0.005 (0.063)	0.058 (0.150)	-0.064 (0.131)	0.072 (0.111)	0.084 (0.078)	0.116 (0.127)	0.911 (0.998)
Earned Aid	-0.059 (0.149)	-0.001 (0.059)	-0.127 (0.147)	-0.166 (0.113)	-0.198 (0.133)	-0.166 (0.101)	0.101 (0.127)	-0.148 (0.340)
p value T1 vs T2	0.157	0.927	0.211	0.497	0.038	0.013	0.907	0.297
N	1608	1615	1617	1617	1617	1617	1540	51

Robust standard errors in parentheses clustered at village level. \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01.

# Land use changes



- Rapid eye imagery, before and after intervention



# Land use change

**Table 3. Unconditional Transfers and Land Use- RCT sample**

	Village-Polygon level (columns 1-6)						Pixel level (columns 7-12)					
	(1) land cleared	(2) land cleared	(3) fallow period	(4) fallow period	(5) farm size	(6) farm size	(7) land cleared	(8) land cleared	(9) fallow period	(10) fallow period	(11) farm size	(12) farm size
unconditional transfer	0.019 (0.026)	0.004 (0.020)	-0.332 (0.352)	-0.185 (0.522)	-0.134 (0.195)	-0.255 (0.253)	0.002 (0.026)	0.004 (0.015)	-0.346 (0.342)	-0.119 (0.434)	-0.170 (0.219)	-0.195 (0.236)
distance to road (std)		0.019 (0.014)		0.898** (0.360)		-0.218 (0.175)		0.012 (0.010)		0.726*** (0.262)		-0.216 (0.129)
distance to GRNP (std)		0.044* (0.025)		0.910 (0.652)		-0.467 (0.317)		0.039* (0.019)		0.696 (0.484)		-0.402** (0.159)
altitude (std)		0.063*** (0.011)		0.107 (0.273)		-0.249* (0.133)		0.055*** (0.008)		0.206 (0.157)		-0.126 (0.114)
slope (std)		0.003 (0.014)		0.130 (0.360)		-0.136 (0.175)		-0.003* (0.002)		-0.003 (0.036)		-0.015 (0.017)
distance to village (std)		-0.024** (0.011)		-0.116 (0.284)		0.053 (0.138)		-0.019*** (0.003)		-0.046 (0.055)		-0.002 (0.034)
population size (std)		0.018 (0.012)		-0.235 (0.299)		-0.104 (0.145)		0.019** (0.007)		-0.246 (0.207)		-0.105 (0.111)
Constant	0.119*** (0.022)	0.104*** (0.018)	6.610*** (0.307)	6.196*** (0.462)	2.822*** (0.170)	2.927*** (0.224)	0.118*** (0.023)	0.104*** (0.015)	6.402*** (0.224)	6.108*** (0.342)	2.733*** (0.195)	2.852*** (0.209)
Observations	44	39	91	39	91	39	17054	15695	17101	15695	17101	15695
Adjusted $R^2$	-0.011	0.541	-0.001	0.045	-0.006	0.099	-0.000	0.028	0.015	0.189	0.017	0.162

Columns (1)-(6) are regressions at the village polygon level. Columns (7)-(12) are at the pixel level with standard errors clustered at village-polygon level. Continuous variables are standardized using the median and interquartile range. \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01

# Conclusions

- Resources used for public goods in most treatments
  - significantly more so when windfall
- Hardly any impact
  - Community-spirit!
  - Low treatment effect (\$15 per household)
  - Power?
  - Spillover effects? Are units independent?
- Akin to major CDC programs: no institutional improvement, very little or no (sustainable) improvement in livelihoods...
  - DRC (Humphreys et al, 2015)
  - Sierra Leone (Casey et al., QJE 2012)

# Benefit of collaboration?

Mission accomplished: Gola is verified!

◀ REPLY

◀ REPLY ALL

▶ FORWARD

...



Tubbs, Nicolas <Nicolas.Tubbs@rspb.org.uk>

Thu 26/11/2015 17:33

Postvak IN

Mark as unread

To: Jeremy Lindsell <jeremy.lindsell@gmail.com>; Voors, Maarten; Andreas Kontoleon <ak219@cam.ac.uk>;

- This message was sent with high importance.
- You forwarded this message on 26/11/2015 19:01.

Dear Jeremy, Maarten and Andreas,  
I hope you're all well!  
We're not communicating this externally quite yet but wanted to inform you personally.

Today is a milestone: After our validation a few weeks ago, today, Gola has 975,024 verified credits to the VCS and CCBA, all now for sale!

After 5 challenging years and a mammoth team effort.

There are too few words to express what all this means and represents, whether it be for all of us involved personally, Gola, Sierra Leone, RSPB, BirdLife and tropical forest conservation globally!

Thank **you** for making the impossible possible, this would not have been possible without you!

Mission accomplished.

And the timing is pretty sweet to, Paris CoP and Thanksgiving!

Congratulations,  
Nicolas

- Descriptive data
- MnE within organisation
- RCT?

# Threats

- Lots of opportunities to lose control
- Control over implementation
  - Attrition (here modest)
  - Misbehaving RAs and accidents
  - Logistical challenges
  - Mis-specifying variables (no variation, no answers, not included)
  - No Pre Analysis Plan
  - Quality of implementation varies by unit (records?, control?)
  - Treatment is delivered to control group
    - By partners (1 case)
    - By other agency “*Goal built us fake toilet*”
    - Due to proximity of units: ie spillovers