Mixing Methods: Field Research, Economic Theory and the Potential for Conversation Across Disciplines

- Development economics has been the beneficiary of a rich tradition of field research.
  - short qualitative studies in which the primary interaction between the researcher and the participants is relatively unstructured conversation
  - large-scale surveys designed by and perhaps loosely supervised by economists (e.g. the LSMS model)
  - In this note I focus on a method of intermediate scale – iterative field research in which the collection of data through surveys is combined with detailed observation and conversation (sometimes with participation as well).

- This would seem to an ideal space for interactions across disciplines.

When is iterative field research sensible?

1. The question cannot be addressed using available data. Even when there is an important gap in available data, in many instances it would be more productive to augment that existing data with targeted supplementary research.

2. If the research question is sufficiently well-defined, then a conventional program of data collection might suffice. Model $\longrightarrow$ data $\longrightarrow$ survey instruments/sample design (some essential references are Deaton (1997) and Grosh and Glewwe (2000); also see the resources at *http://sticerd.lse.ac.uk/FIELDW*
In Figure 1, this approach is exemplified by Bandiera and Rasul (2002).

3. The research question is ambiguous and open-ended. It is in this circumstance that a research methodology that involves an interactive process of detailed observation, construction of economic models, data collection and empirical testing is most useful.

Example

Anderson and Baland (2003 AER).

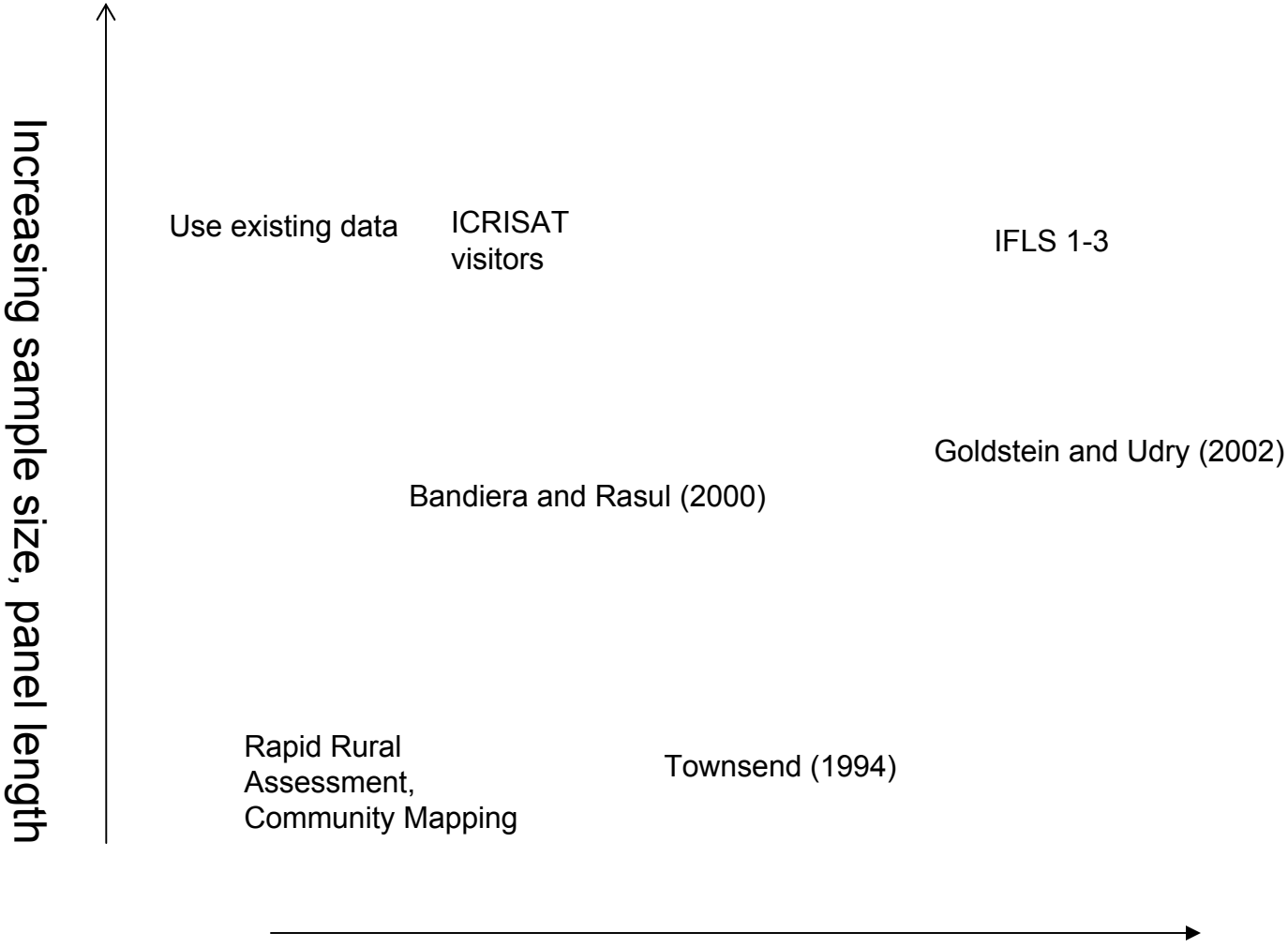

Increasing sample size, panel length
Use existing data
ICRISAT visitors
IFLS 1-3
Goldstein and Udry (2002)
Bandiera and Rasul (2000)
Rapid Rural Assessment, Community Mapping
Townsend (1994)
Increasing intensity of field research

Figure 1

1 Gender, Power and Agricultural Investment in Ghana

Outline

1. Background: Land Tenure in Africa, W. Africa and Ghana (borrowing)

2. Benchmark: Efficient fertility choices and productivity (theory)

3. Field Research

4. Preliminary Results

   (a) women have lower yields

   (b) trace to fallowing choices

   (c) political power: office holders and fallowing

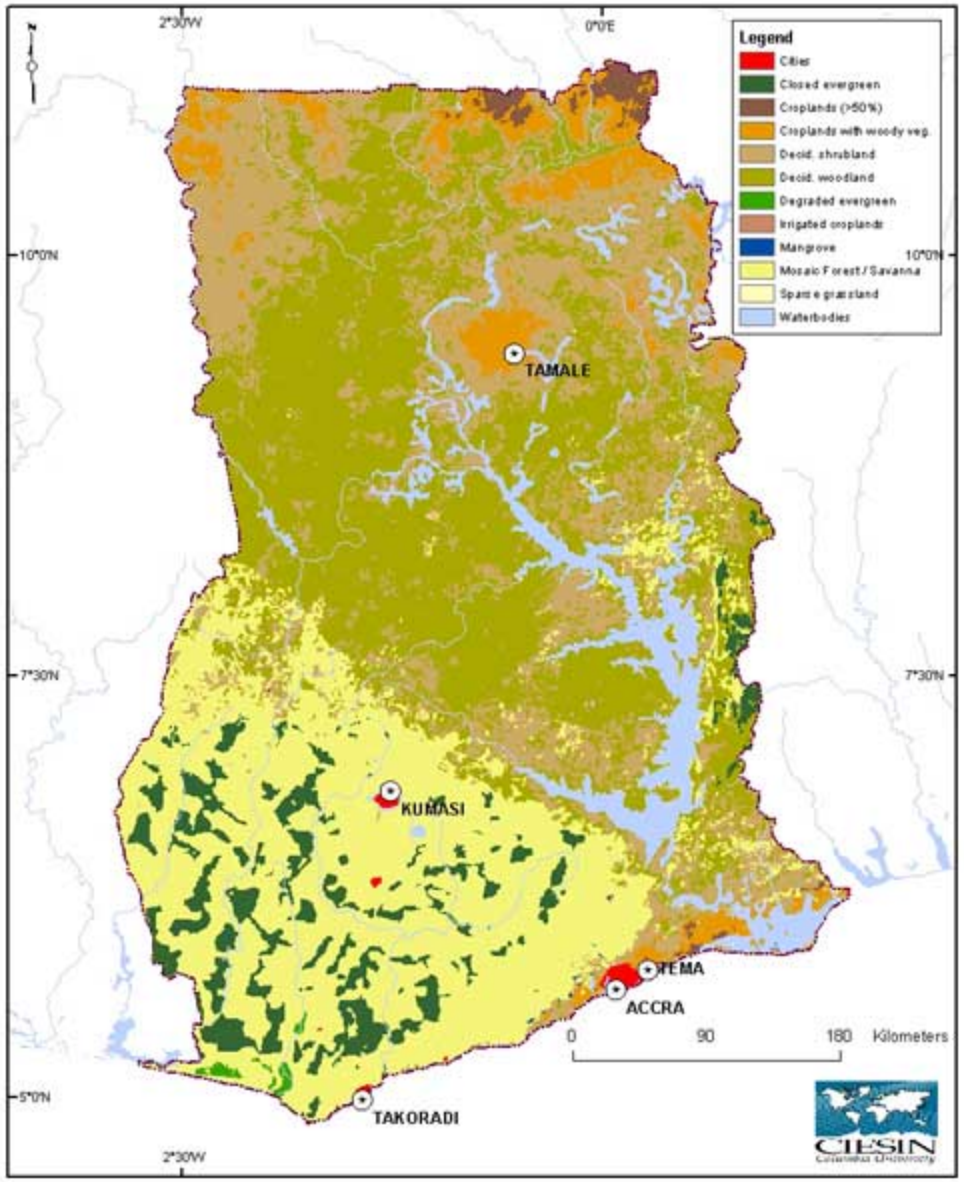
   (d) *not* related to wealth

5. Theory and Conversation: A story of need

6. Further Testing

   A political economy model

Ghana: Land Cover, 2000



2 Access to Land in Ghana (Akan)

- explicit land transactions – sales, cash rentals, and sharecropping – have become more common in southern Ghana over recent decades

- But, "the commercialisation of land transactions has not led to the consolidation of land rights into forms of exclusive individual or corporate control comparable to Western notions of private property" (Berry, NCP, 104)

- Sources of land:
  - chiefs: stool land, dispute resolution, allocation
  - lineage (abusua): right to use ancestors land

  - household, individual (matrilineal & patrilineal inheritance)

- contract types – rental, sharecropping, purchase, borrowing, "allocation"

- family-stool nexus

> Although family rights in land are formally subordinate to those of the stool, they are not to be lightly overridden. Families rent out portions of their land for cultivation, at going market rates, without seeking the chief's permission. The stool may acquire farmland ..., but if the land in question is already occupied by a local family, the family has a right to expect compensation.(Berry, CNTB, 179)

- land is subject to multiple, overlapping claims – debate has impact on use and distribution of revenue

> land ... is subject to multiple, overlapping claims and ongoing debate over these claims' legitimacy and their implications for land use and the distribution of revenue. Rather than induce or impose consensus on rules and boundaries, the formalization of land administration and processes of adjudication have added new layers of interpretation and debate, complicating rather than hardening the lines of authority and exclusion. Berry, CNTB xxi.

- Plots are virtually never lost when cultivated - it is while they are fallowed that they are lost

However, because of tenure insecurity under traditional land tenure institutions, there is no strong guarantee that the cultivator can keep fallow land for his or her own use in the future. The most feasible strategy to guarantee use rights is to use the land continuously. Thus, we hypothesize that tenure insecurity induces the shortening of the fallow period." (QAPO, 71-72)

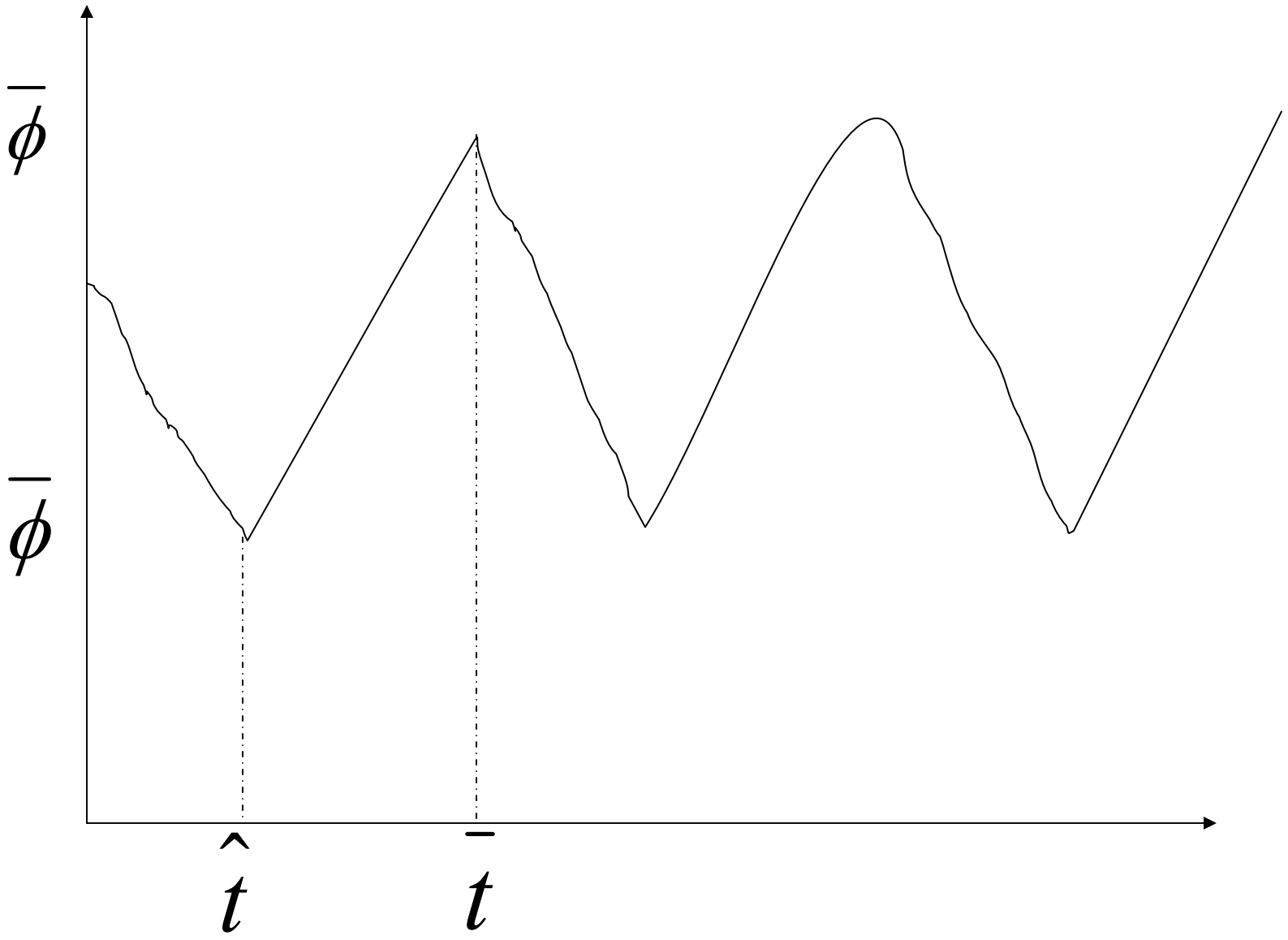
land rights are political, depend on power to mobilize support for them

the process of acquiring and defending rights in land is inherently a political process based on power relations among members of the social group. That is, membership in the social group, is, by itself, not a sufficient condition for gaining and maintaining access to land. A person's status ... can and often does determine his or her capacity to engage in tenure building. (Bassett, 20)

3 Benchmark Theory

Pareto efficient land management under fallowing systemWhat's the order of magnitude of appropriate fallow duration?

> Under forest conditions, both soil organic matter changes and the transition from thicket ot young secondary forest re-growth suggest that, in many areas, a fallow of 6-8 years is a desirable practical minimum: below this the soil will be maintained by successive fallows at a lower organic matter level and level of productivity. (Ahn, PM 1979"The optimum length of planned fallows" in HO Mongi and PA Huxley, eds Soils Research in Agroforestry Proceedings of an expert consultation, held at the International Council for Research in Agroforestry, Nairobi, Match 26-30, 1979.)


$\bar{\phi}$
$\bar{\phi}$
$\hat{t}$
$\bar{t}$

cassava pics and fallowing pic

1. Separation-type argument implies $\exists$ household-specific shadow prices for K and L (perhaps task-specific) $s.t.$ the pdv of future $\{\pi_{iht}\}$ is maximized for each plot

2. $\therefore$ all physically-similar plots w/in hhs fallowed similarly, and have similar $\{\pi_{iht}\}$ up to random location in cycle

3. optimal fallow durations and $\{\pi_{iht}\}$ depend on $\{w_{ht}\}$, $\{r_{ht}\}$. None of these is plot-specific.

4 Field Research

- 2 year rural household survey in Ghana
- Akwapim South district, Eastern Region
- Primary crops: maize, cassava, and pineapple
- around 240 hhs in 4 village clusters, 480 respondents , men and women interviewed separately
- 15 interviews, about 5-6 weeks apart

- modular structure (35 modules) with detailed ag production data

- GPS, Ph & OM

Table 1: Summary Statistics
Plot Level Data

	Men		Women	
Variable	Mean	Std. Dev.	Mean	Std. Dev.
profit x1000 cedis/hect	794.63	7175.28	-95.71	1502.33
yield x1000 cedis/hect	1788.00	7705.59	880.06	1777.64
hectares	0.39	0.43	0.21	0.17
labor cost x1000	802.20	2281.07	912.53	1196.60
seed cost x1000	285.52	782.23	133.45	259.23
ph	6.37	0.72	6.28	0.78
organic matter	3.20	1.12	3.02	0.95
last fallow duration (years)	4.26	3.37	3.66	1.74
length of tenure (years)	10.11	12.05	6.17	9.90
plot from spouse=1	0.03	0.16	0.29	0.46
plot from spouse's family=1	0.07	0.26	0.12	0.32
plot from family=1	0.60	0.49	0.41	0.49
plot from resident non-relation=1	0.20	0.40	0.16	0.36
plot from non-res. non-relation=1	0.10	0.30	0.03	0.16
plot contract: alloc family land=1	0.53	0.50	0.41	0.49
plot contract: alloc hh land=1	0.04	0.19	0.32	0.47
plot contract: cash rent=1	0.20	0.40	0.14	0.35
plot contract: sharecropping=1	0.15	0.36	0.08	0.27
plot contract: other=1	0.08	0.27	0.06	0.23

Individual Level Data

	Men		Women	
Variable	Mean	Std. Dev.	Mean	Std. Dev.
age	42.63	12.65	42.04	13.18
average assets x1000 cedis	905.85	1066.63	596.58	1023.81
years of schooling	8.50	4.84	4.80	6.01
1 if mother was a trader	0.20	0.40	0.21	0.41
1 if mother was a farmer	0.77	0.42	0.75	0.44
1 if father was a farmer	0.80	0.40	0.83	0.38
1 father was an artisan	0.10	0.30	0.07	0.25
1 if father was a civil servant	0.08	0.27	0.08	0.27
1 if father was a laborer	0.00	0.00	0.02	0.14
1 if first in village of family	0.14	0.35	0.30	0.46
yrs family or resp has been in village	64.11	39.48	48.62	39.21
1 if resp holds traditional office	0.26	0.44	0.05	0.22
number of wives of father	2.28	1.39	2.05	1.11
number of children of father	10.48	6.57	11.81	6.28
parity of mother in father's wives	1.38	0.74	1.33	0.70
1 if fostered as a child	0.60	0.49	0.79	0.41
size of inherited land	0.33	0.63	0.09	0.35
1 if mother had any school	0.05	0.21	0.15	0.36
1 father had any school	0.22	0.42	0.32	0.47

5 Initial Results: Productivity

- recall same fallow duration on plots cultivated by different individuals
- But, possible imperfect capital or labor markets, so we use a tighter test – this will be true *within* households
- i.e. marginal product of inputs equated across plots within household
- This is characterized by:

$$\pi_{it} = \mathbf{X}_{ip}\beta + \gamma G_{ip} + \lambda_{h_{ip},t} + \epsilon_{ipt},$$

with

$$\epsilon_{ipt} = \frac{\partial \pi_t}{\partial \phi}(\phi_{ip0} - \bar{\phi}_{h0}) + \nu_{ipt}$$

Table 2: Base results

	1	2	3	4
	profit x1000	yield x1000	labor cost x1000	seed cost x1000
gender	-1,043.43	-1,497.18	-262.71	-91.22
	[472.73]	[561.54]	[276.17]	[125.70]
hec decile=2	446.64	-775.44	-1,313.13	-244.97
	[576.66]	[684.99]	[336.89]	[184.37]
hec decile=3	1,039.18	-793.74	-1,734.12	-238.22
	[595.48]	[707.34]	[347.88]	[182.15]
hec decile=4	1,135.09	-331.22	-1,556.35	-169.9
	[597.12]	[709.30]	[348.84]	[165.58]
hec decile=5	656.62	-1,188.55	-1,721.02	-345.87
	[588.40]	[698.94]	[343.75]	[168.38]
hec decile=6	810.67	-1,083.07	-1,821.08	-209.65
	[586.80]	[697.03]	[342.81]	[159.66]
hec decile=7	875.33	-1,369.88	-2,079.89	-277.51
	[590.16]	[701.03]	[344.78]	[170.48]
hec decile=8	438.97	-1,816.14	-2,074.95	-232.3
	[599.90]	[712.60]	[350.47]	[182.80]
hec decile=9	249.13	-2,733.71	-2,783.99	-298.64
	[638.96]	[759.00]	[373.29]	[178.01]
hec decile=10	-315.67	-2,847.31	-2,278.36	-587.54
	[700.07]	[831.59]	[408.99]	[190.82]
soil type=loam	-174.76	-249.94	-105.46	-7.57
	[400.06]	[475.21]	[233.72]	[103.42]
soil type=clay	-511.77	-101.82	329.79	108.4
	[467.71]	[555.58]	[273.24]	[117.99]
ph	-259.79	-118.68	200.78	-102.67
	[249.19]	[296.00]	[145.58]	[59.12]
organic matter	-15.94	19.09	73.05	-46.63
	[151.08]	[179.46]	[88.26]	[37.65]
topo: midslope	299.14	96.63	-295.81	499.03

	[1,595.93]	[1,895.74]	[932.35]	[600.76]
topo: bottom	663.23	358.48	-228.79	279.67
	[1,584.04]	[1,881.62]	[925.41]	[593.65]
topo: steep	2.73	460.28	282.27	389.05
	[1,625.75]	[1,931.16]	[949.77]	[609.07]
Constant	1,209.25	3,234.46	1,253.24	949.85
	[2,186.75]	[2,597.55]	[1,277.51]	[702.08]
Observations	614	614	614	336
R-squared	0.81	0.52	0.9	0.89

all regressions include household-year fixed effects
standard errors in brackets
hectare decile=1, soil type=sand, topo=uppermost (level) excluded

Table 3: Robustness of base result

	1	2	3	4
	OLS	OLS	spatial GMM	spatial GMM*
	dep variable = profit x1000 cedis/hectare			
sch yrs	-61.9			
	[81.88]			
gender	-1,233.99	-858.66	-1043.43	-1666.78
	[570.43]	[369.05]	[299.87]	[373.79]
ph	-153.47		-259.79	-346.83
	[276.30]		[88.51]	[75.62]
om	-45.44		-15.94	154.97
	[159.16]		[52.27]	[42.95]
Observations	558	888	614	575
Fixed Effects	hh-yr	hh-yr	hh-yr	household-year and spatial**

standard errors in brackets
plot controls and constant included in every regression
* spatial standard errors calculated as defined in footnote 5
** spatial fixed effects for unobserved characteristics in the plot neighborhood (250m)

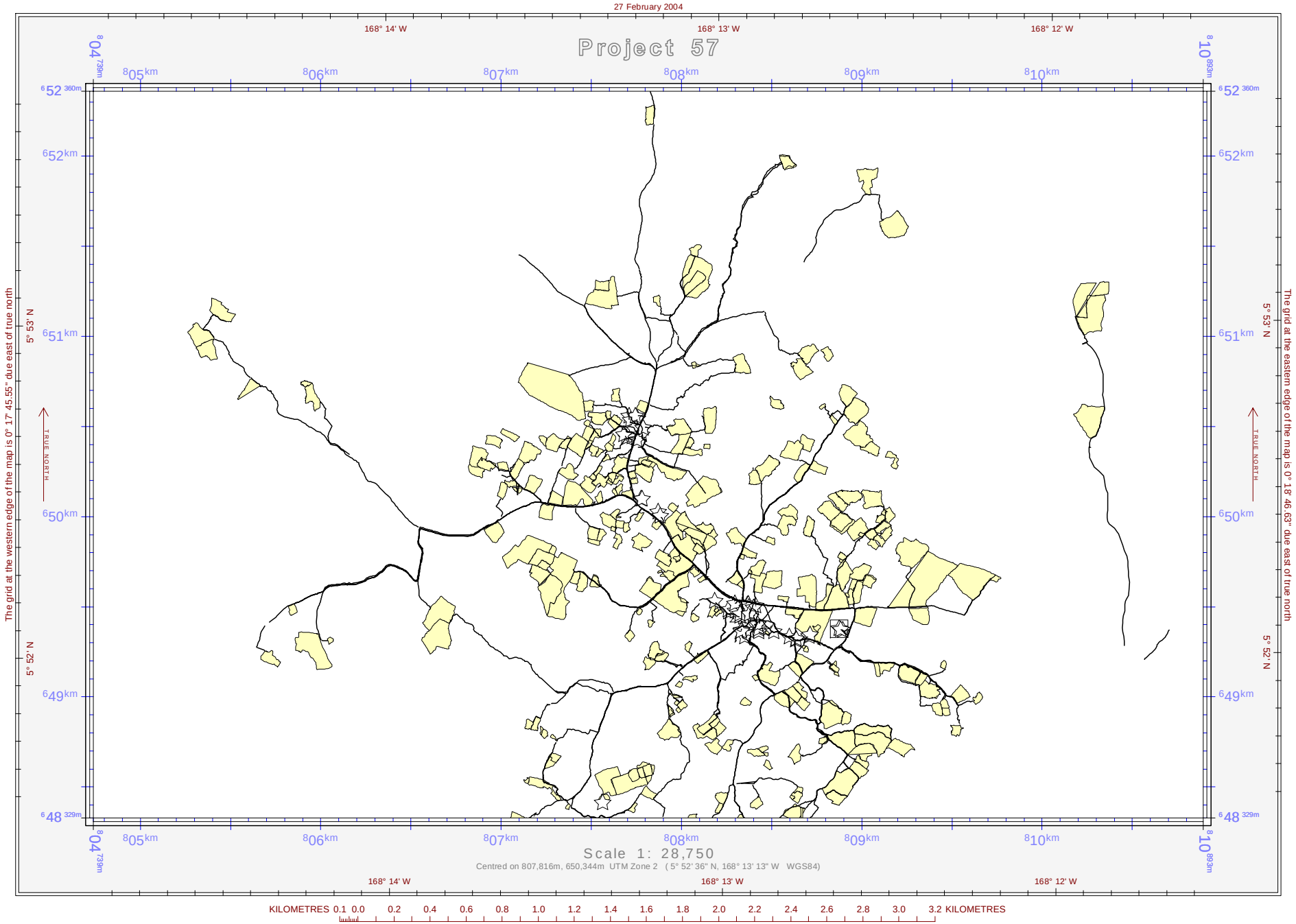

27 February 2004
Project 57
168° 14' W
168° 13' W
168° 12' W
804 739m
805km
806km
807km
808km
809km
810km
810 893m
652 360m
652km
651km
650km
649km
648 329m
The grid at the western edge of the map is 0° 17' 45.55" due east of true north
The grid at the eastern edge of the map is 0° 18' 46.63" due east of true north
5° 53' N
5° 52' N
TRUE NORTH
Scale 1: 28,750
Centred on 807,816m, 650,344m UTM Zone 2 (5° 52' 36" N, 168° 13' 13" W WGS84)
KILOMETRES 0.1 0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0 3.2 KILOMETRES

Table 4a: Profits and fallow duration

	1 OLS profit x1000	2 IV profit x1000	3 first stage fallow duration (years)
fallow duration	163.12	421.41	
	[47.88]	[225.67]	
gender: 1=woman	-356.19	19.28	-0.58
	[397.00]	[537.24]	[0.67]
1 if first of family in town			-0.44
			[0.66]
/ears family/resp lived in village			-0.01
			[0.01]
1 if resp holds trad. office			3.91
			[1.11]
number of wives of father			0.39
			[0.35]
number of father's children			-0.08
			[0.07]
parity of mom in father's wives			-0.44
			[0.41]
1 if fostered as child			0.86
			[0.74]
size of inherited land			-0.29
			[0.63]
1 if mother had any education			-0.87
			[1.17]
1 if father had any education			-0.13
			[0.80]
Observations	760	755	755
Fixed Effects	hh-yr	hh-yr	hh-yr
F-test of instruments			F(10,415) =2.10

standard errors in brackets
plot controls and constant included in every regression

Table 4b: Profits and fallow duration

	4 IV profit x1000	5 first stage fallow duration (years)
fallow duration	314.07	
	[182.00]	
gender: 1=woman	143.06	-0.43
	[426.13]	[0.54]
1 if first of family in town		0.29
		[0.64]
years family/resp lived in village		0.01
		[0.01]
1 if resp holds trad. office		1.95
		[0.80]
number of wives of father		0.52
		[0.23]
number of father's children		-0.02
		[0.05]
parity of mom in father's wives		-0.42
		[0.36]
1 if fostered as child		0.35
		[0.61]
size of inherited land		-0.52
		[0.57]
1 if mother had any education		0.96
		[1.05]
1 if father had any education		-0.98
		[0.63]
Observations	700	700
Fixed Effects	hh-yr & spatial	hh-yr & spatial
F-test of instruments		F(10,381) =2.49

standard errors in brackets
plot controls and constant included in every regression

Table 5: Fallow and credit constraints

	1 IV last fallow dur	2 first stage avg assets x1000 cedis
average assets x1000 cedis	0	
	[0.00]	
gender: woman=1	-1.01	-2.37
	[1.10]	[126.38]
1 if first of family in town	-1.18	537.51
	[0.99]	[106.60]
years family/resp lived in village	-0.03	7.96
	[0.01]	[1.59]
1 if resp holds trad. office	2.77	-68.91
	[1.79]	[185.27]
number of wives of father	0.12	416.23
	[0.63]	[59.27]
number of father's children	-0.05	-44.74
	[0.10]	[9.61]
parity of mom in father's wives	-0.51	156.64
	[0.63]	[61.46]
1 if fostered as a child	1.05	-983.67
	[1.28]	[132.66]
size of inherited land	-0.02	140.36
	[1.18]	[133.90]
1 if mother had any school	-0.48	1,546.91
	[1.72]	[232.34]
1 if father had any school	-0.54	-969.84
	[1.40]	[160.69]

1 if mother was a trader		1,041.00
		[304.51]
1 if mother was a farmer		-1,982.73
		[346.50]
1 if father was a farmer		4,070.56
		[500.44]
1 if father was an artisan		971.38
		[423.82]
1 if father was a civil servant		4,283.37
		[516.50]
Observations	486 household-year	486 household-year
Fixed Effects		
F-test of instruments		F(5,212)=36.18

standard errors in brackets
all regressions include plot controls and a constant
excluded categories: father other occupation, mother other occupation

6 Theory and Conversation

Focus groups

- organization

- main conclusion: land allocation based on need, and the adverse signal of fallowing

Toward a Model

set up:

- individual autonomous from hh
- each individual has a plot of land & off-farm opportunity
- return to off-farm is private information
- two periods (years)
- risk neutral, no discounting
- individual has endowment of T units of time, and control over 1 unit of land

- c be amount of time cultivating the plot (choose units of area s.t. c is amount of cultivated in c units of time)

  so $(1 - c)$ of plot is fallowed

- land cultivated each year has yield 1, fallow land yields $y > 2$ next year

- off farm returns

  - high type w_h with $y > w_h > 1$
  - low type $w_l < 1$

high type's income over both periods:

$$w_h(T-c)+c+(1-c)y+(T-(1-c))w_h.$$

on her own, chooses to fallow in period 1, has income:

$$w_h(2T-1)+y$$

low types's income:

$$w_l(T-c)+c+(1-c)y+c+(T-1)w_l,$$

again would choose to fallow in period 1, with income:

$$w_l(2T-1)+y.$$

–> they look identical to outsiders

Lineage head allocates land to max his own income, subject to incomes of lineage members being sufficiently high. Low type's income is too low.

If LH has full information he allocates additional land to low types. Low type's income becomes:

$$w_l(T-c)+c+(2-c)y+c+(T-2)w_l,$$

and once again the low type chooses $c=0$. She now achieves an income of:

$$w_l(2T-2)+2y.$$

But, LH does not have full information. Must introduce contract to separate, uses cultivation requirement that c cultivated in period 1.

IC constraint of high type:

$$w_h(2T-1)+y \geq w_h(T-c)+c+(2-c)y+(T-(2-c))w_h$$

or

$$c \geq \frac{y-w_h}{y-1} \equiv c_h.$$

so at some critical level of required cultivation, high type refuses land because of off-farm income sacrifice

low type will benefit from additional land w/cultivation requirement so long as:

$$w_l(2T-1)+y < w_l(T-c)+c+(2-c)y+c+(T-2)w_l$$

or

$$c < \frac{y-w_l}{y+w_l-2} \equiv c_l.$$

as long as cult req not too high, low type will accept the additional land ($c_h < 1 < c_l$, because $w_l < 1$) even with low fallowing

–> given these info constraints, the constrained efficient mechanism is for LH to offer land with the cultivation requirement c_h.

-well connected individuals can convey otherwise private info, these folks optimally fallow land

*key empirical implication of this model – all plots treated the same by individual, regardless of source

Table 7: Determinants of Fallowing, With Individual Fixed Effects

	1 Last Fallow Duration (years)		2 Last Fallow Duration (years)	
	Parameter Estimate	std	Parameter Estimate	std
Female				
Direct Effect:				
Land from Spouse	-0.73	0.39	-1.03	0.35
Land from Spouse's Family	0.69	0.44	0.41	0.55
Land from Resident Non-Relation	-0.46	0.20	-0.94	0.23
Land from Non-Resident Non-Relation	-0.19	0.32	-0.80	0.43
Office Holder times:				
Land from Spouse			3.85	0.51
Land from Spouse's Family			0.38	0.74
Land from Resident Non-Relation			4.03	1.00
Land from Non-Resident Non-Relation			2.32	0.77
	422		422	

Omitted Category: Direct Effect of Family Land
All specifications include: full set of plot characteristics, full set of family
Household-year and spatial fixed effects

Observations	728	728	728	728
Fixed Effects	household-year	ıusehold-ye	household-year	ıusehold-year

standard errors in brackets
all regressions include plot controls and a constant
excluded categories: allocated family land (contract) land from family (source)

Table 7b: Determinants of Fallowing, With Individual Fixed Effects

	3		4	
	Last Fallow Duration (years)		Last Fallow Duration (years)	
	Parameter Estimate	std	Parameter Estimate	std
Female				
Direct Effect:				
Land from Spouse	-1.04	0.34	-0.71	0.39
Land from Spouse's Family	0.56	0.47	0.54	0.51
Land from Resident Non-Relation	-0.61	0.22	-0.78	0.19
Land from Non-Resident Non-Relation	-0.68	0.42	-0.30	0.31
Family Office Holder times:				
Land from Spouse	3.82	0.51		
Land from Resident Non-Relation	2.25	0.49		
Land from Non-Resident Non-Relation	2.28	0.77		
Village Office Holder times:				
Land from Spouse			0.19	0.78
Land from Resident Non-Relation			4.67	1.32
	422		422	

Omitted Category: Direct Effect of Family Land
full set of family background variables.
Household-year and spatial fixed effects

Observations	728	728	728	728
Fixed Effects	household-year	usehold-ye	household-year	usehold-year

standard errors in brackets
all regressions include plot controls and a constant
excluded categories: allocated family land (contract) land from family (source)

Plots on which cultivation was observed	1150		
cultivation stopped	270		
Fallowed	176		
End of Contract or transferred out	51		
Taken	28		
of taken			
from officeholders	2	0.97%	as a proportion of
from nonofficeholders	26	2.76%	plots cultivated

7 A New Interpretation

1. System emerges as coordination device under land abundance: no real cost.

2. Over time, flexibility yields benefits (expulsion)

3. Huge cost in terms of productive efficiency with scarce land

4. *Not* second-best response to imperfect information

5. Political leadership extracts current rents from system by bestowing favors in exchange for political support

6. Rents could be increased by transforming tenure into freehold. Why not? Benefits from this transformation spread far into future. With imperfect capital markets, farmers can't pay up front, nor can they commit to future stream of payments.

- results align with "the conceptualization of land tenure as a political process"

- rights depend on farmers ability to mobilize support for a plot

- security of tenure depend upon position in political and social hierarchies

- But, even conditional on position, security depends upon circumstances through which farmer came to access plot

7.1 But, the interpretation is different...

- Bassett, indigenous systems are not obstacles; "There is a need to transcend [the WB] technocratic and theological approaches that posit a direct link between freehold tenure and productivity"

- Berry

- Complex multiple and overlapping rights to land *are* associated with barriers to investment in land fertility

- individuals who are not central to networks of social and political power are in danger of losing land while fallow

- strong gender dimension, because women are not in positions of power

8 Conclusion

Iterative field research provides an opportunity, within the context of a unified project, for a flow of work between different research methods: detailed qualitative observation and conversation, theorizing, collection of data through surveys, statistical analysis.

Goal: blur the boundaries, lower costs

- outlets for discussions of field research methods,

- strengthen our research collaborations in developing countries,

- intensify our work with data collection agencies

- greater collaboration between major centers of graduate education