

Need for speed: the connecting and disconnecting powers of motorized transport in rural Indonesia



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Progress since our last meeting



Rationale for the current research



Most recent findings



Ethiopia

Social networks in rural
areas
of developing countries



The role of mobile
phones



The role of motorized
transport

Indonesia



Most people in developing countries
are employed the agricultural sector; 80% in Ethiopia

Territorialism, ethnic segregation, low literacy, low exposure to media, inefficient institutions , **insufficient access to ecological information**

→ uninformed agricultural practices leading to ecological degradation and insufficient food productivity



High expectations on mobile phones

- ICT expected to compress time and space and transform local social networks (Illahine and Sherry 2012)
- Mobile phone is the only phone
- Massive expansion



Not so high expectation on
motorized transport?


Economic importance of transportation
infrastructure widely accepted

but

no specific interest in the role of motorized
transport in information diffusion or creation
and maintenance of social networks across
rural regions of developing countries?

Negative local and global environmental
impacts well-documented





Importance of intra-communal ties and worries regarding new technologies and social capital

Importance of face-to-face contact for 'sense of community'.
Density and frequency of interactions necessary for collective action.
(Glynn 1981; Nasar and Julian 1995; Grannis 2009; Whalen et al. 2012)

Walking enables spontaneous social contact which promotes public respect and trust; and even health
(Leyden 2003)

New transportation and communication technologies can destroy the "community" or "social capital" by decreasing interactions within the neighborhoods (Putnam..)

Disconnecting effects of roads in dividing urban neighbourhoods
(Grannis 1998)




Importance of extra-communal ties

Evidence shows the importance of ties reaching outside of one's clique for accessing valuable, original, diverse, and fresh information (Granovetter, Burt..)

Both intra- and inter-communal ties are necessary for development (Woolcock..)

Internal cohesion can come “at the expense of external relations” and cause “wider social fragmentation” (Forrest and Kearns 2001)

Raising children in disconnected segregated communities perpetuates intolerance and racism (Grannis 1998)



What is the role of new expanding ICTs and motorized transport for social contact and information diffusion **within and between** local communities in traditionally pedestrian low density rural areas of developing countries?



Addis Ababa

Ethiopia

Gulf of Aden

Djibouti

'Adan

Berbera

Burco

Hargeysa

Buuhoodle

Gaalkacyo

Gode

Beledweyne

Baydhabo

297 random personal nets
2010,2011,2012



Experiment
in all



265
full info network
2011, 2012

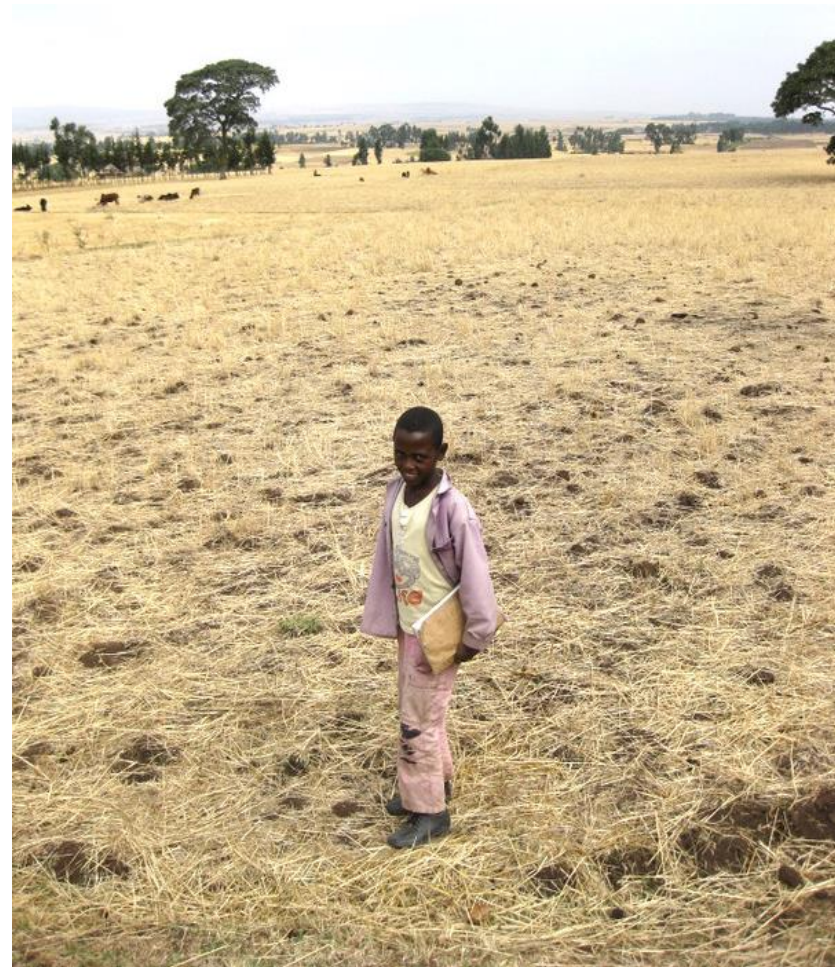


BEFORE: situation without motorized transport and ICTs
Walking is a dominant form of contact

98.2% of alters are contacted solely by walking
(3,972 ties)

Remaining 1.8% of ties
included walking +

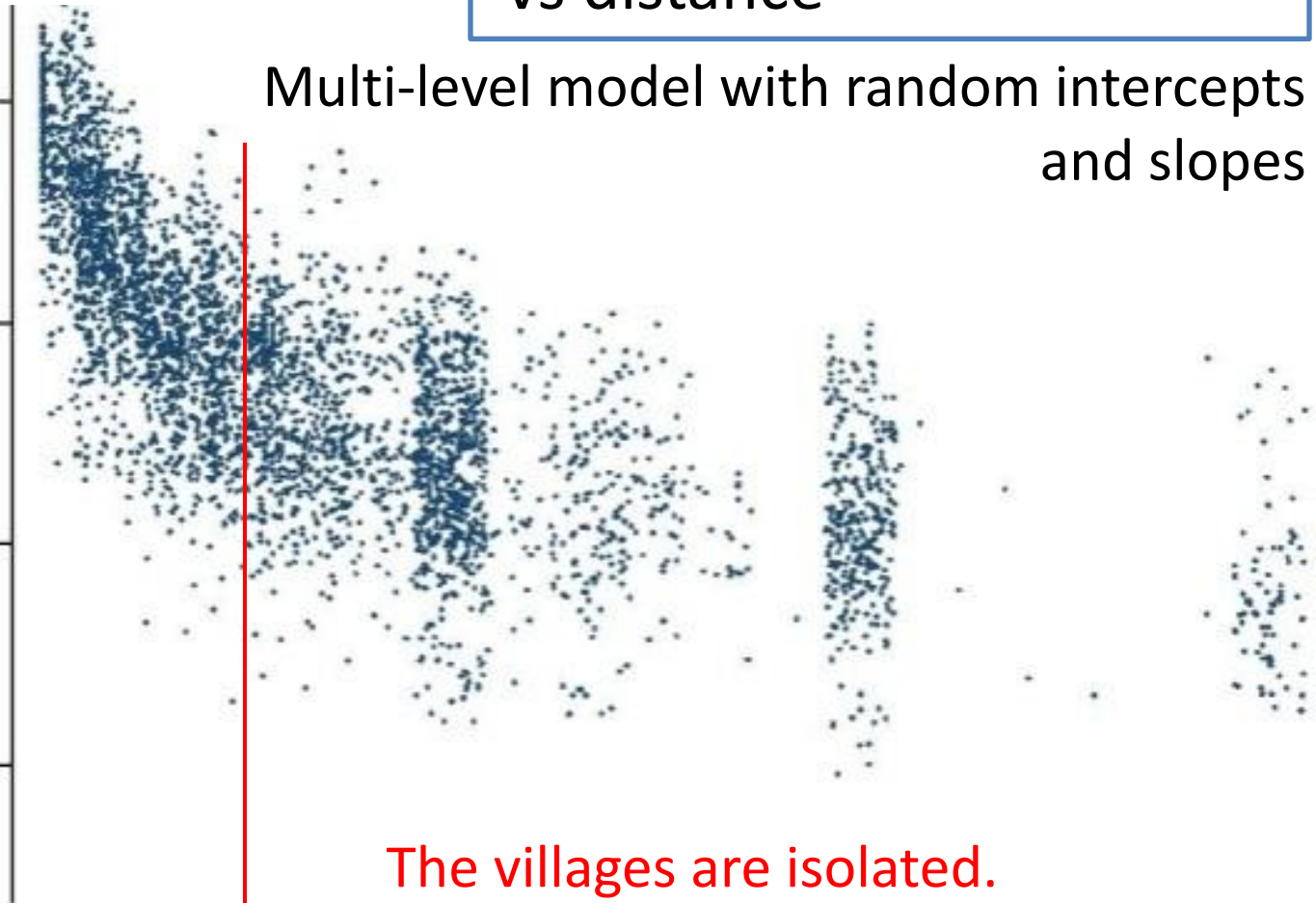
- public transport (40 ties)
- mobile phone call (16 ties)
- private vehicle (10 ties)
- landline call (3 ties).



Communicating at least once in...

Frequency of contact vs distance

- ④ 1-2 days
- ③ 3-14 days
- ② 15 days - 1 month
- ① Less than once per month



Multi-level model with random intercepts and slopes

The villages are isolated.
(Laboratory-like conditions)

Walking minutes
Kilometers

0 15 30 45 60 75 90
0 1 2 3 4 5 6 7

Random phone donation (supervised by Ayako Ishiwata)



Conducted
in all four
villages

Sending weekly messages about resource-conserving agriculture (e.g. instructions on composting with manure instead of artificial fertilizers) to a randomly-selected subgroup of the phone users



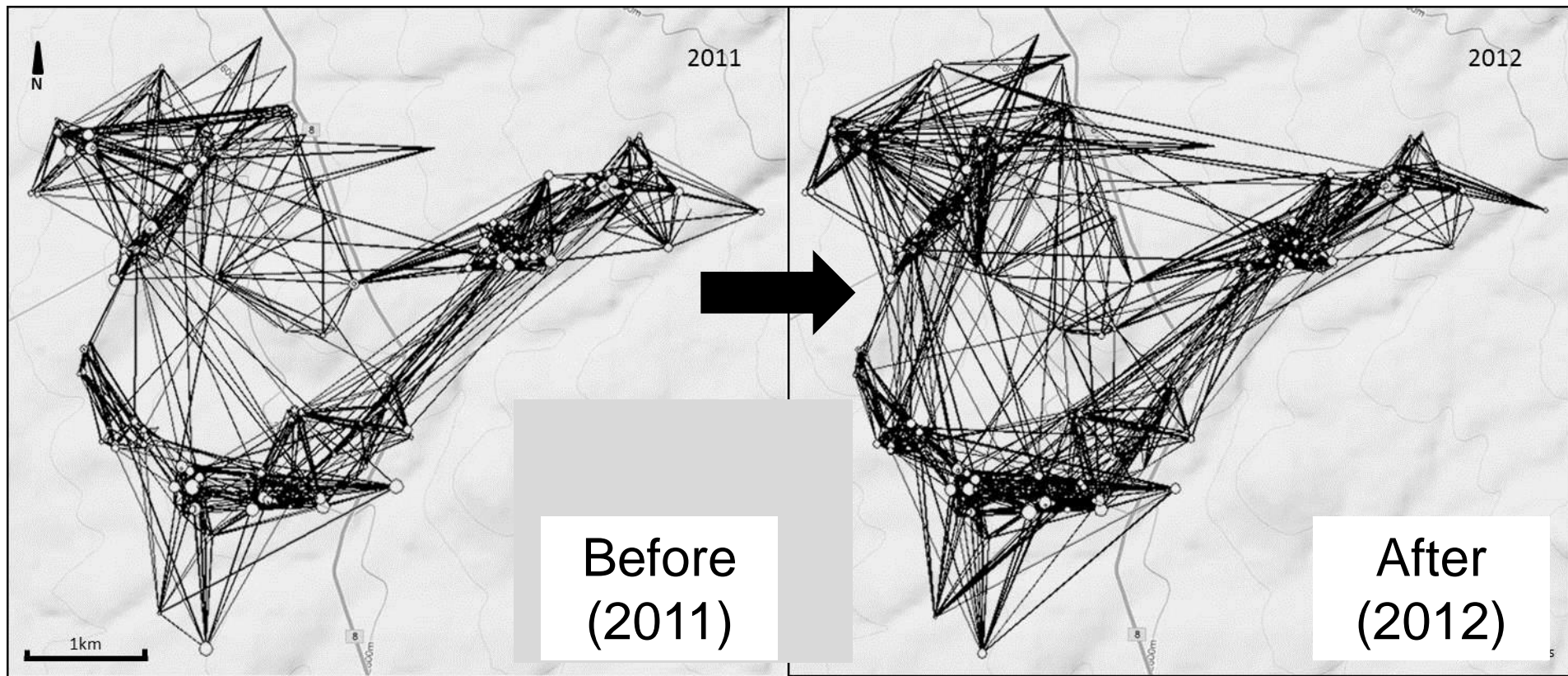
First, focusing on the village
with the full network data

18% phones

13% SMS



Information network evolution



Impact of the SMS intervention on advice networks

	In-degree			Out-degree		
	SMS recipient	Non-recipient		SMS recipient	Non-recipient	
2011	6.4	5.1		5.2	5.2	
2012	10.4	**	6.9	9.2	**	7.1

Mann-Whitney-Wilcoxon test (** p<0.05)



No effect of
phones without
SMS

on networks
or practices!

neither in Stochastic
Actor-Oriented
Simulation
(SIENA)

nor

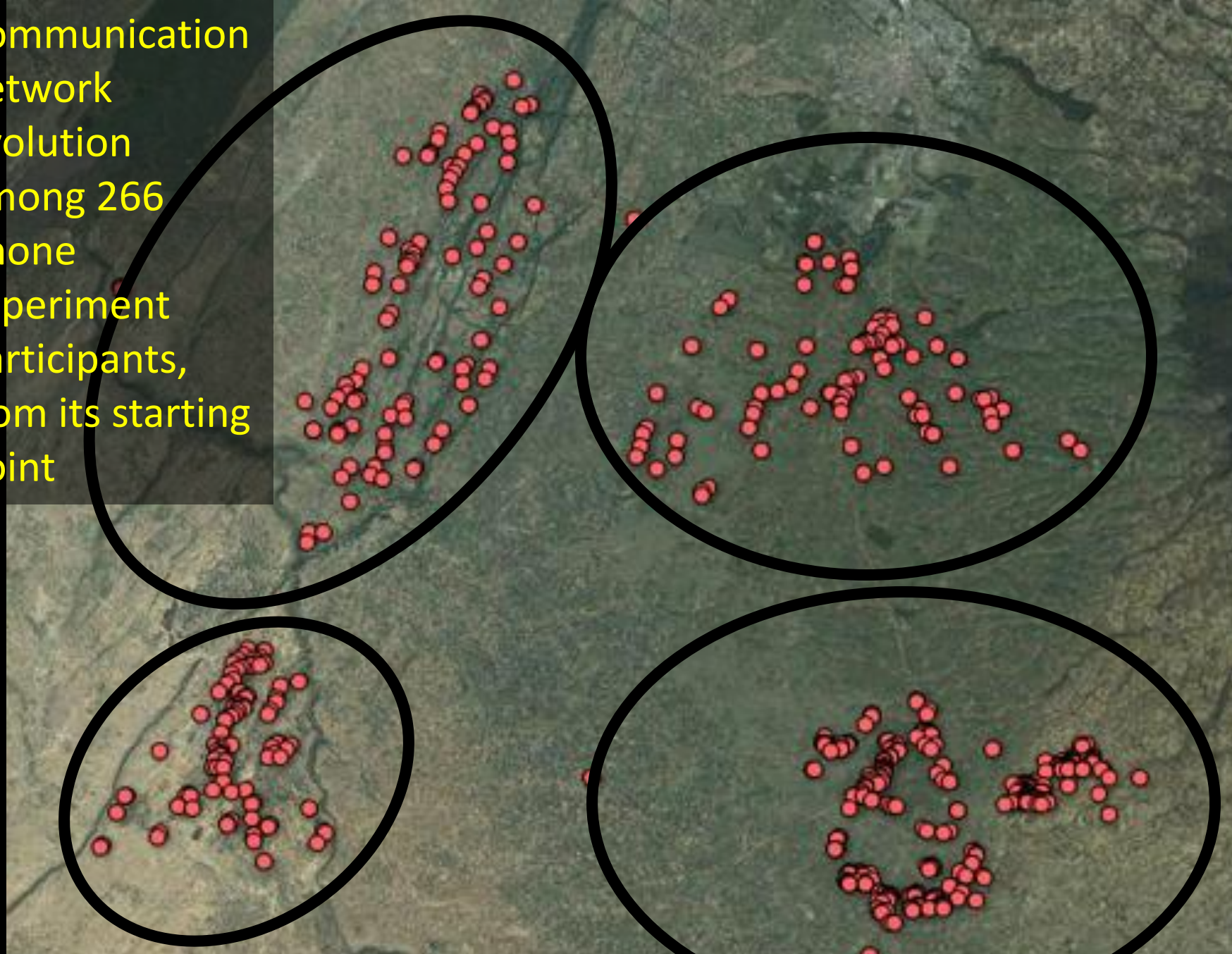
by a direct
comparison
of the TG&CG

How did they use the phones?

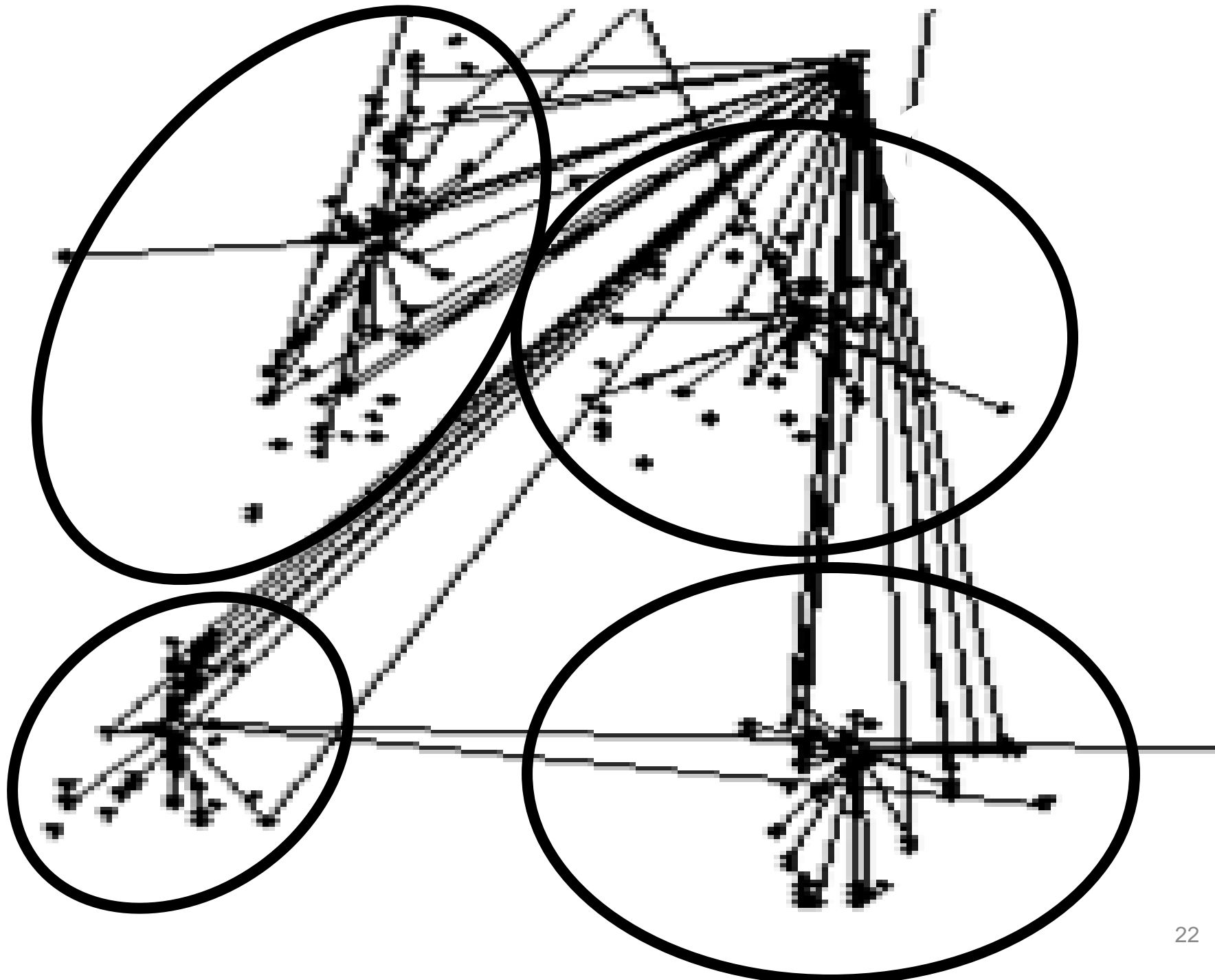


yo,
what's for dinner?

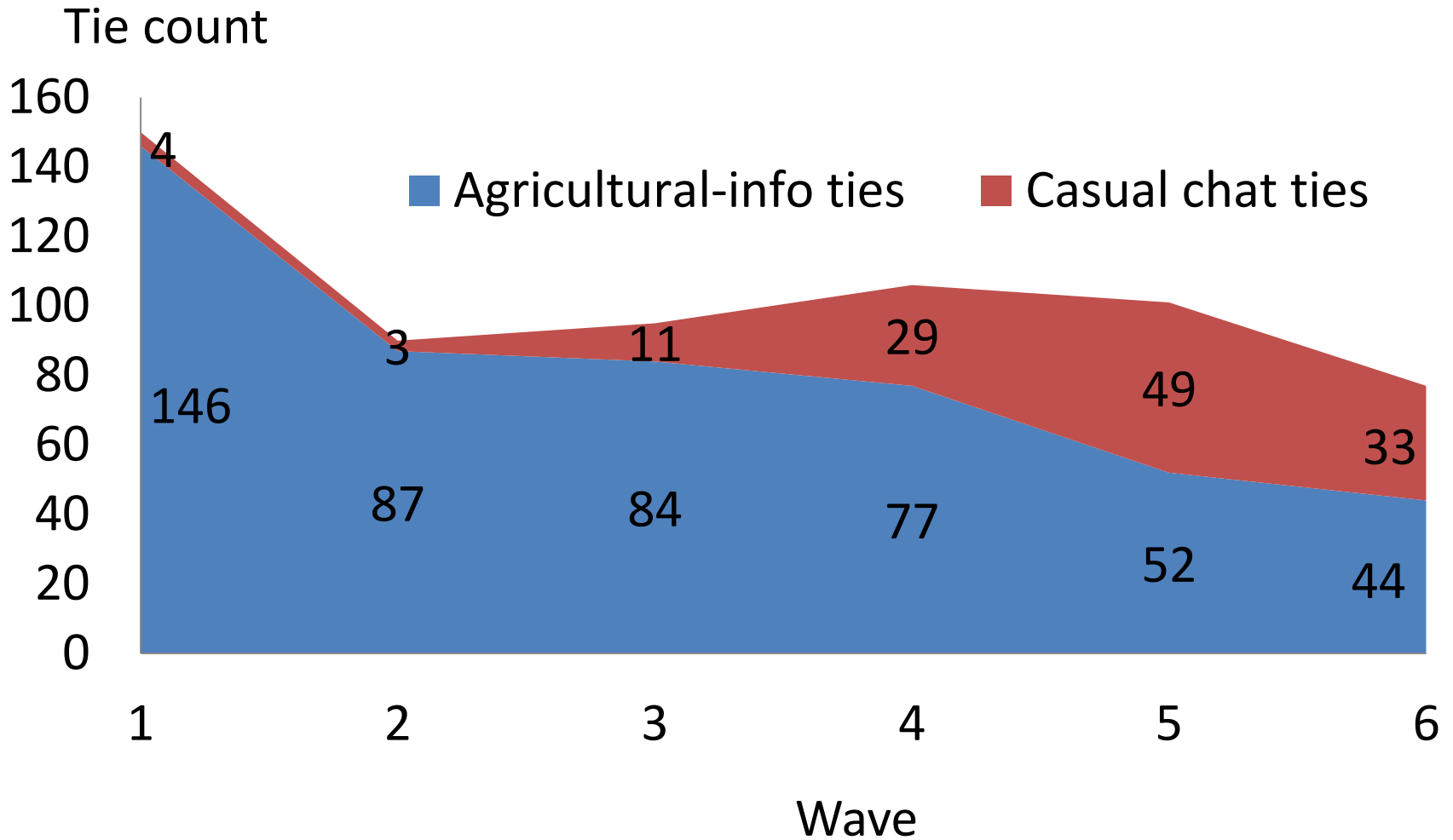
Communication network evolution among 266 phone experiment participants, from its starting point



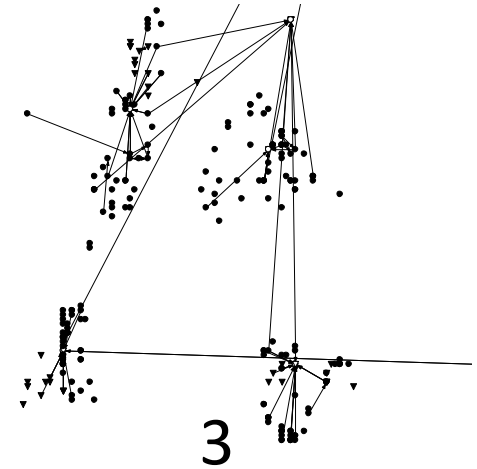
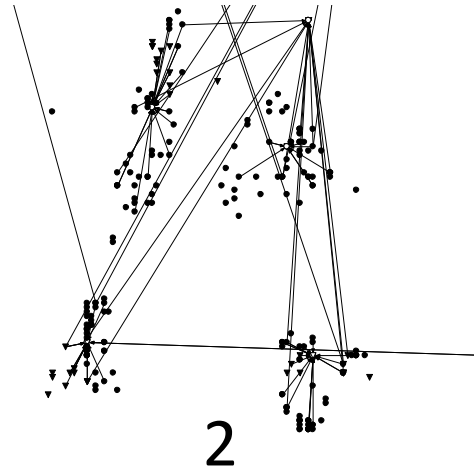
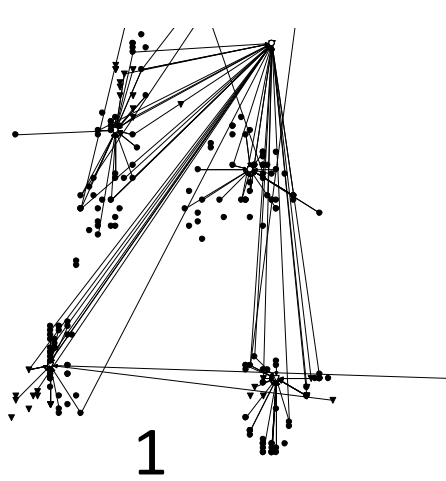
Monthly surveys of main calling partners and call content



Communication type

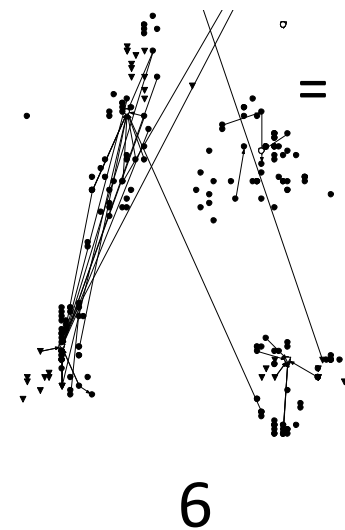
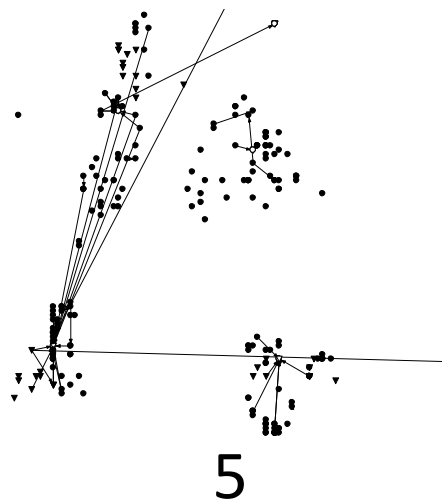
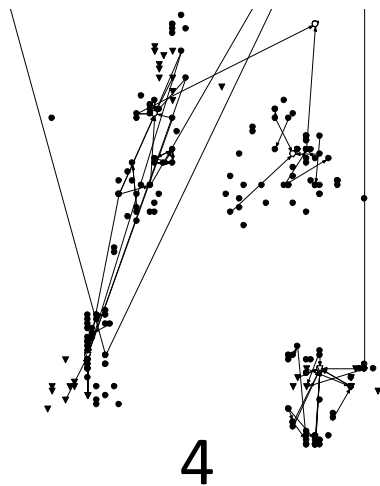


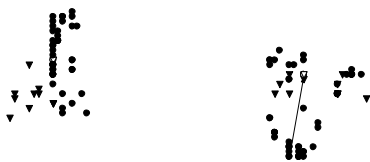
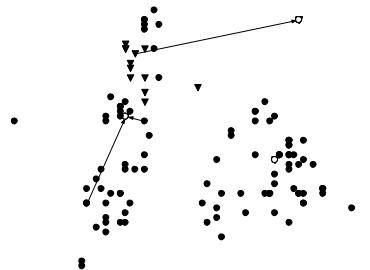
+other



Agricultural information network

(Med tie length = 2.4km)



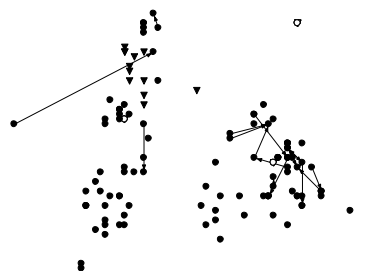


1

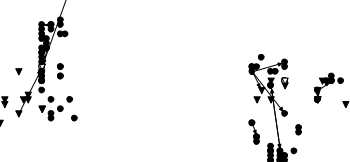
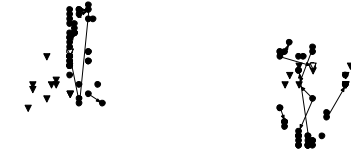
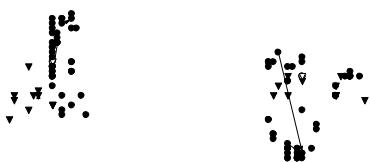
2

3

Casual chats



(Med tie
length =
0.9km)



4

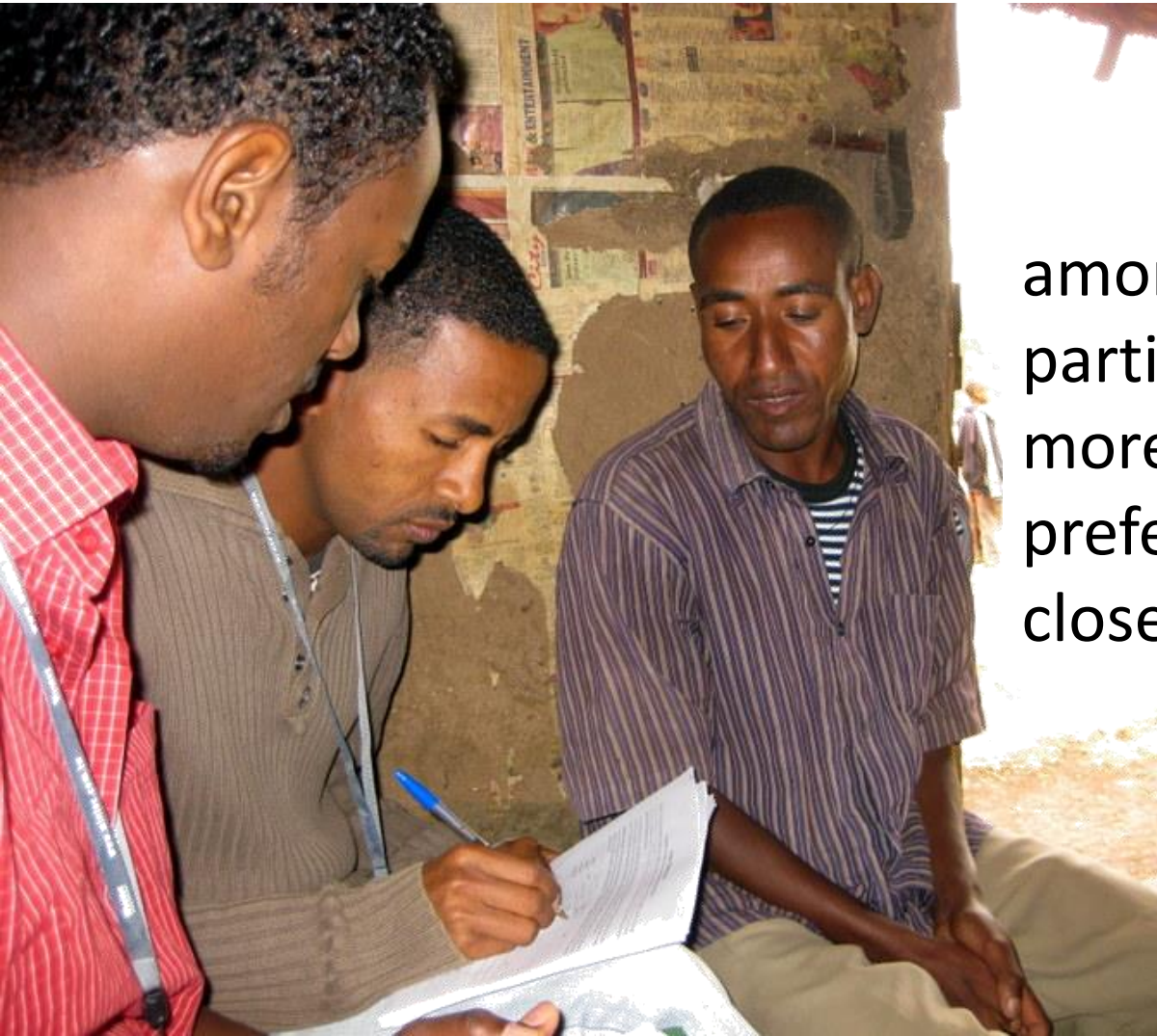
5

6

Stochastic Actor-Oriented Modeling

Controlling for the effects of the network on itself,
coevolution of network and behavior...

SIENA



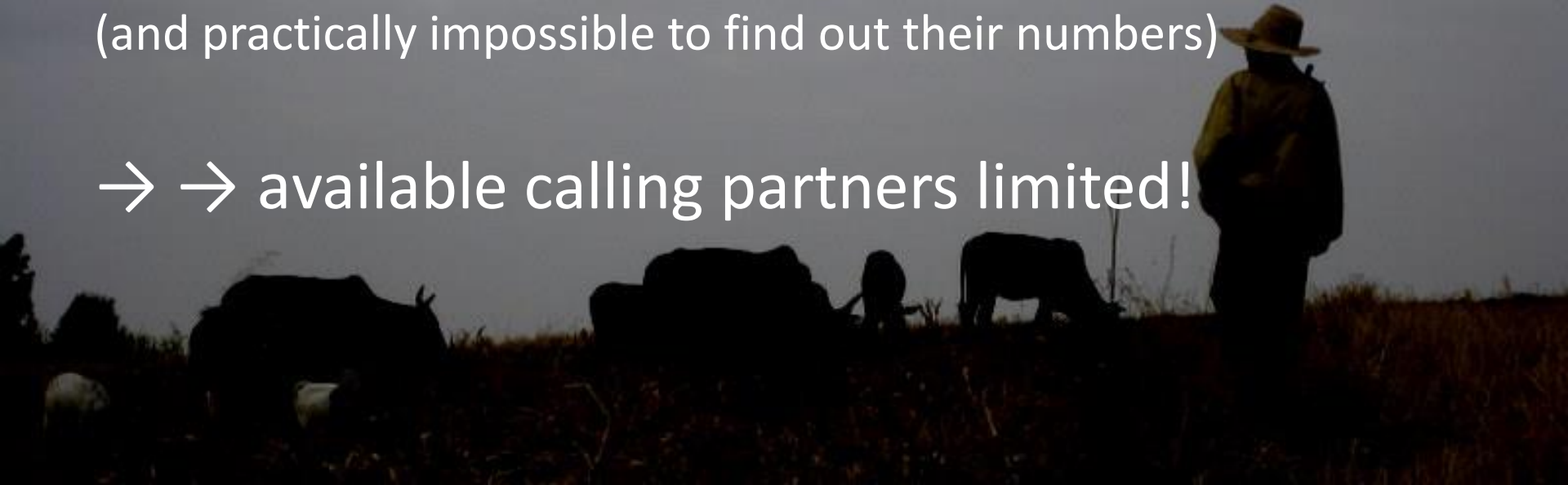
among the experiment
participants,
more distant individuals
preferred for info calls;
closer ones for casual chats

Mobile phones are expected to enhance social networks most in areas with inaccessible, unaffordable infrastructure

However, our data show constrained mobility → geographically confined networks

+ reluctance to call those who are not known (and practically impossible to find out their numbers)

→ → available calling partners limited!

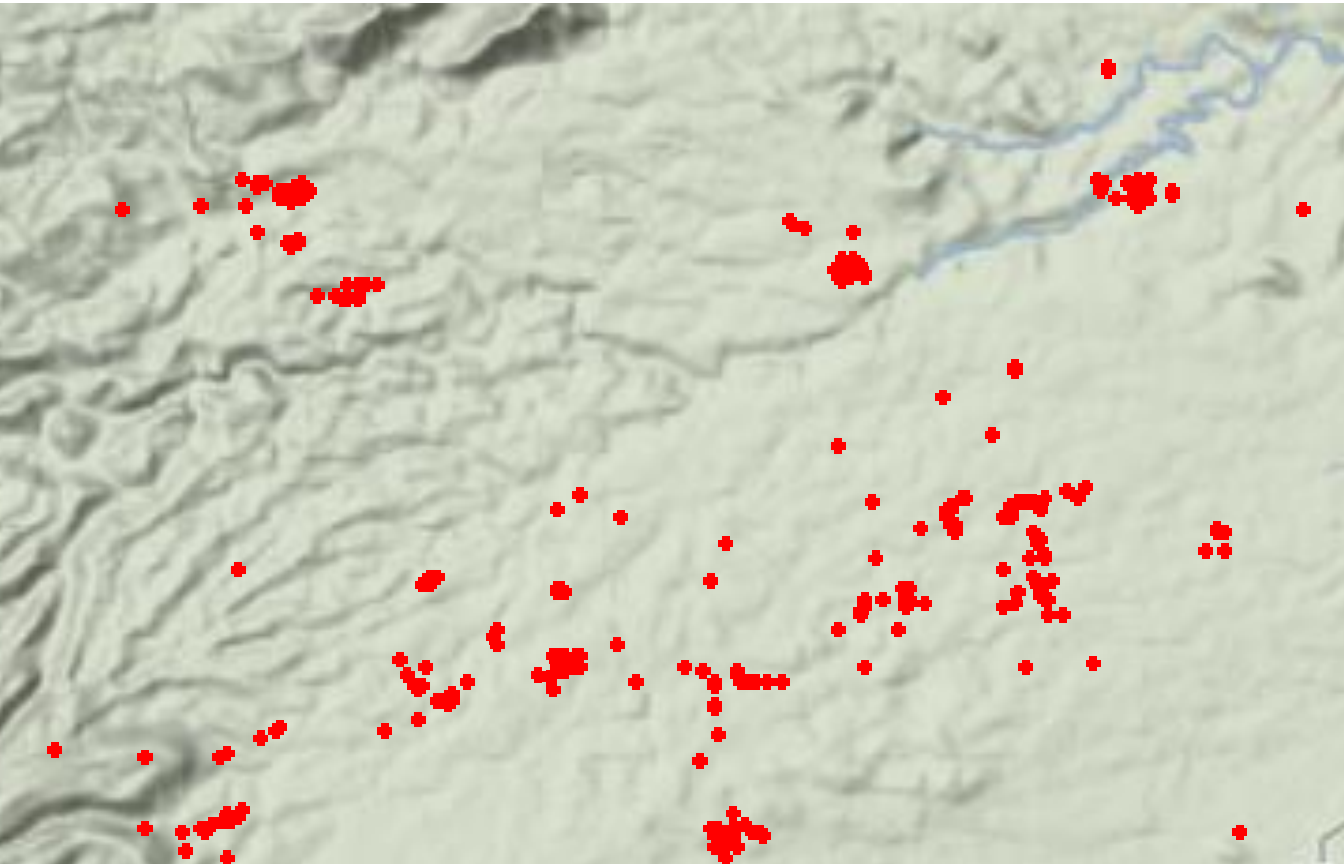




Would a combination of phones with motorized transport make a difference?

Indonesia!





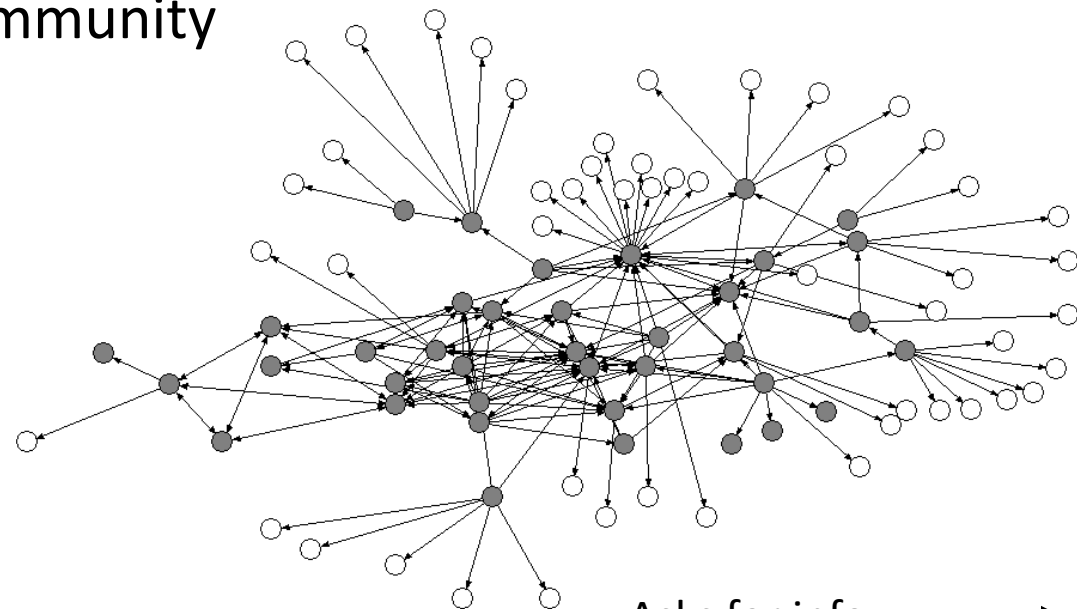
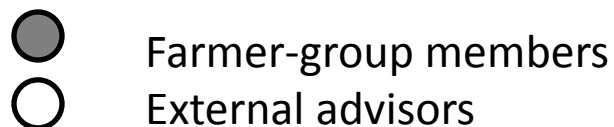
Sumatra, Bandar-Lampung 2012

16 randomly selected coffee and cocoa
producing farmer groups
(315 farm owners, 1575 ties)



“Who do you get agricultural information from?
Identified the person and her exact location,
both in and outside the community

16 information networks
-internal advisors
-external advisors



After an initial analysis

Qualitative interviews with 20 farmers from 9 groups and 2 extension agents

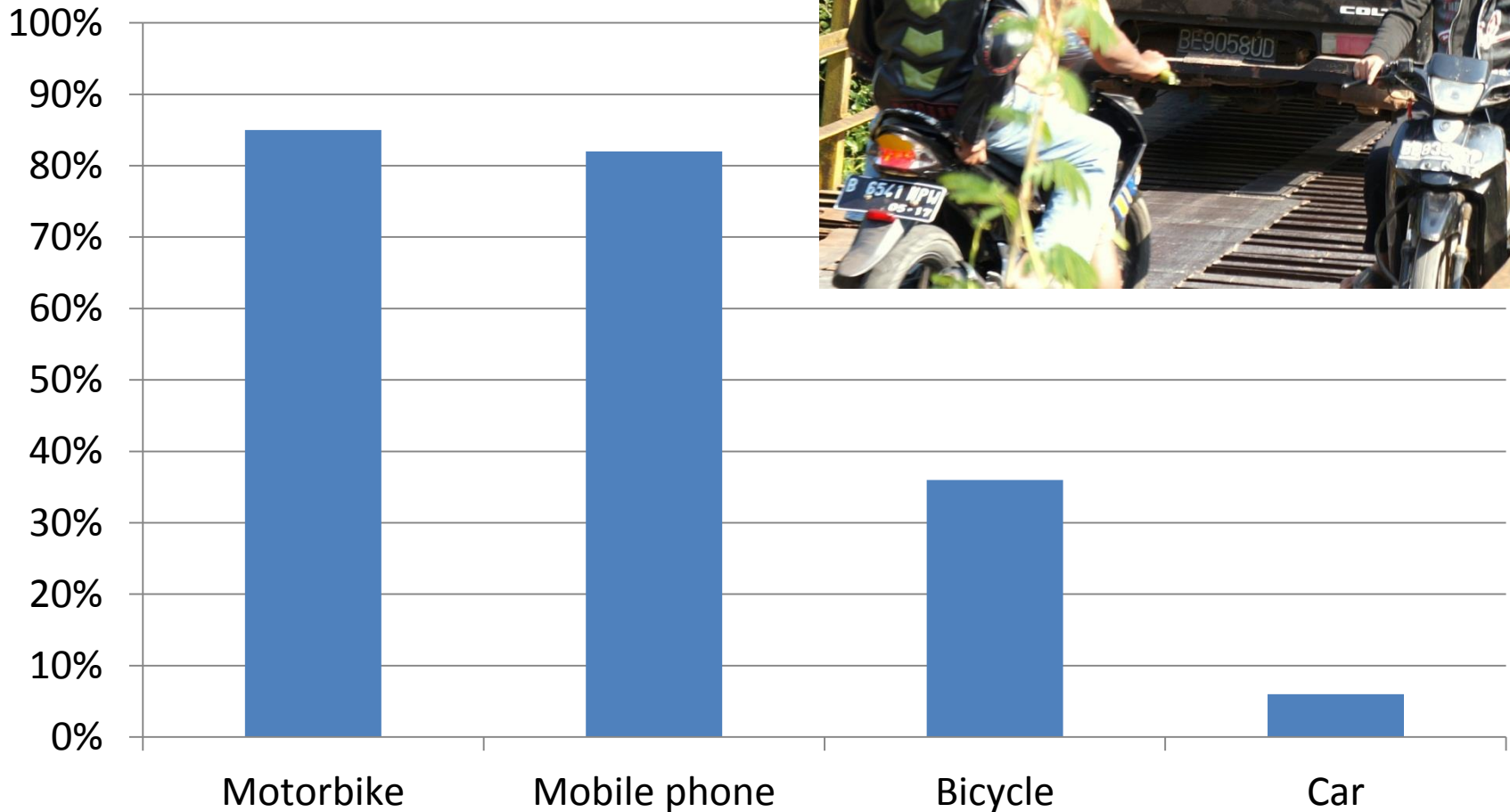
- Additional explanation, clarification of the provided info
- Deeper description and stories of how people meet, contact, exchange info



Results



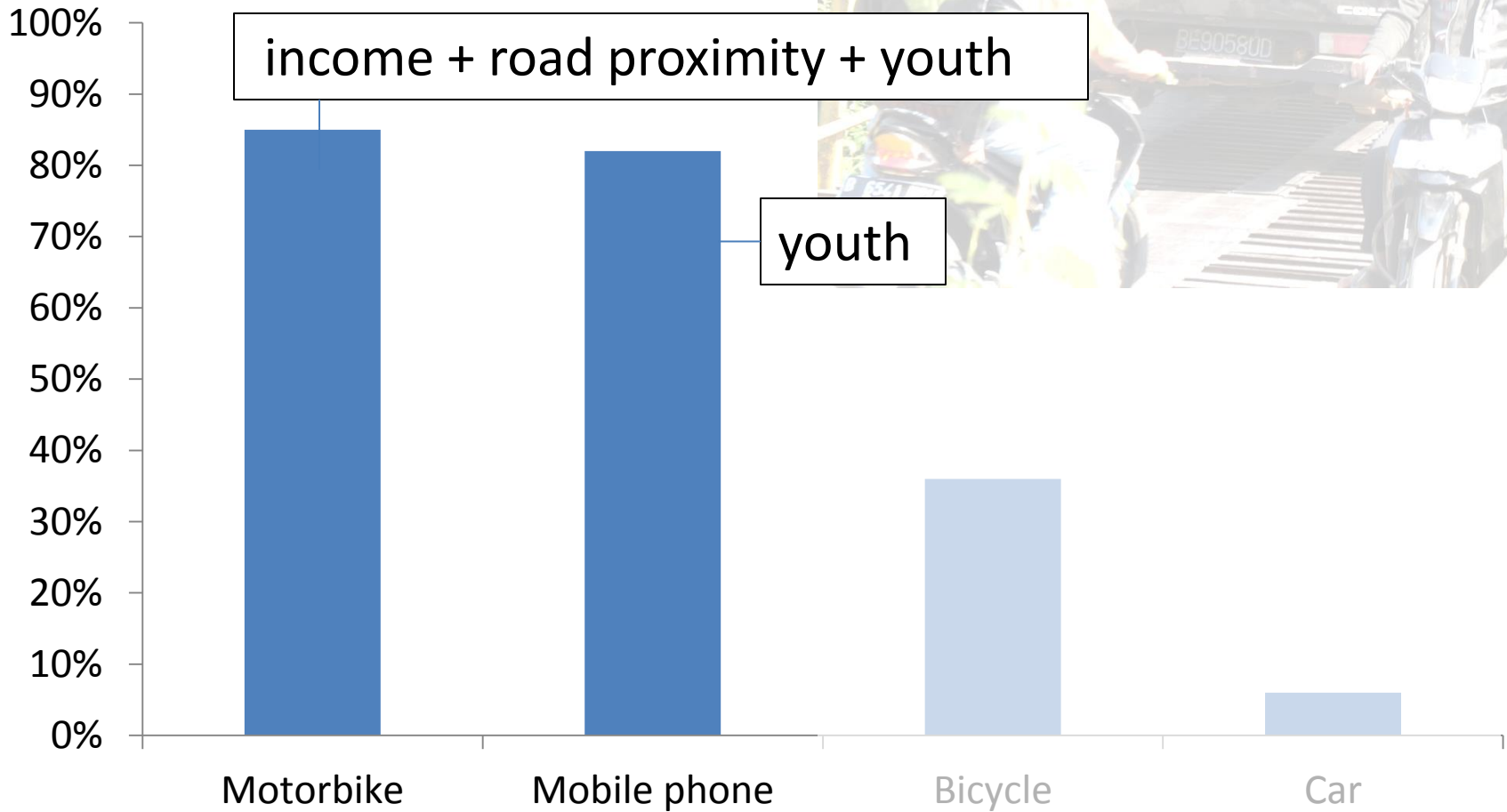
Ownership rates



only for kids who can't reach yet
motorbike pedals

Ownership determinants

Logistic regression with random effects at the group-level

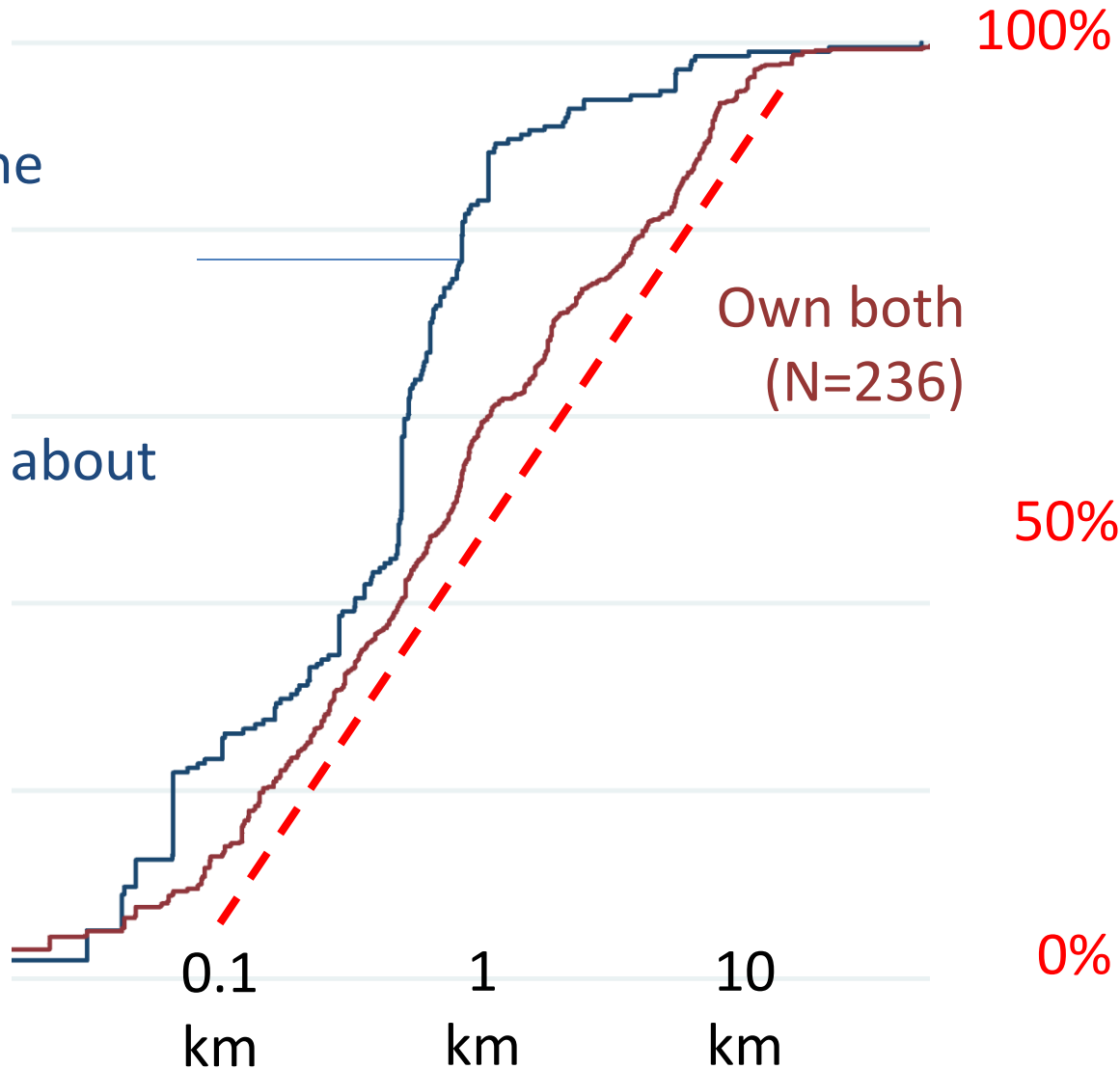


Motorbike &
phone ownership
and information
networks



Technology ownership and the geographical distribution of ties

Those who have neither the motorbike nor the phone (N=26), have shorter ties overall; but the maximum reach is about the same



Logarithmic distance

Technology ownership and the number of info sources

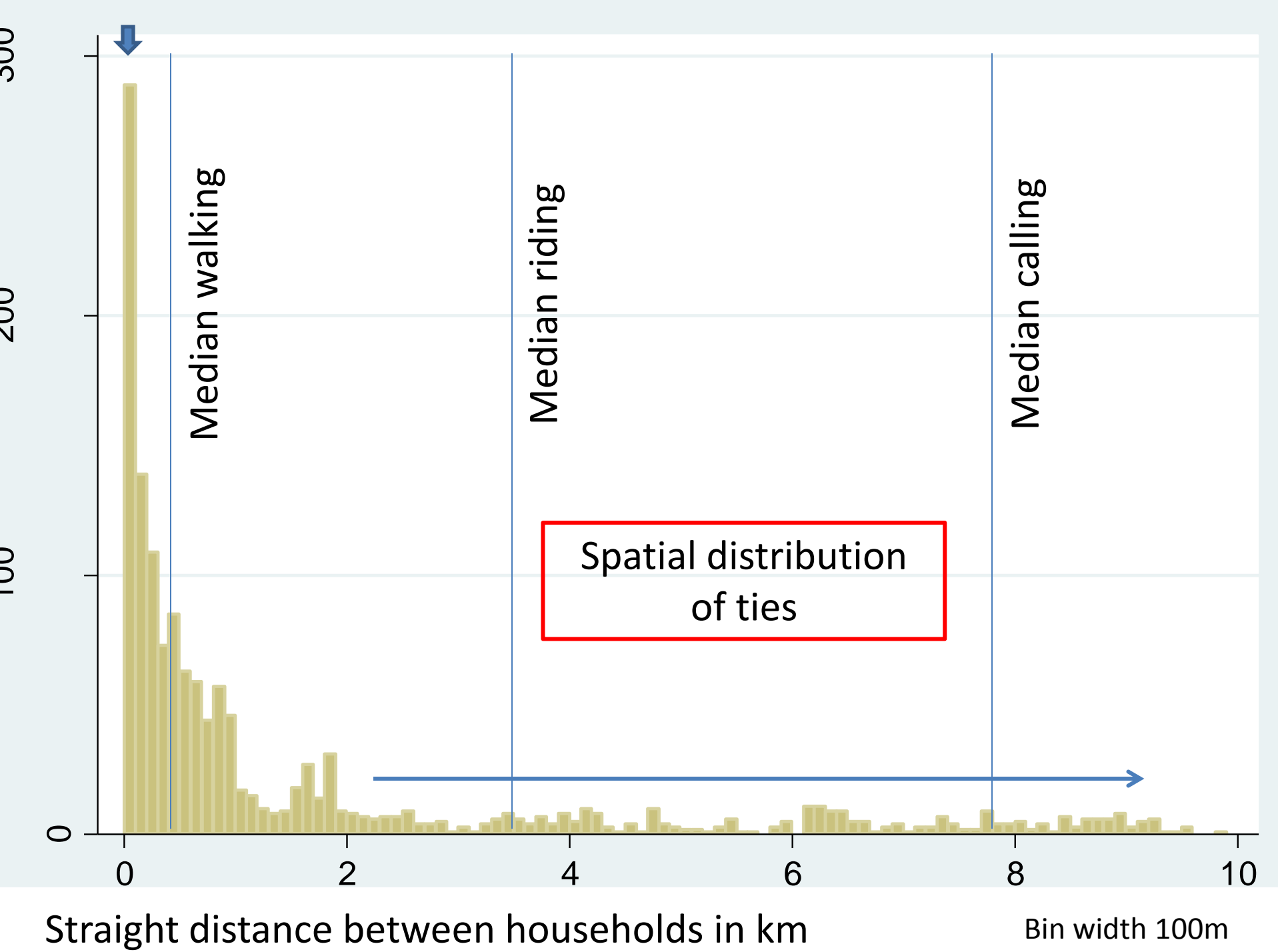
No statistically significant difference in in-group access
(t-test)

Those who own both the motorbike and the mobile
phone have better access to external information than
others
(1.5. vs 1 external information sources)

However, **no difference after controlling for income** (OLS,
the same results with and without random effects for the farmer
groups)

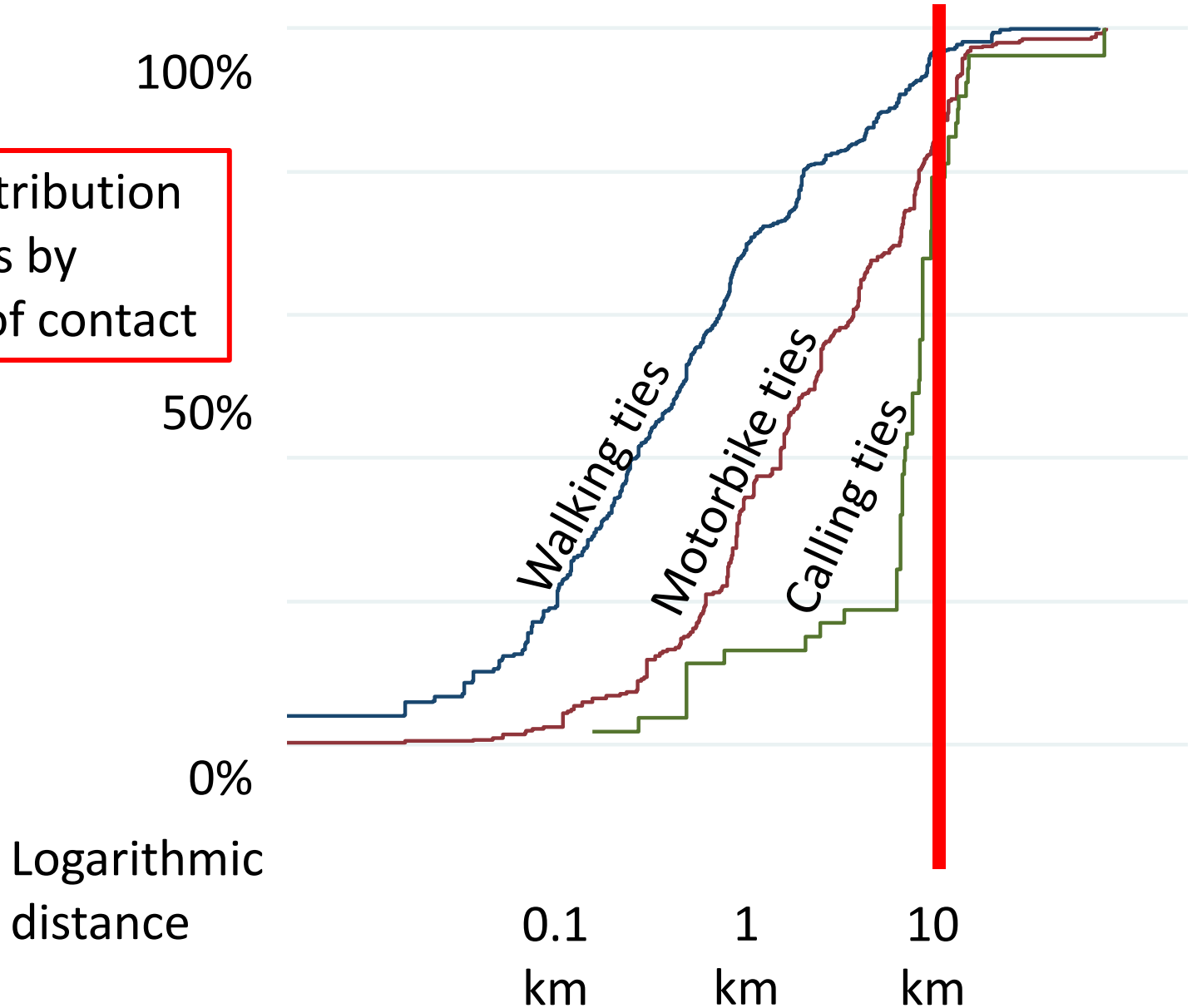
Motorbike & phone usage and tie characteristics





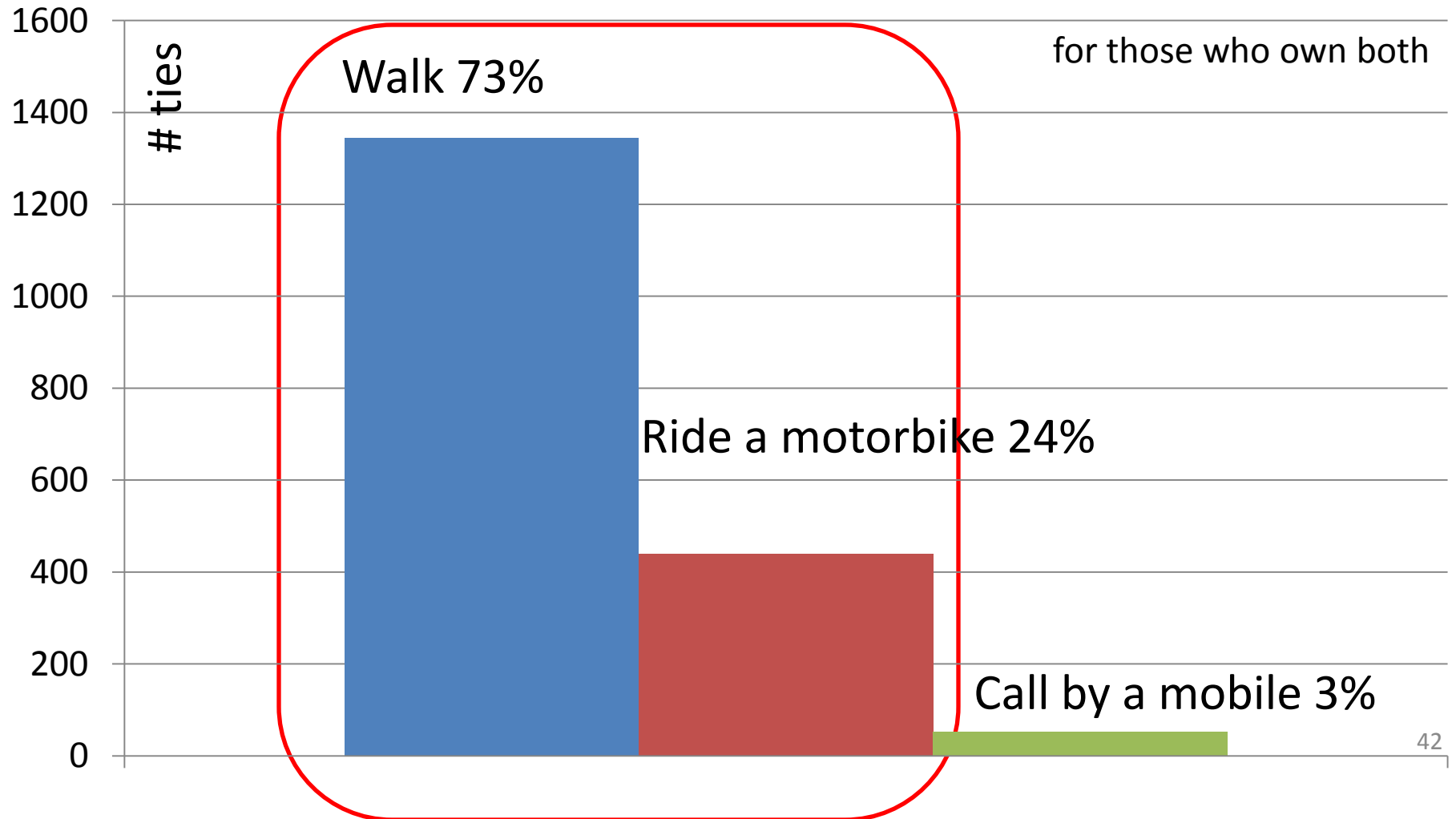
For those who own both (75%)

Spatial distribution
of ties by
the mode of contact



The main mode of contact for each tie

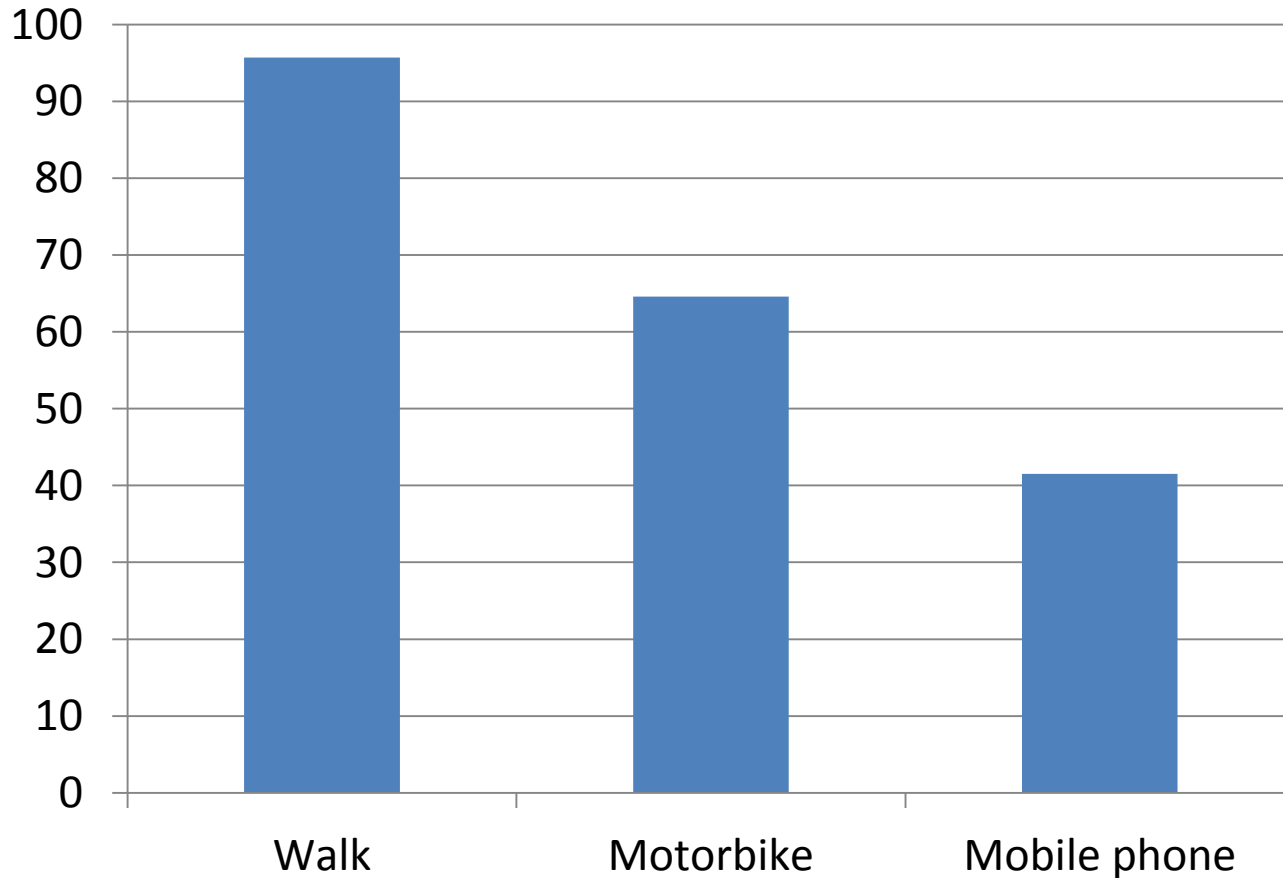
F2F contacting dominant!



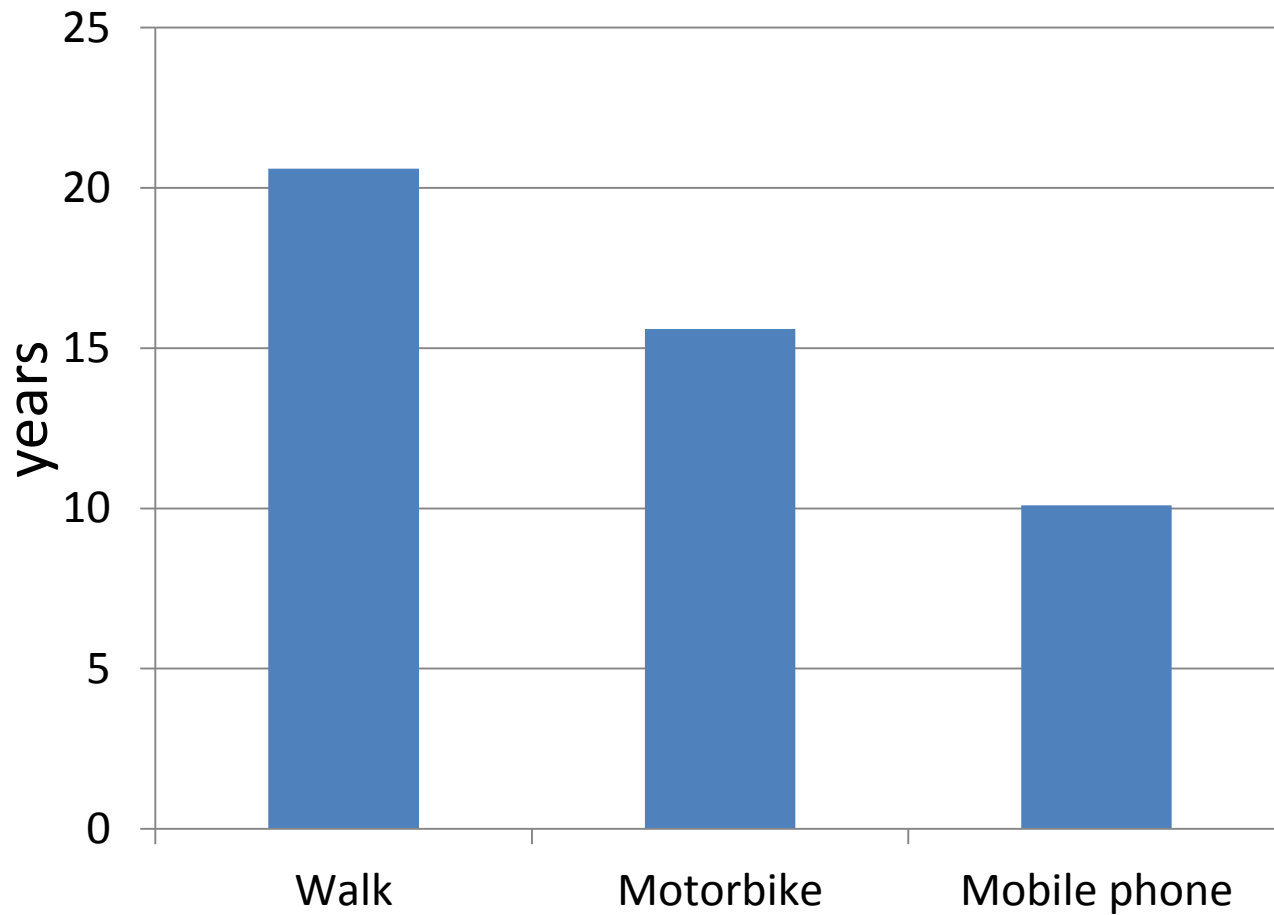
Mode and the frequency of communication

(for those who own both)

% meeting at least once in 2 weeks



The main mode of contact and the mean length of relationship (for those who own both)



McFadden's choice model

- the value of time, money, and personal meetings

	Coef.	P> z
Cost [Rp]	0.000	0.28
Time [min]	-0.0095	0.00
(Base alternative = walking)		
Motorbike		
Frequent contact dummy	-1.03	0.00
Length of relationship [yrs]	-0.027	0.00
Constant	0.96	0.56
Phone		
Frequent contact dummy	-0.86	0.01
Length of relationship [yrs]	-0.10	0.00
Constant	-1.50	0.00

McFadden's choice model

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Frequent contacts dummy	-0.86	0.01
Length of relationship [yrs]	-0.10	0.00
Constant	-1.50	0.00

~150x



Face-to face
meetings:

priceless!





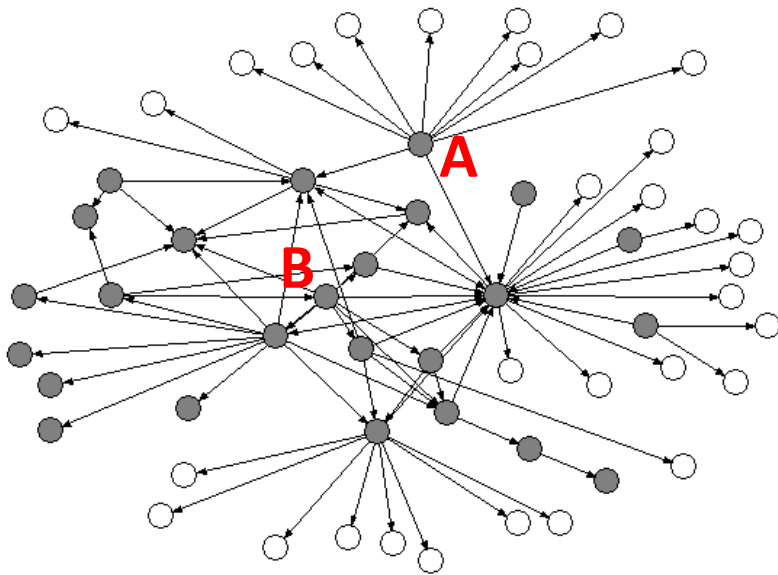
Mode of f2f contact
and **personal network characteristics**

What is the role of motorized transport for community relations?

- F2f meeting is the main mode of contact for 97% of ties
- Some motorbike owners ride more and some walk more to the settings in which they meet with their information sources.
- What is the role of motorized transport for these contacts (who rides and when?) and what the implications of the choice?



Does individuals' **tendency to use** motorized transport at given distance, relate to their social contact and information access within and outside of their communities?



Correlates of walking

vs. motorized transport (for motorbike owners)

	Odds ratios	P> z
Distance	0.53	0.02
Frequent contact	6.33	0.00
Length of relationship	2.95	0.00
Age	0.37	0.01
Altitude	2.50	0.03
Internal info sources	2.89	0.06
External info sources	0.18	0.00

Rho=0.90

Tie

Ego

Personal network

Hierarchical logit with std vars (std. dev. =1, mean=0 for all vars)



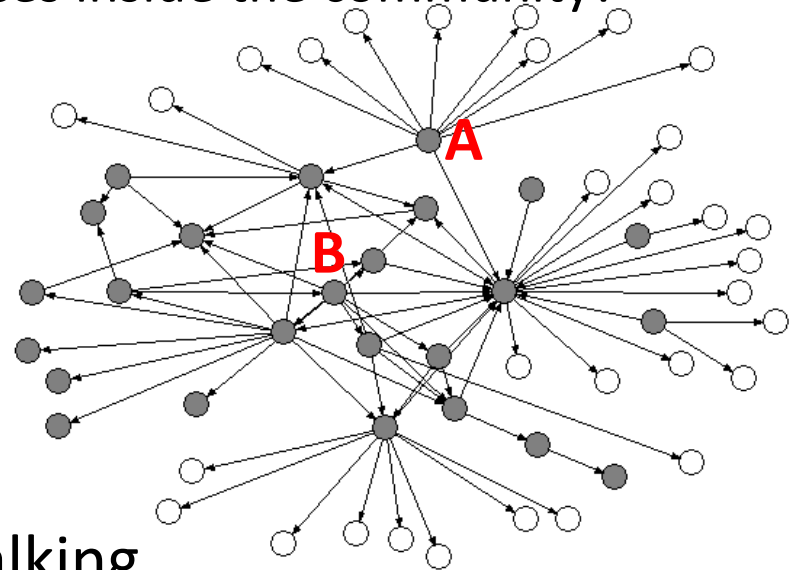
Not sig: kinship, income, education, overall number of info sources



Motorized
transport and
networks – future
research agenda!

A Love motorbiking → large activity radius?

- Get info from more distant (and better?) info outside of the community
- Less possibility getting info from closer sources inside the community?



B Love walking → Meeting, greeting, chatting with others? (qualitative explanations)

Conclusions

- F2F contact is still preferred for information gathering even among phone owners
- It is considered normatively necessary to travel for communication even if that involves both higher time and monetary costs
- Thus, motorized transport is a major communication tool!
- It is useful for expanding the geographical range of known people and the radius of personally meet-able people and for social contact between diverse communities
- Motorized transport enables reach outside of one's strong ties that maintained by walking
- Mobile phones are used to coordinate the motorized F2F information exchange



- People who shun walking have more extensive extra-communal social contact and access to information.
- Weak evidence that people who prefer walking to motorized transport have more in-community contact
- Motorized transport reduction policies (e.g. recent gasoline price hikes) might have negative social consequences and obstruct the move from territorialism to pluralistic societies in developing countries where alternative modes of transport are lacking ?!?
- Such policies might also paradoxically result in people using less informed and environmentally harmful practices.
- Potential of bicycles under utilized



Thank you!

