Social Networks, UDP and Rice Production: A Case Study of Washe and Sheshi Villages in Niger State.

Oluyemisi Kuku (IFPRI), Saweda Liverpool-Tasie (MSU), Akeem Ajibola (IFPRI)

Guiding Sustainable Intensification in Sub Saharan Africa (GISAIA); Nigeria Launch

Abuja, Nigeria – June 17, 2013

Presentation Outline

- Introduction
- Urea Deep Placement
- Fieldwork and Data
- Results
  - UDP knowledge
  - Yield
  - Social networks
    - The village promoter
- Future steps

Introduction

- The agricultural sector is crucial to the Nigerian economy
  - Largest employer
  - Food self sufficiency
- Agricultural productivity is low – working in agricultural sector is hard and unrewarding
  - Agronomic factors (e.g seed quality)
  - Farm management
    - poor production technologies
    - outdated farming methods
- Many technological innovations that can dramatically increase productivity
  - How to encourage adoption?

Urea Deep Placement technology

- placement of 1-3 grams of urea supergranules or briquettes at a 7-10 centimeters (cm) soil depth shortly after the paddy is transplanted.
- Importance of irrigation

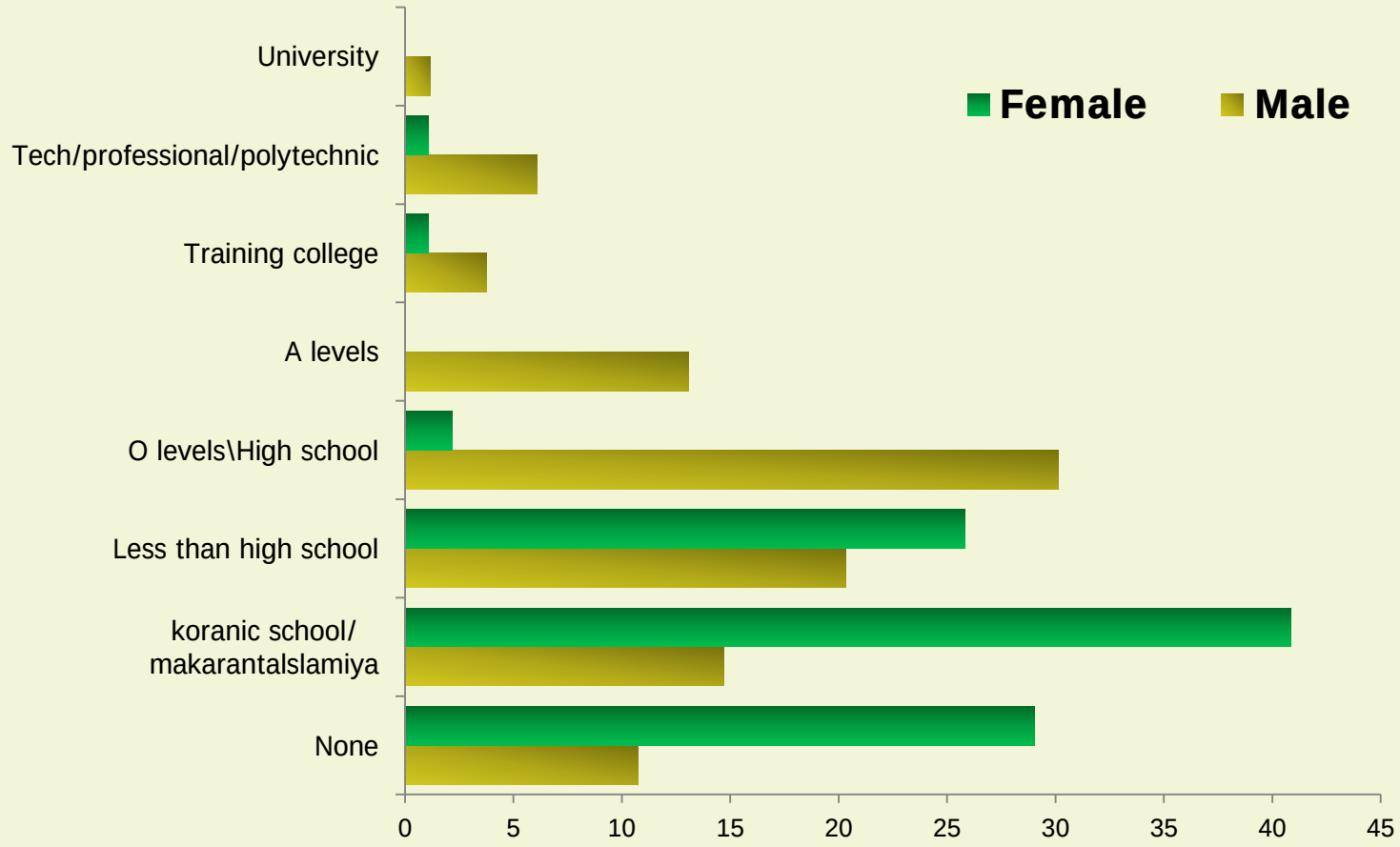
Fieldwork

- Initially visited Farmer field days in Gombe and Niger and carried out qualitative interviews (June\July,2012)
- Returned to Washe and Sheshi villages in Niger State in December 2012 (post rainy season) at the end of the harvest season.
- Survey of 278 households

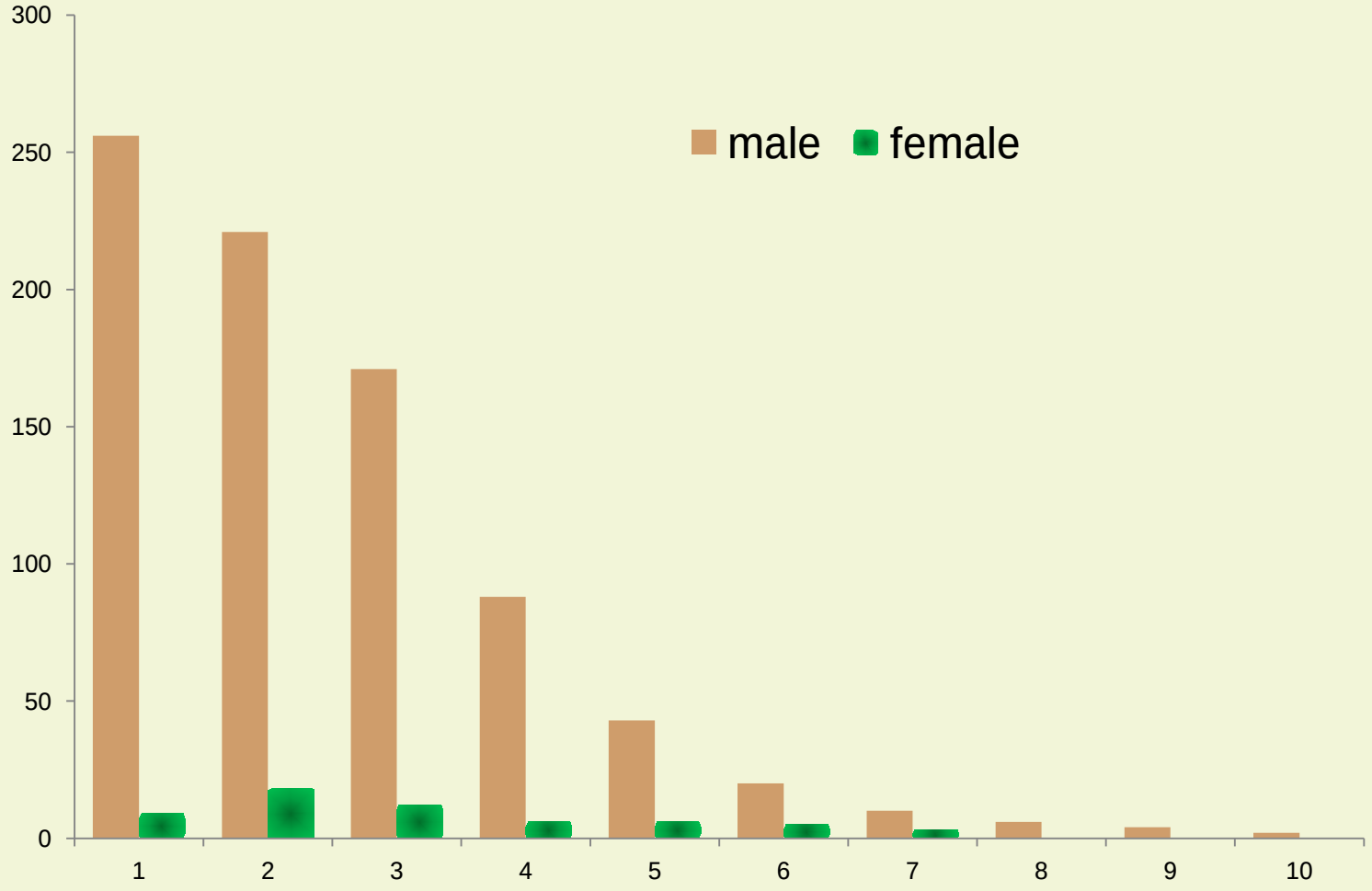
Sample characteristics

- Sample almost evenly split between both villages
- Very similar demographics across both villages in terms of
  - gender (83 percent male)
  - age (mean: 34)
  - religion (Moslem).
- Major occupations in the villages were farming, fishing and small business /commerce
- About 500 plot owners identified, with about 880 plots .

Education by gender



Number of plots by gender



Results: Knowledge of UDP

Steps taken		percentage of USG users
Obtain, clean and sort rice seed		71.282
Establish a rice nursery for seedlings		64.103
Cover nursery seeds		56.923
Prepare the rice fields	a. Harrow	52.051
	b. level,	50.256
	c. Irrigate	37.179
Cultivate, add NPK fertilizer and pulverize the soil		41.026
Transplant rice seedlings from nurseries	a. When (21-28 days after nursery establishment)	58.205
	b. At 30-35 cm high	56.154
Apply USGs in transplanted rice fields	a. Spacing (4 rice hills)	60.256
	b. When (one week after transplanting)	54.103
	c. Insert at 5-7cm depth	57.692
	d. Conditions (wet soil either from rain or irrigation)	66.154
Keep field wet after USG application		68.462
Harvest rice grains		72.051

Results: Rice yields (kg per acre)

Year	No USG	Use USG
2011	1203	1334
2012	871	1,627

USG users had double the output of non-USG users despite the flooding That took place in 2012.

Practices in use of USG

SN	Crop	Unit	N	Depth (cm)	Plant / tablet
1	Rice	Kg	157	3.3	4.69
2	Sorghum	Kg	11	4.5	3.4761
3	Millet	Kg	1	4	4
4	Ground nut	Kg	1	10	2
5	Cowpea	Kg	1	4	4
6	Yam	Tubers	6	5.5	1.83
8	Maize	kg	2	2.5	4
9	Guinea corn	Kg	2	3	2.5

Recommended depth is 7-10cm, and 4 plants per USG tablet.

Social networks and UDP adoption in Niger

www.leedsmetapps.co.uk

Social networks and technology adoption

The technology adoption decision

$$V_t(I_{t-1}) = \max_{\iota_t \in \{0,1\}} E_t \sum_{s=t}^{T} \delta^{s-t} \left[(1 - \iota_t) q_a + \iota_t q_s(I_{s-1}) \right]$$

Farmer adopts if:

$$q_a - E\, q(0) \leq \delta (V_1(1) - V_1(0))$$

Social networks and technology adoption

- Information as an important factor
- Farmer updates expectations based on information about the new technology which could come from personal experience and/or the experience of peer farmers.
- Farmers who are more connected to information via social networks potentially have larger information sets from which to form their subjective expectations about a technologies profitability

- Social networks in rural villages are vital channels of communication,
- The means of diffusing messages can potentially influence who receives information and/or the confidence they have in the information to use it appropriately
- A training of extension agents may increase local capacity. However actual behavior change achieved in the targeted audience may vary according to the quantity and quality of links between the extension agents and farmers.

Notore/IFDC approach to promoting the adoption of UDP in Niger:

- Work with ADP
- Use of Notore Sales agents working with ADP
- Farmer field days
- Demonstration plots
- Use of a village promoter
  - Local resident in the community
  - Part of the demonstration plot team
  - Also serves as a sales agent in the community

Awareness, Knowledge and use of UDP

Farmer has heard of the UDP technology	**yes**	**Count**	249
		%	93.26%
	No	**Count**	18
		%	6.74%
Farmer knows how to use the USG technology	**yes**	**Count**	190
		%	76.61%
	No	**Count**	58
		%	23.39%
Farmer has used the UDP technology (adoption)	**yes**	**Count**	182
		%	67.41%
	No	**Count**	88
		%	32.59%

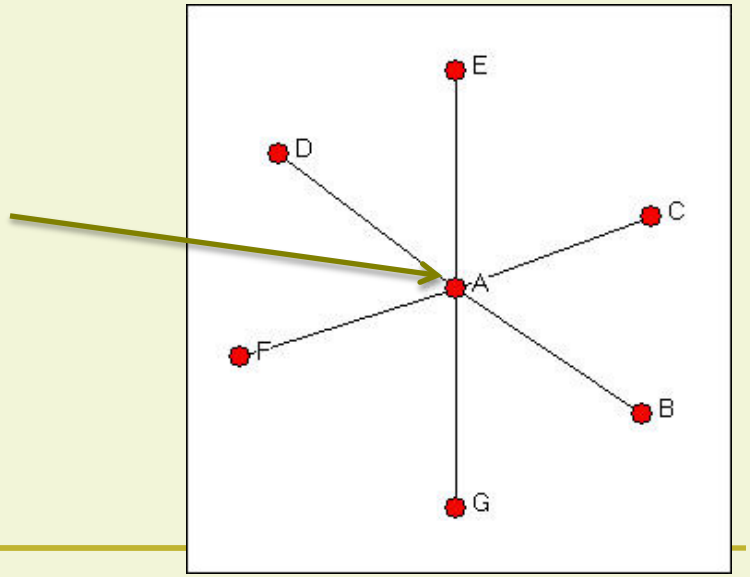
Who did you hear about UDP from?

5. Who taught you how to use it?	Freq.	Percent
Fellow farmer	15	7.94
Notore village promoters	22	11.64
ADP	89	47.09
ADP + Notore	60	31.75
Village head	2	1.06
Other	1	0.53
Total	189	100.00

Network characteristics….Centrality

- Various measures of a person's connectedness; Degree, closeness and betweenness

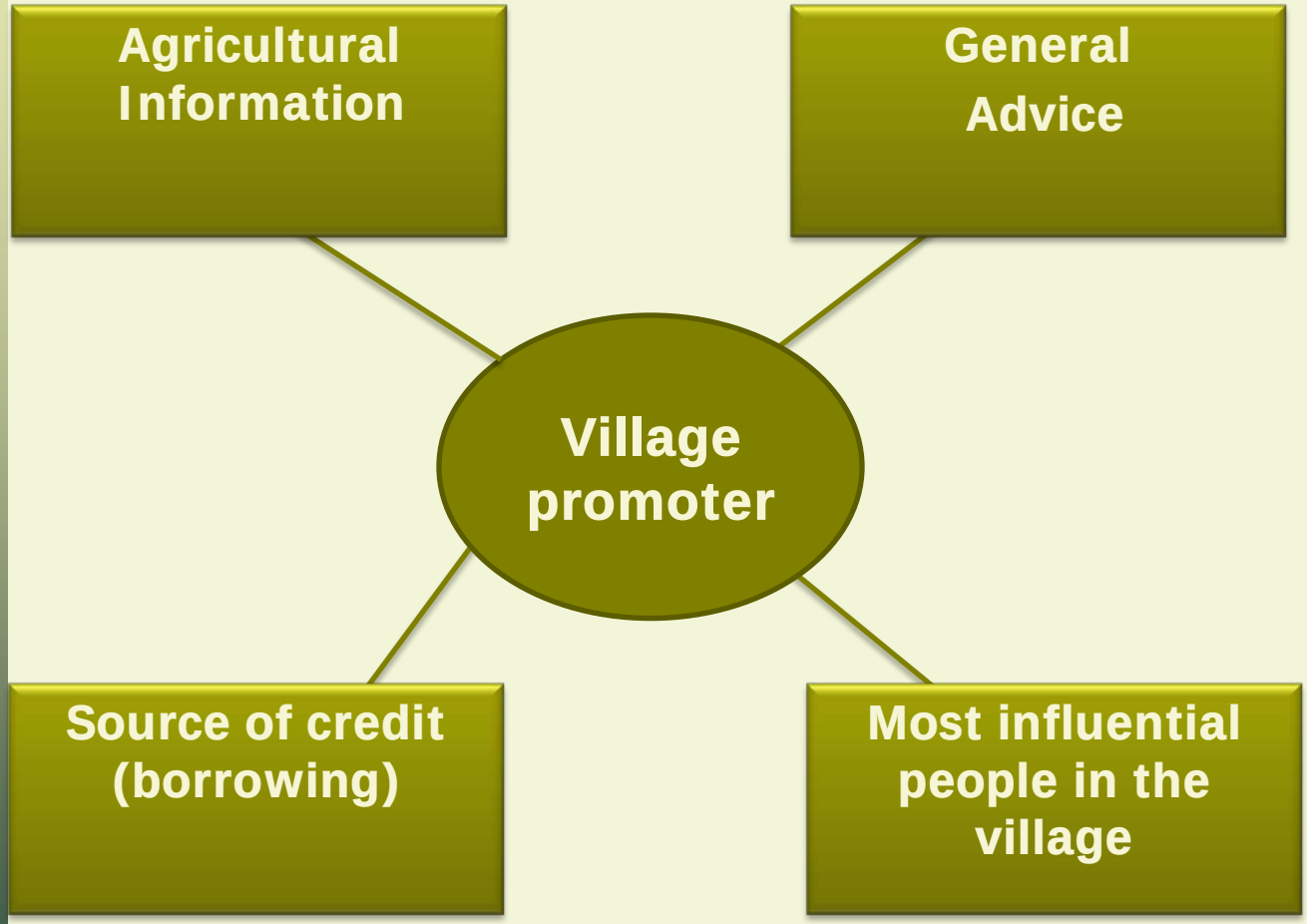
- Centrality as the number of nodes



With our dataset...

- We develop centrality measures to capture the prominence/influence of individuals in the community.
- We use the following:
  - How frequently is an individual/household mentioned as the primary source of agricultural information by other households in the community
  - How frequently is an individual/household mentioned as the most influential person in the community
  - How frequently is a person/household mentioned as the person other community members would go to if they needed advice (generally)
  - How frequently is a person/household mentioned as the person other community members would go to if they needed to borrow money

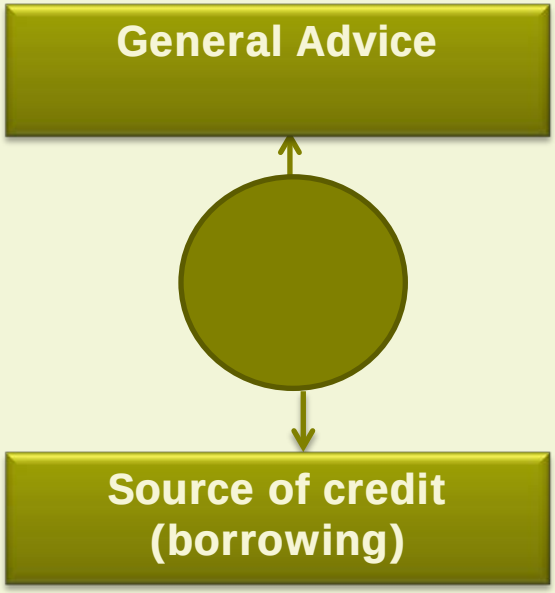
Findings...


Agricultural Information
General Advice
Village promoter
Source of credit (borrowing)
Most influential people in the village

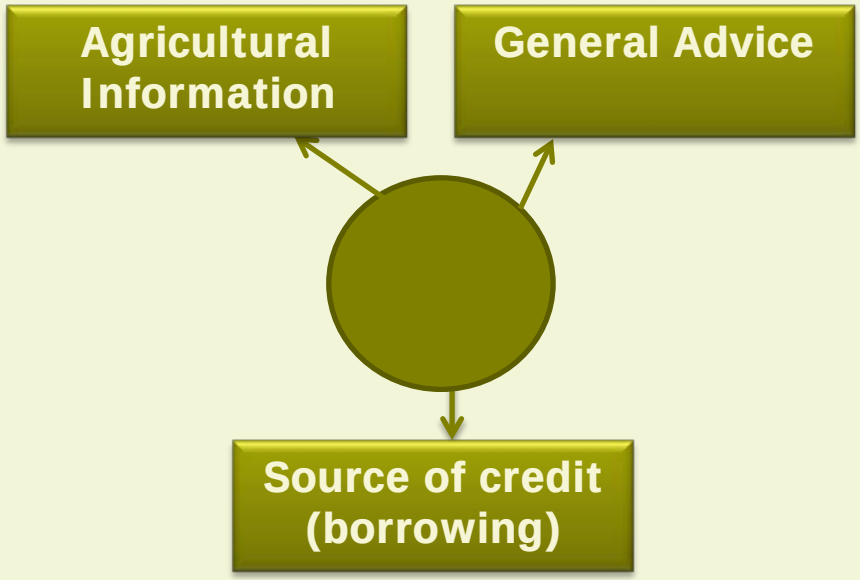
Who is the village promoter?

- Age: 41
- Highest education : polytechnic
- Primary work activity is farming,
- Secondary work activity is small business/ commerce (i.e selling USG)
- An indigene of the village who has lived in the village all his life and farmed most of his life.
- He is also a member of a farmer organization and plays the role of president.
- He owns three plots, and grows rice on all of them
- He owns 2 motorcycles and 2 Tvs

Other key players:



- 32 years old, male
- highest education: polytechnic,
- owns a motorcycle and TV;
- owns 1 plot & grows rice only
- Lived all his life in the village
- Used USG



- 30 years old, male
- highest education: JSS
- own motorcycle and TV;
- owns 4 plots & grows rice only
- Lived all his life in the village
- Used USG on all plots

Lessons learned

- An Effective information dissemination strategy was used in these two villages
  - Farmers were saturated with information about UDP
- The mechanism included a unique blend of social networks and commercial motivation to propagate a new technology.
- In Niger:
  - a model farmer, open to innovative practices, very popular, very well respected and well liked.
  - Called a village meeting to propagate the technology.
  - Majority of respondents pointed to him as the source of their agricultural knowledge.
  - He appears to have credibility

However...

- Cause and effect with regards to village promoter is unclear – it may be his role that makes him influential.
- This is a special case, a lot of resources was devoted to propagating this technology in such a small geographic space, which led to deep diffusion.
- It is unlikely that this approach will be practical more generally, so it is critical to identify the most effective means of information transmission in order to propagate the technology.

Also, although yields differ across UDP users...

	2011		2012	
RICE	Non Users	UDP users	Non Users	UDP users
yield for plots managed by females	1153.85	4259.13	1442.31	5627.98
yield for plots managed by males	2176.59	3338.38	2159.66	4062.52
% difference between male and female plots	0.89	-0.28	0.50	-0.39

Future Steps

- Larger evaluation of the technology in 2013/2014
- This will be based on a randomized control trial
- This will be done by the Nigeria team including University of Ibadan, Michigan State University, IFPRI, IFDC and Notore

Thank you!