

# Beyond Market Prices:

Improving Productivity and Profitability of Small Farmers

Tapan S. Parikh • [parikh@berkeley.edu](mailto:parikh@berkeley.edu)

# Agriculture and Development

- The majority of the world's poor make their living from agriculture
- Improving productivity and profitability is the main pathway for development of the poorest countries (WDR 2008)
- Doing so more efficiently can reduce natural resource consumption and impact







# Beyond Market Prices

- Most work using and evaluating ICTs has focused on providing market prices
- While important, this ignores important aspects:
  - Trust and Relationships
  - Quality and Productivity
  - Transportation and Logistics
  - Institutions (ex. cooperatives)

# Two Projects

- **Digital ICS** - Quality Control, Certification and Marketing for Cooperatives
- **Avaaj Otalo** - Farmer to Farmer Knowledge and Experience Sharing



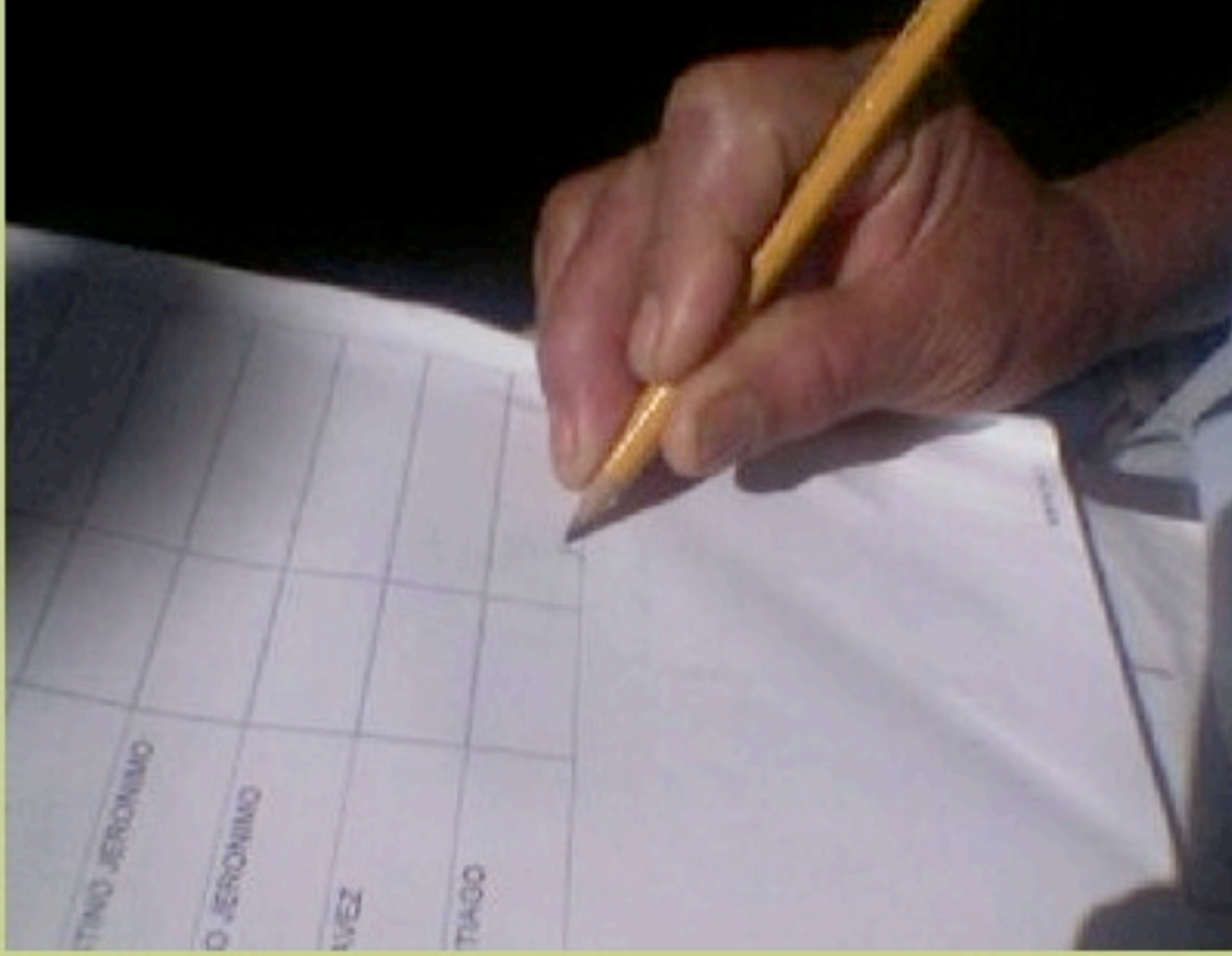
Yael  
Schwartzman





# Internal Control

- Certification (organic, etc.) and improved quality allow small farmers to differentiate their products and earn premiums
- Cooperatives use *Internal Control Systems* to ensure farmers are following best practices
- Internal control and certification are both labor and data-intensive





# Digital ICS

**Inspection**



Evaluation



Report Generation

Internal Inspectors  
use mobile phones  
to monitor

- Growing practices
- Parcels
- Equipment
- Neighboring crops
- Substances used
- Personal records









# Digital ICS

Inspection



Evaluation



Report Generation

Evaluators use **web application** for feedback and to decide outcome

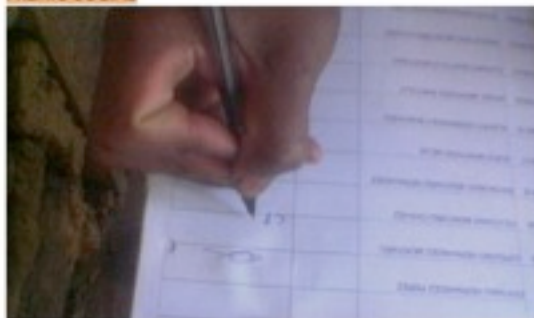
- Approved
- Sanctioned
- Expelled

CEPCO - Inspecciones Internas (Ver sitio »)				
Tablero Escribir Administrar Comentarios Blogroll Presentación Plugins Usuarios Opciones				
Subir <b>Evaluar</b>				
Lista de Miembros Imprimir Reporte Evaluar Imprimir Inspecciones				
SAN JUAN TABAA	SI	clave org E0392160001001	Inspector: JORGE LOPEZ ROBLES	Fecha Insp: 28/10/07 Resultado: aprobado
SANTIAGO TEOTLAXCO	Nombre: ALFONSO CASTELLANOS VASQUEZ OBSERVACIONES: 1.4 Num. parcela inspeccionada: 1 MEJORAR EL LLENA			
SAN JUAN YAGILA				
SAN MIGUEL TILTEPEC	NO	clave org E0392160001002	Inspector:	Fecha Insp: Resultado: baja
SANTA MARIA ZOOGOCHI	Nombre: APOLONIO JERONIMO GARCIA OBSERVACIONES:			
	SI	clave org E0392160001003	Inspector: JORGE LUIS ESTEBAN CARRASCO	Fecha Insp: 28/10/07 Resultado: aprobado

## REGISTROS DE ETIQUETAS DEL HONGO UTILIZADO

### 9 - Aspectos Organizativos

- ☐ EL PRODUCTOR NO CONTRATO MANO DE OBRA
- ☐ EL PRODUCTOR NO CONTRATO NIÑOS(AS) PARA TRABAJAR EN EL CAFETAL
- ☐ EL PRODUCTOR SI PARTICIPO EN LAS ASAMBLEAS DE SU ORGANIZACION O GRUPO COMUNITARIO
- ☐ EL PRODUCTOR SI SABE SI LA DIRECTIVA DE SU ORGANIZACION REGIONAL REALIZO UN BALANCE DE COMERCIALIZACION.
- ☐ EL PRODUCTOR SI SABE SI LA DIRECTIVA DE SU ORGANIZACION REGIONAL INFORMO COMO SE VENDIO EL CAFE DE LA COSECHA ANTERIOR.
- ☐ EL PRODUCTOR VENDIO SU CAFE EN FIRME Y SI CONOCE EL PRECIO FINAL DE SU CAFE QUE FUE DE 20.90 PESOS
- ☒ EL PRODUCTOR NO SABE CUANTO DINERO RECIBIO SU ORGANIZACION DE PREMIO SOCIAL



# Digital ICS

Inspection → Evaluation → **Report Generation**

Automatically  
generates reports

- External Certifiers
- Internal Records
- Producer Records
- Extension Follow-up

kg. Fecha de aplicación de abono : 04-10-2007

**5 - Manejo de cultivos**

☐ 5.1 El productor realizó podas, en su parcela

☐ 5.2 No hay problemas con plagas o enfermedades

☐ 5.3 Vió evidencia o muestra de aplicación de fertilizante para n o enfermedades en la parcela 1

☐ 5.4 El productor no cuenta con equipo de aspersión .

☒ **5.5 Hay poca basura inorgánica en la parcela**

☐ 5.6 I control

rg 60001001

Inspector: Yael Schwartzman

Resultado: **aprobado**

Fecha Insp: 10/07/2007

la parcela

OBSERVACIONES:

NOMBRE	Fecha insp.	Nombre insp.	Fecha eval.	Nombre eval.	Resultado	OBSERVACIONES
Pedro Gonzales	11/05/07	Felipe	12/05/07	Manuel	Aprobado	Inter barreras
Manuel Felipes	11/05/07	Felipe	12/05/07	Manuel	Sancionado	uso quimicos
Roxana Claudia	11/06/07	Felipe	12/05/07	Manuel	Aprobado	
Alberto Ramos	11/06/07	Felipe	12/06/07	Manuel	Sancionado	5.5 hay poca basura en la parcela
Sawila Camote	11/07/07	Felipe	12/06/07	Manuel	Aprobado	
Meche Fuentes	11/07/07	Felipe	12/06/07	Manuel	Aprobado	
Roberta Fuentes	11/08/07	Felipe	12/07/07	Manuel	Aprobado	

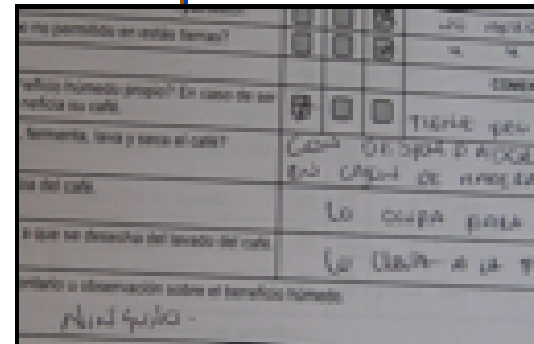


## Previous System

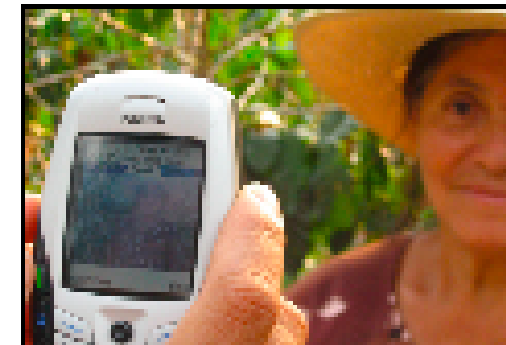
## DigitalICS

Internal  
Inspection

### Paper Forms



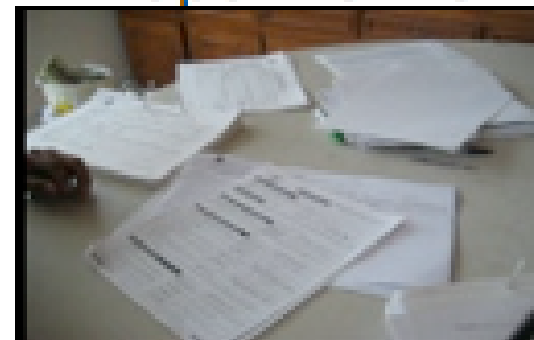
### Mobile Phones



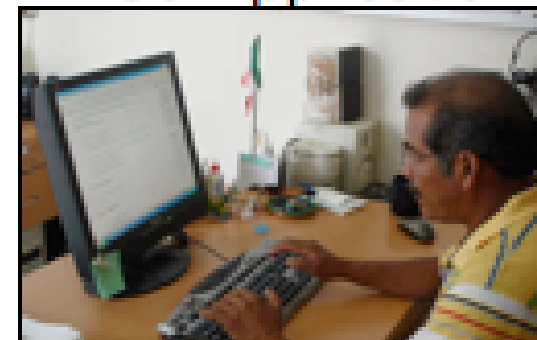
Automatic Data Transfer  
via USB Cable

Internal  
Evaluation

### Paper Forms



### Web Application



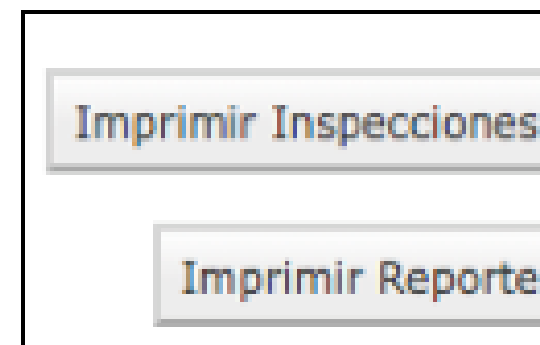
Manual Data  
Entry

Report  
Generation

### Excel or FileMaker



### Web Application + FileMaker

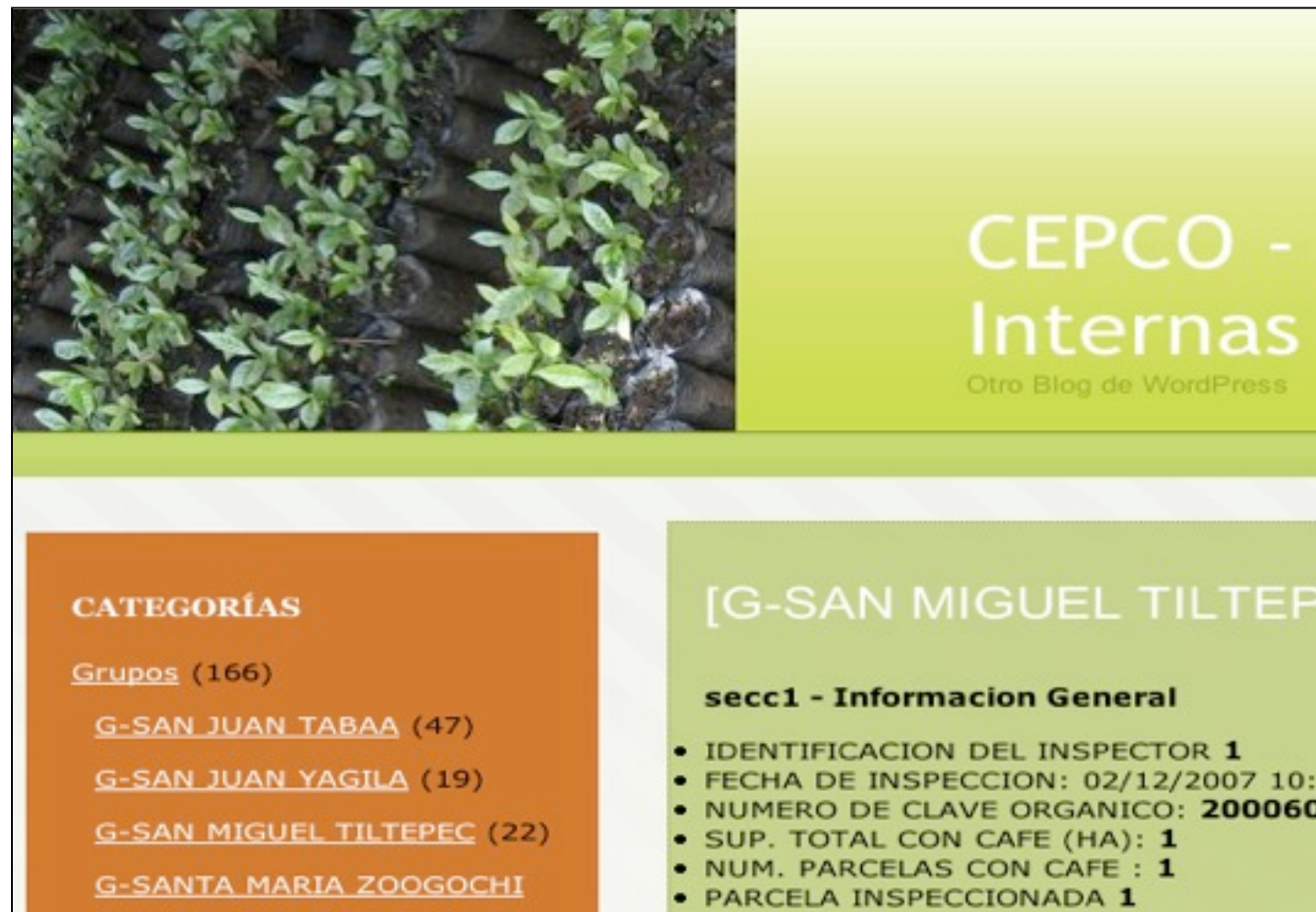


# Current Results

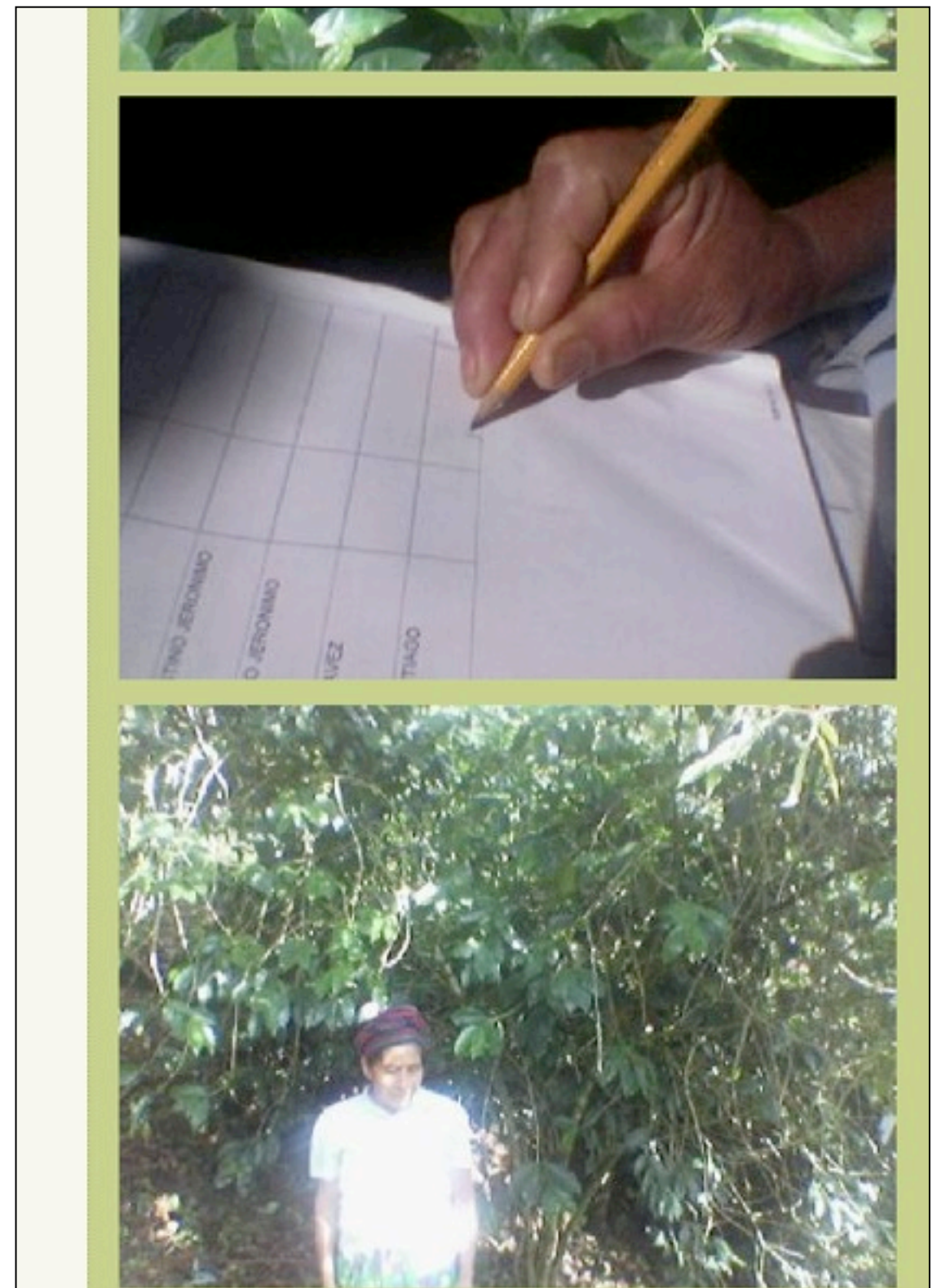
- Deployed with 900 farmers
  - **38%** reduction in inspection time
  - **69%** reduction in evaluation time
  - **\$10,000** yearly savings for cooperative
- Feedback from farmers used to inform decision-making and governance
- Service contract and interest from coops



# Digital ICS: Producer-2-Consumer



- Trace coffee to parcel
- Growing history
- Farmer's stories
- Two-way communications



# Research Questions

- Data-driven form design
- Organizing, understanding and acting upon qualitative feedback
- Open source business models
- Impact on cooperative, farmer profits
- Impact on consumer behavior

# Agricultural Extension

- Farmers have many questions
  - Treating specific pests?
  - Fertilizer and chemicals to use?
- Government and university extension programs are costly, and still don't reach many farmers or address their concerns
- Only accessible resource is local input dealer
- No mechanism for contextualizing knowledge



Neil Patel





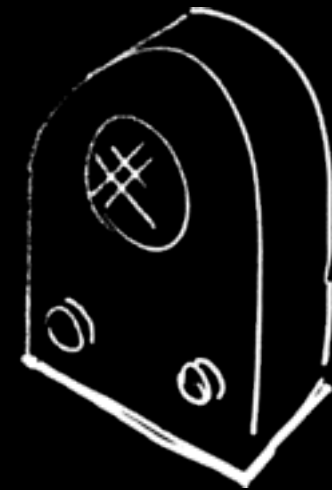
# Avaaj Otalo



**announcements**



**question &  
answer**



**radio  
broadcast**

# Avaaj Otalo

- Farmers call an IVR-based voice system to:
  - record and tag questions
  - review news, questions and answers
  - provide answers
  - popular questions are broadcast on radio



















# Current Results

- Pilot with 50 users since January 2009
- Over 3500 calls per month (more than 2 calls per user per day!)
- Three times as many questions answered by other farmers, as by NGO experts



# Research Questions

- Voice-based UI design
- Tagging and searching audio content
- Making voice-based systems easier to design and deploy
- Impact on technology / knowledge diffusion
- Cost-benefit analysis

# Conclusions

- Providing farmers tools to help themselves
- Empowering institutions
  - Cooperatives, NGOs, networks
- Models can be transferred
  - Improving Feedback Loops
  - Peer-to-Peer Knowledge Sharing
- Sustainable replication is hard!



# Thanks!

- Yaw Anokwa, Kuang Chen, Brian DeRenzi, Kurtis Heimerl, Neha Kumar, Neil Patel and Yael Schwartzman
- Asobagri, CEPCO, DSC and IBM
- Nokia Research, Intel Research, Microsoft Research, Unamesa and Transfair
- UC Berkeley School of Information