

Giving Farmers a Voice

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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 this efficiently can reduce natural resource consumption and impact



Farmers Need Information

- Knowledge about inputs
- Dealing with pests and diseases
- New practices, technologies
- Access to markets, buyers
- Transportation
- Weather forecasts
- Access to capital

Challenges

- Access to technology
- Infrastructure (power, connectivity)
- Education and literacy
- Social, economic, cultural, linguistic and institutional gaps



Mobiles and Voice

- Mobile phones are rapidly reducing the physical limitations of access
- However, information must still be usable, trusted and relevant
- Voice-based content can be accessed, and created, by farmers with low-cost handsets

- **Hisaab** - UI Design for Microfinance
- **Avaaj Otalo** - Farmer to Farmer Knowledge Sharing
- **Digital ICS** - Quality Control and Communication for Cooperatives

Hisaab

Microfinance

- Provision of financial services to under-served communities
- Organized into groups that decide who gets loans, monitor repayments, and maintain accounts
- Poor records (due to lack of literacy and training) limit performance, complexity of products and access to capital







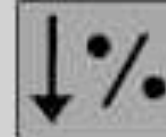
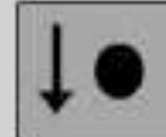
தர்ந்தெடுக்கப்பட்ட ள்ளார்

தேதி : 12/10/02

1		விஜயா	50	50					
2		பாரதிதாசன்	50	50					
3		கார்த்திக்	50	0					
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5		மீனா	50		12.10.02	50	✓		
6		லல்வி	50		05.10.02	50	✓		
7		சித்ரா	50		22.09.02	50	✓		
8		சத்யானந்தன்	50		15.09.02	0	✗		
9		சகுந்தலா	50		03.09.02	50	✓		
10		விவகானந்தன்	50		26.08.02	50	✓		
11		கார்த்திக்	50						





4 பிரியா




 ஆரம்ப இருப்பு 12.10.02

குழுவின் மொத்த சேமிப் 1080

 Group Investments

 கையிருப்பு 1600

 Bank balance 6850



Design for Low-literacy

- Leverage existing representations
- Use icons that are familiar and realistic
- Provide guidance throughout the task
- Numbers are more accessible than text
- Local language audio is very important

Orality (Ong, 1982)

- Oral communities have their own ways of representing and managing information
- Aggregative - tolerant of repetition, redundancy and inconsistency
- Situational - tied to specific situations and people; not abstract concepts
- Dialectic - reinforced by dialogue

Avaaj Otalo

Neil Patel



Agricultural Extension

- Farmers have many questions
 - Treating specific pests?
 - Amount, type of inputs to use?
- Extension programs are costly, but still don't reach most farmers
- Difficult to contextualize knowledge
- Only accessible resource is local input dealer

Avaaj Otalo

- Farmers and experts call an IVR-based voice system to:
 - record questions
 - provide answers
 - review previous questions and answers
- Popular questions broadcast on radio
- Early days of Usenet; using Voice



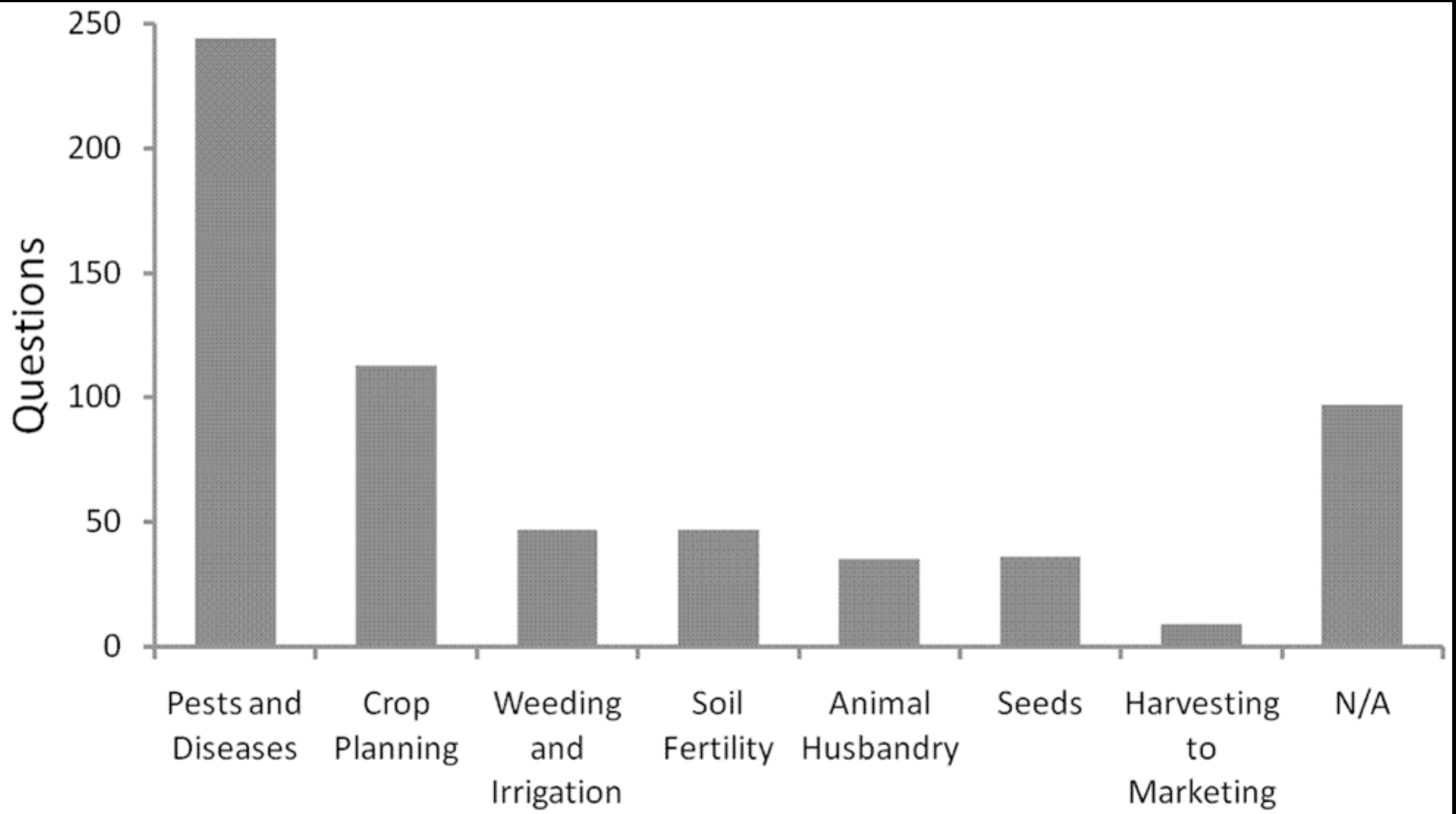






Current Results

- Pilot with 50 users since December 2008
- Averaging 1000 calls per month
- One farmer self-reported a \$6K increase in income due to information from AO!
- Questions covered a variety of topics



Major Findings

- Numeric input was more intuitive, less error-prone than limited vocabulary speech recognition
- Farmers preferred expert advice, but also learned from questions and experiences of other farmers
- Farmers patiently waited through (and even enjoyed) lots of irrelevant (free) content
- Lots of uses for voice forum, both for farming, and for non-farming activities

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Digital ICS

A photograph of three people sitting outdoors in a rustic log cabin setting. On the left, a man with short dark hair, wearing a blue and white plaid shirt, is looking towards the center. In the middle, a man wearing a red baseball cap and a dark blue button-down shirt is looking towards the right. On the right, a woman wearing a dark blue baseball cap, a white cardigan over a green top, and a dark necklace is looking towards the center. She is holding a white piece of paper. The background is filled with lush green foliage. A colorful woven bag is visible behind the man in the middle. The text 'Yael Schwartzman' is overlaid in a white box in the top right corner.

Yael
Schwartzman

Digital ICS

- Internal control system for agri-cooperatives
- Maintain quality, certifications (organic, fair trade)
- Voice feedback and questions from farmers

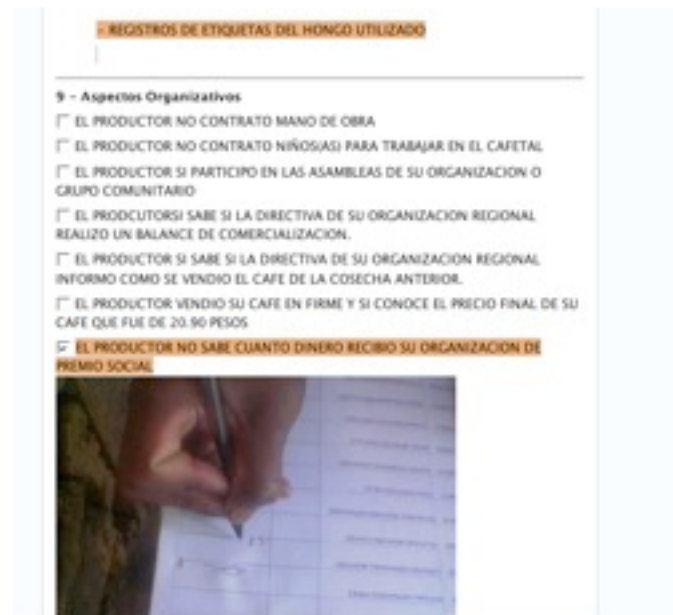
Inspection

Inspectors use **mobile phones** to monitor farms



Evaluation

Evaluators use a **web application** to give feedback



REGISTROS DE ETIQUETAS DEL HONGO UTILIZADO

9 - Aspectos Organizativos

- ☐ EL PRODUCTOR NO CONTRATO MANO DE OBRA
- ☐ EL PRODUCTOR NO CONTRATO NIÑOS(A) 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

Report Generation

Generate **reports** for extension and certification




Fig. 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 Vid evidencia o muestra de aplicación de fertilizante para 6 enfermedades en la parcela
- ☐ 5.4 El productor no cuenta con equipo de aspersión
- ☒ 5.5 Hay poca basura inorgánica en la parcela
- ☐ 5.6 control

Inspector: Yael Schwartzman

Resultado:

Fecha insp: 10/07/2007

OBSERVACIONES:

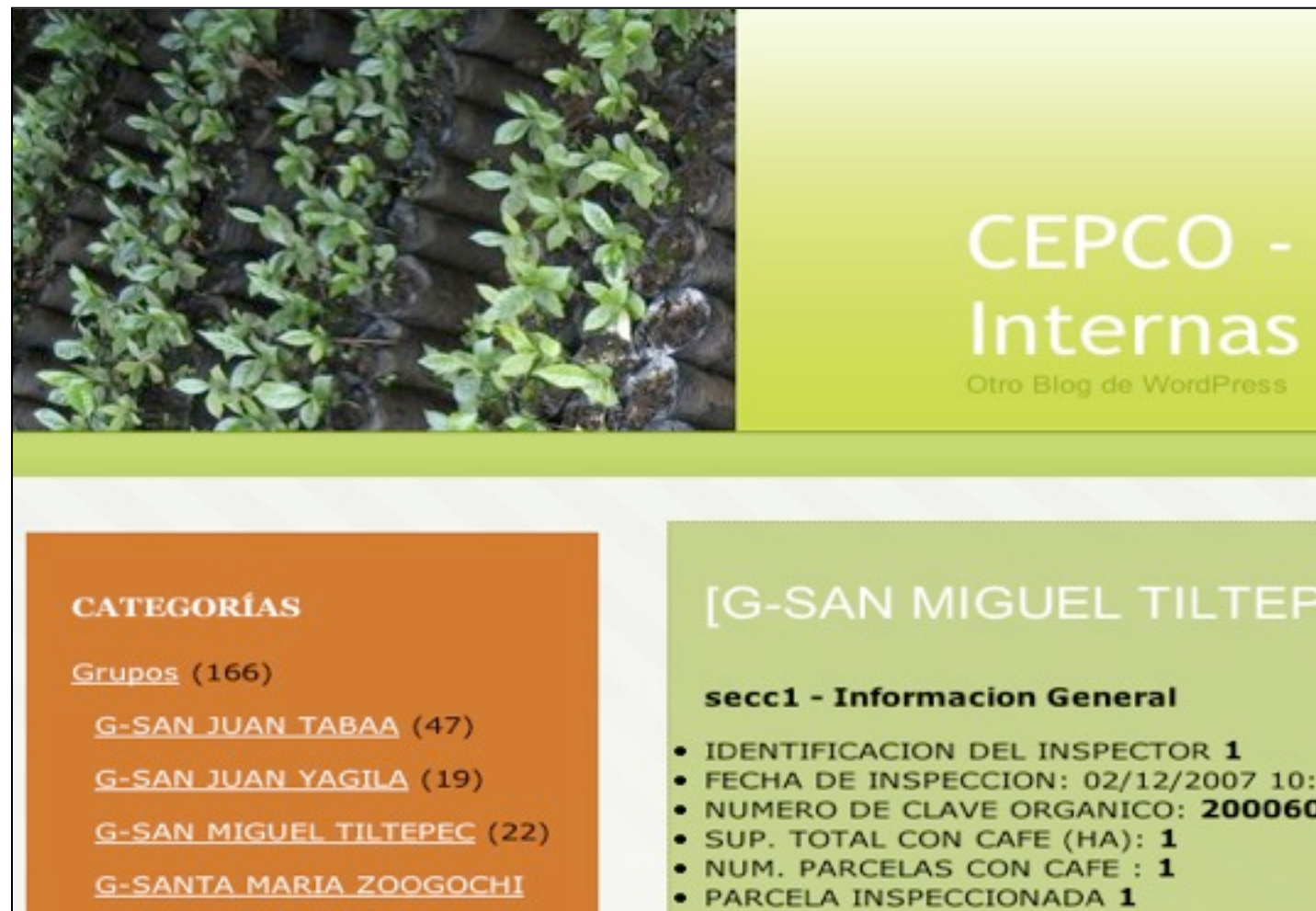
NOMBRE	Fecha insp.	Nombre insp.	Fecha eval.	Nombre eval.	Resultado	OBSERVACIONES
Pedro Gonzales	11/05/07	Felipe	12/05/07	Manuel	Aprobado	
Manuel Felipe	11/05/07	Felipe	12/05/07	Manuel	Sancionado	
Roxana Claudia	11/06/07	Felipe	12/05/07	Manuel	Aprobado	
Alberto Ramos	11/06/07	Felipe	12/06/07	Manuel	Sancionado	
Savila Camote	11/07/07	Felipe	12/06/07	Manuel	Aprobado	
Mecha Fuentes	11/07/07	Felipe	12/06/07	Manuel	Aprobado	
Roberta Fuentes	11/08/07	Felipe	12/07/07	Manuel	Aprobado	

Current Results

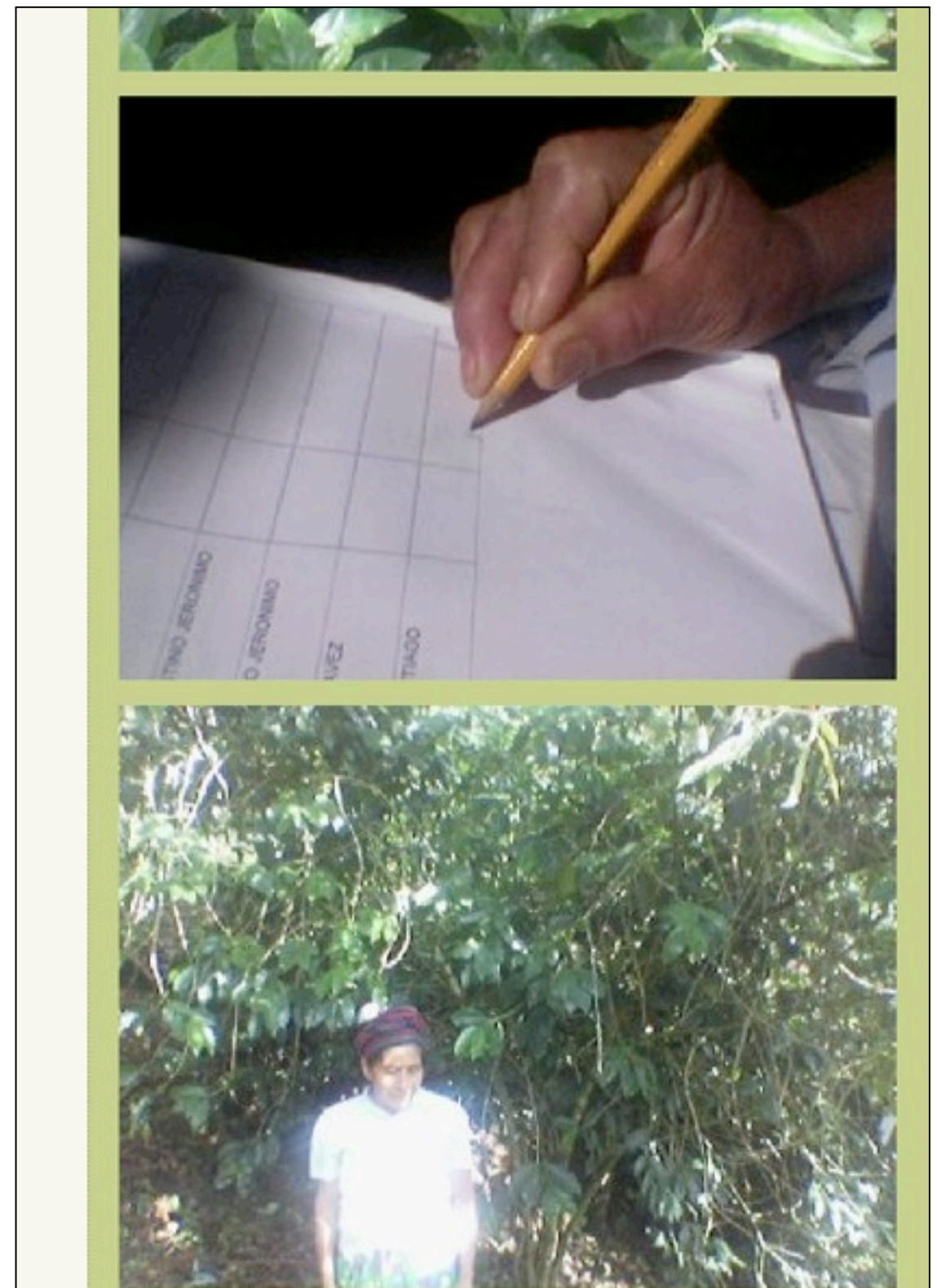
- Deployed in a Mexican coffee cooperative with over 2700 farmers
- More efficient reporting, decision-making
- **\$10,000** yearly savings for cooperative
- Voice feedback used to target extension, governance, allocation of premiums
- Service contract established



Digital ICS: Producer-2-Consumer



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



Giving Farmers a Voice

- Rural communities want to be heard!
- Using text and forms is like “threading an elephant through the eye of a needle”
- Voice is a much better medium for expression and engagement
- Voice not only useful for interacting with information, but for aggregating and representing information itself

Future Research

- What is the best way to organize information for oral users?
- Can we efficiently index, search and browse user-generated voice content?
- Can we use collected voice data to improve speech recognition?
- What is the impact of such technologies, and can we use voice to document it?

Conclusions

- Tools for people to help themselves
- Empowering institutions
 - Cooperatives, NGOs, farmer networks
- Models can be transferred
 - Improving feedback
 - Peer-to-peer sharing

Other Projects

- CommCare - Mobile Tool for CHWs
 - Surveys, Clinical Protocols
- Mobile MIS for SHGs
- Improving Data Entry using ML
- Voice-based Data Collection
- OpenRosa - Mobile Data Collection

Discussion

- Can these models be applied to
 - Improve the accountability of public programs?
 - Engage rural communities in discussions about climate change and environmental issues?
 - Disseminate and discuss other kinds of information?

Thanks!

- Kaushik Ghosh, Apala Chavan, Sarit Arora, Puneet Syal, Neil Patel, Yael Schwartzman, Yaw Anokwa, Kuang Chen, Brian DeRenzi, Kurtis Heimerl, Neha Kumar
- CCD, Asobagri, CEPCO, DSC, Media Lab Asia, HFI, IBM Research India
- Intel, Microsoft, Nokia, Unamesa, Transfair, Bill & Melinda Gates Foundation

E-Z Rural Computing

Easy to Use: Max outreach

Easy to Teach: Word of mouth

Easy to Access: Travel is hard

Easy to Share: Amortize high costs

Easy to Create: Local ownership

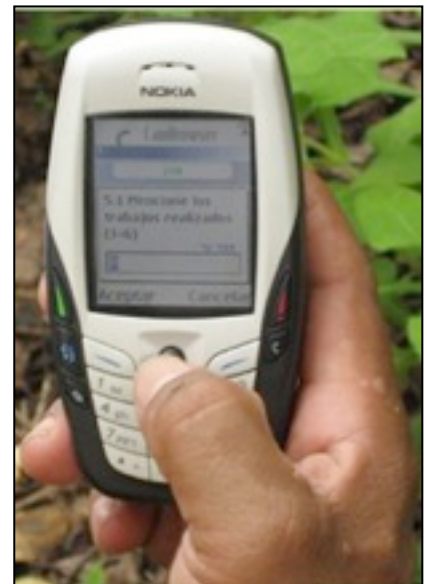
Easy to Adapt: Localization essential

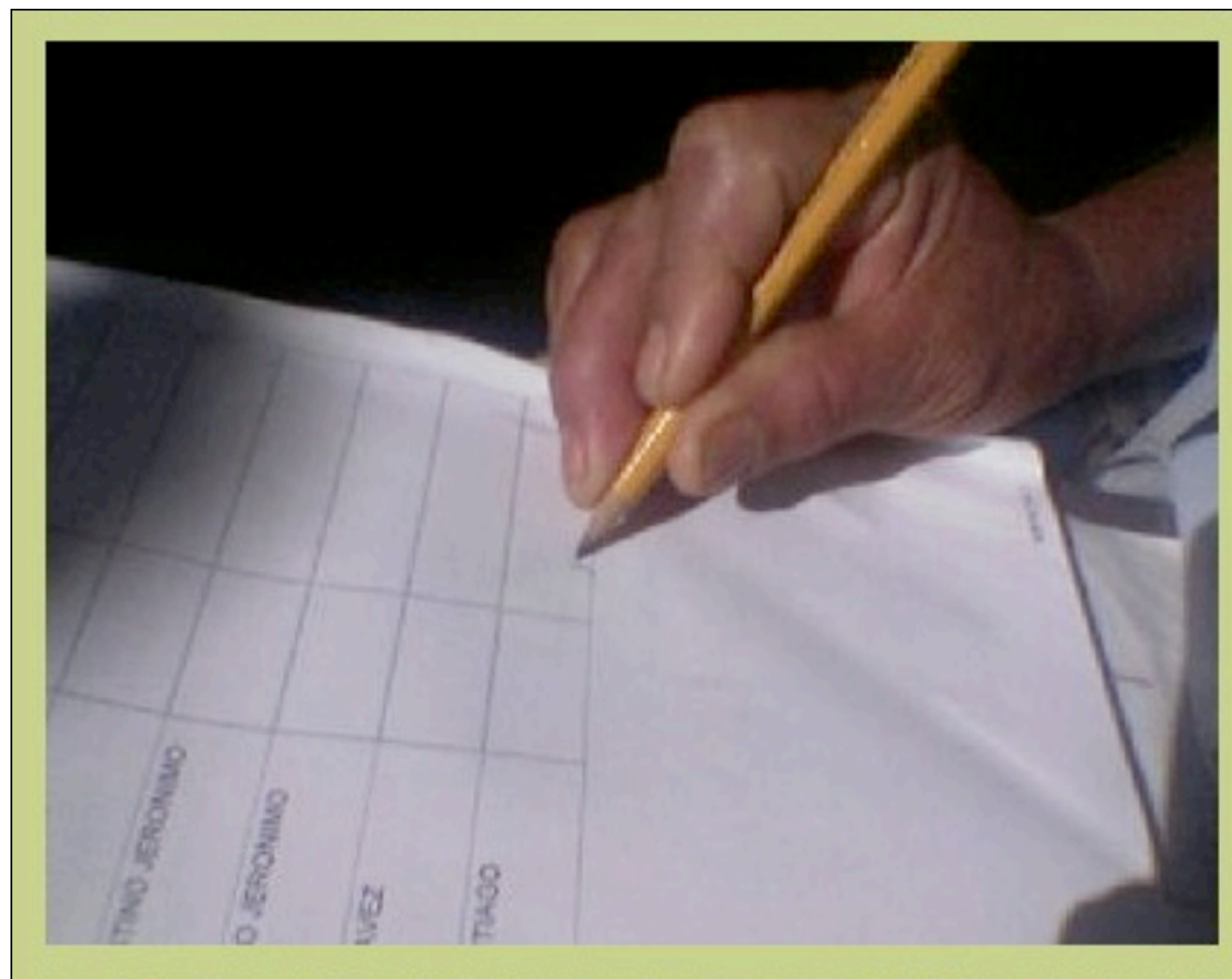
Internal Control

- Certification (organic, fair trade, etc.) and quality can allow small farmers to earn price premiums
- Cooperatives use *Internal Control Systems* to ensure farmers are following best practices
- Internal control, certification and responding to farmers' needs are labor, feedback and data-intensive

Digital ICS

- Management, monitoring and quality control tool for agricultural cooperatives
- Field staff use mobile phones to document
 - Compliance with organic requirements
 - Farmers' questions and feedback





Digital ICS

Inspection



Evaluation



Report Generation

Cooperative's field staff use mobile phones to document

- Organic certification
- Growing practices
- Farm parcels
- Equipment
- Neighboring crops
- Substances used
- Questions and comments



w/ Yael Schwartzman, CEPCO



Digital ICS

Inspection



Evaluation



Report Generation

Evaluators use **web application** to review data, provide feedback and follow-up

CEPCO - Inspecciones Internas (Ver sitio ») ¡Hola!, Mario. [Salir, Mi Perfil]

Tablero Escribir Administrar Comentarios Blogroll Presentación Plugins Usuarios Opciones

Subir **Evaluar**

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	NO	clave org E0392160001002	Inspector:	Fecha Insp:	Resultado: baja
SAN MIGUEL TILTEPEC	Nombre: APOLONIO JERONIMO GARCIA	OBSERVACIONES:			
SANTA MARIA ZOOGOCHI	SI	clave org E0392160001003	Inspector: JORGE LUIS ESTEBAN CARRASCO	Fecha Insp: 28/10/07	Resultado: aprobado

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Digital ICS

Inspection → Evaluation → **Report Generation**

Reports for:

- Buyers
- External certifiers
- Internal records
- Decision-making
- 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

5.5 Hay poca bas **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	hacer 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	5.5 hay poca basura en la parcela
Alberto Ramos	11/06/07	Felipe	12/06/07	Manuel	Sancionado	
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	

Knownet-Grin

Knowledge Network for Grassroot Innovators: A Honey Bee Project

- Honey Bee shares grassroots knowledge and innovation
- Publishes 7 regional magazines about agricultural practices and other innovations
- Interested in new ways to share content and facilitate communication between innovators
- Developed multi-media distributed database and communications application
- Networked using asynchronous CD-based updates
- Implemented at kiosks in Gujarat, Madhya Pradesh, Maharashtra and Tamil Nadu

