Giving Farmers a Voice

Tapan S. Parikh • 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 this efficiently can reduce natural resource consumption and impact

Wednesday, October 21, 2009

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

Wednesday, October 21, 2009

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

Wednesday, October 21, 2009

Wednesday, October 21, 2009

தர்ந்தெடுக்கப்பட்ட ள்ளார்
தேதி : 12/10/02

1	விஜயா	50	50
2	பாரதிதாசன்	50	50
3	கார்த்திக்	50	0
4	பிரியா	50	☐
5	மீனா	50	
6	லல்லி	50	
7	சித்ரா	50	
8	சத்யானந்தன	50	
9	சகுந்தலா	50	
10	விவேகானந்தன்	50	
11	கார்த்திக்	50	

4 பிரியா

50

12.10.02	50	✓
05.10.02	50	✓
22.09.02	50	✓
15.09.02	0	✗
03.09.02	50	✓
26.08.02	50	✓

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 then text
- Local language audio is very important

w/ HFI, CCD, Media Lab Asia

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

w/ Neil Patel, IBM, DSC

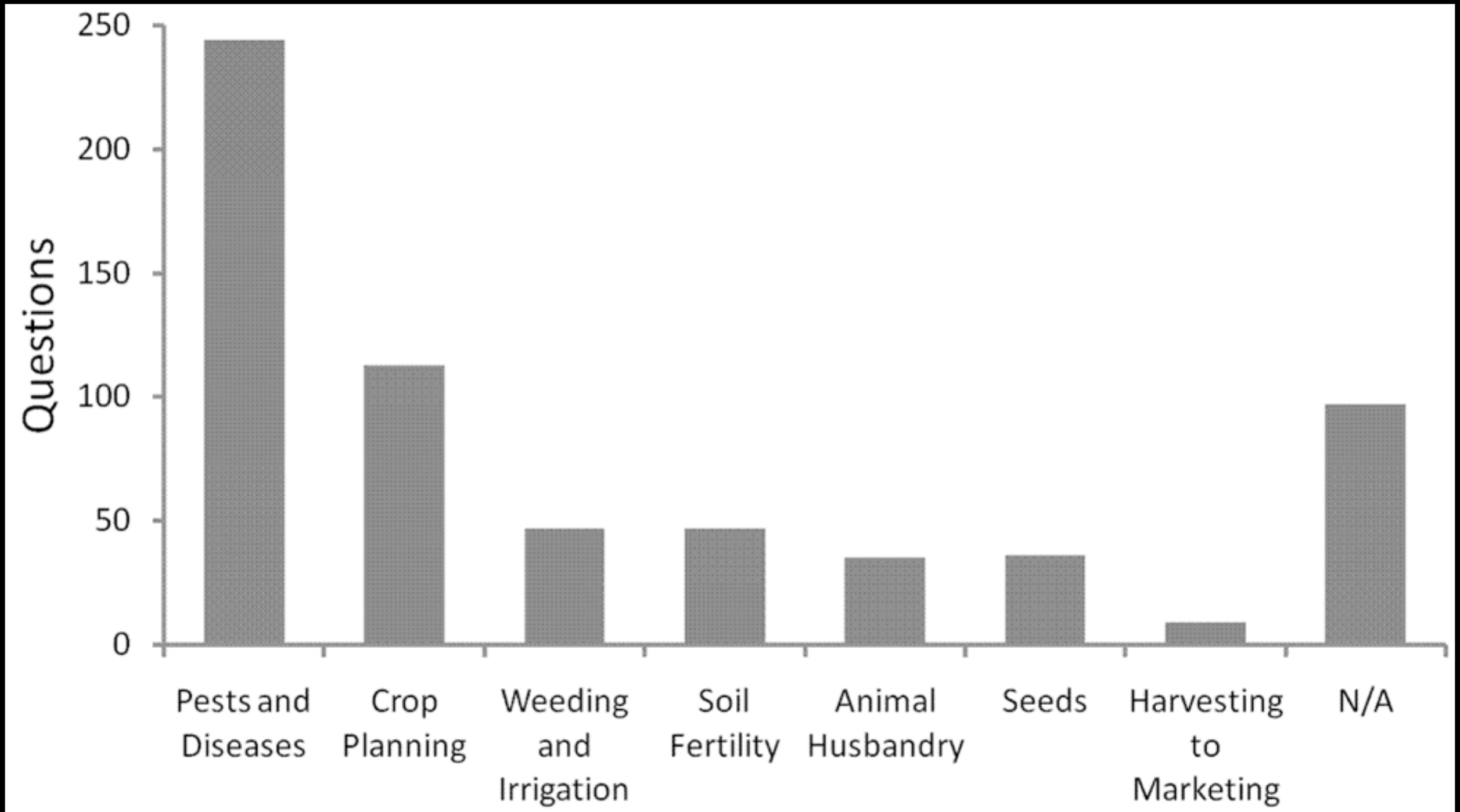
Wednesday, October 21, 2009

Wednesday, October 21, 2009

Wednesday, October 21, 2009

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


250
200
150
100
50
0
Questions
Pests and Diseases
Crop Planning
Weeding and Irrigation
Soil Fertility
Animal Husbandry
Seeds
Harvesting to Marketing
N/A

Major Findings

- Numeric input was more intuitive, less error-prone then 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

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

Digital ICS

Yael
Schwartzman

Digital ICS

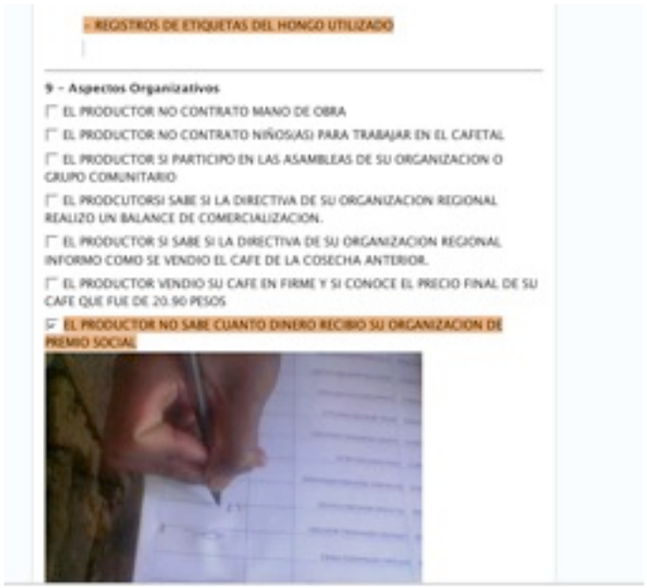
- Internal control system for agri-cooperatives
- Maintain quality, certifications (organic, fair trade)
- Voice feedback and questions from farmers

Inspection

Inspectors use **mobile phones** to monitor farms

Evaluation

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



Report Generation

Generate **reports** for extension and certification

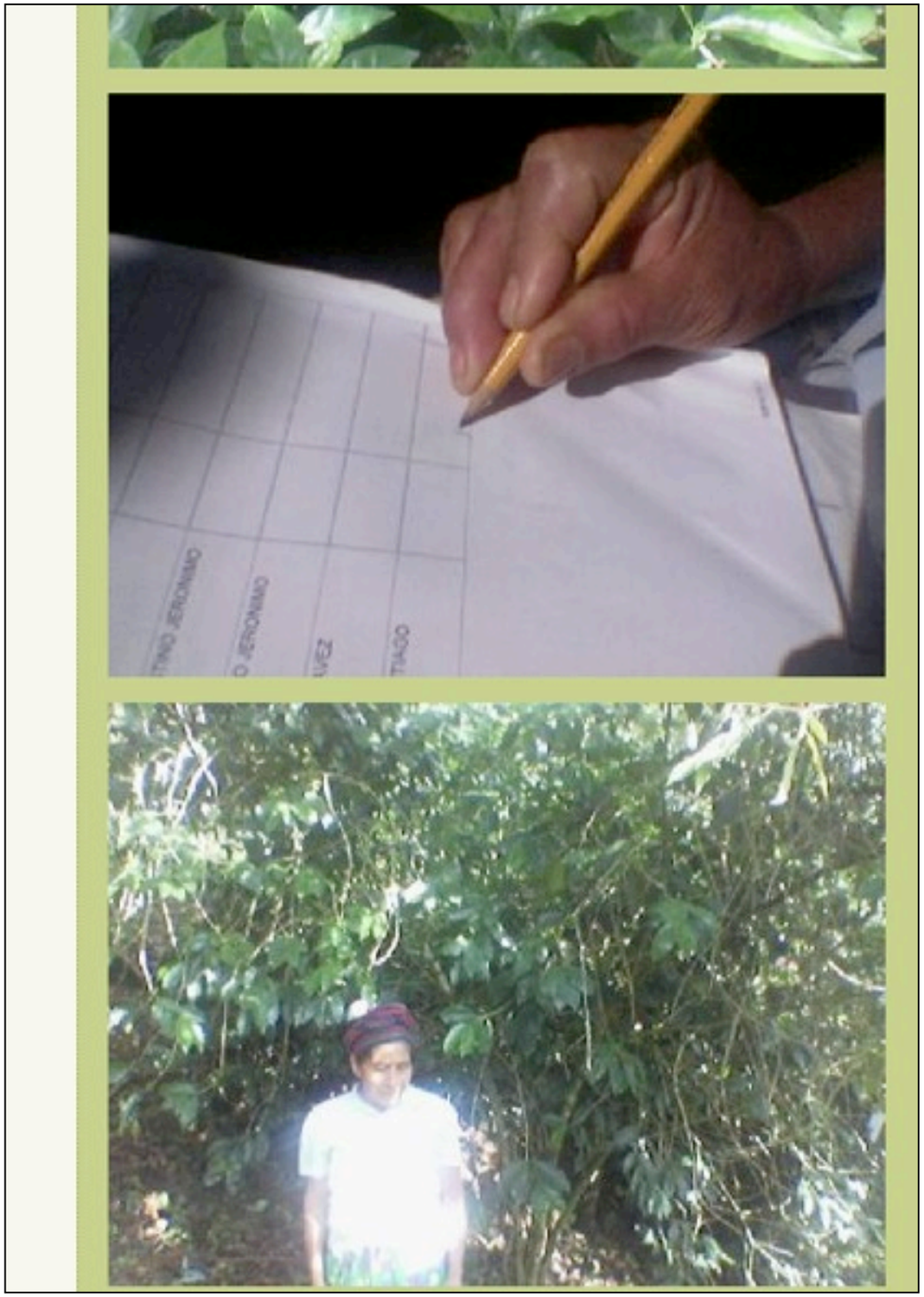
w/ Yael Schwartzman, CEPCO, Asobagri

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

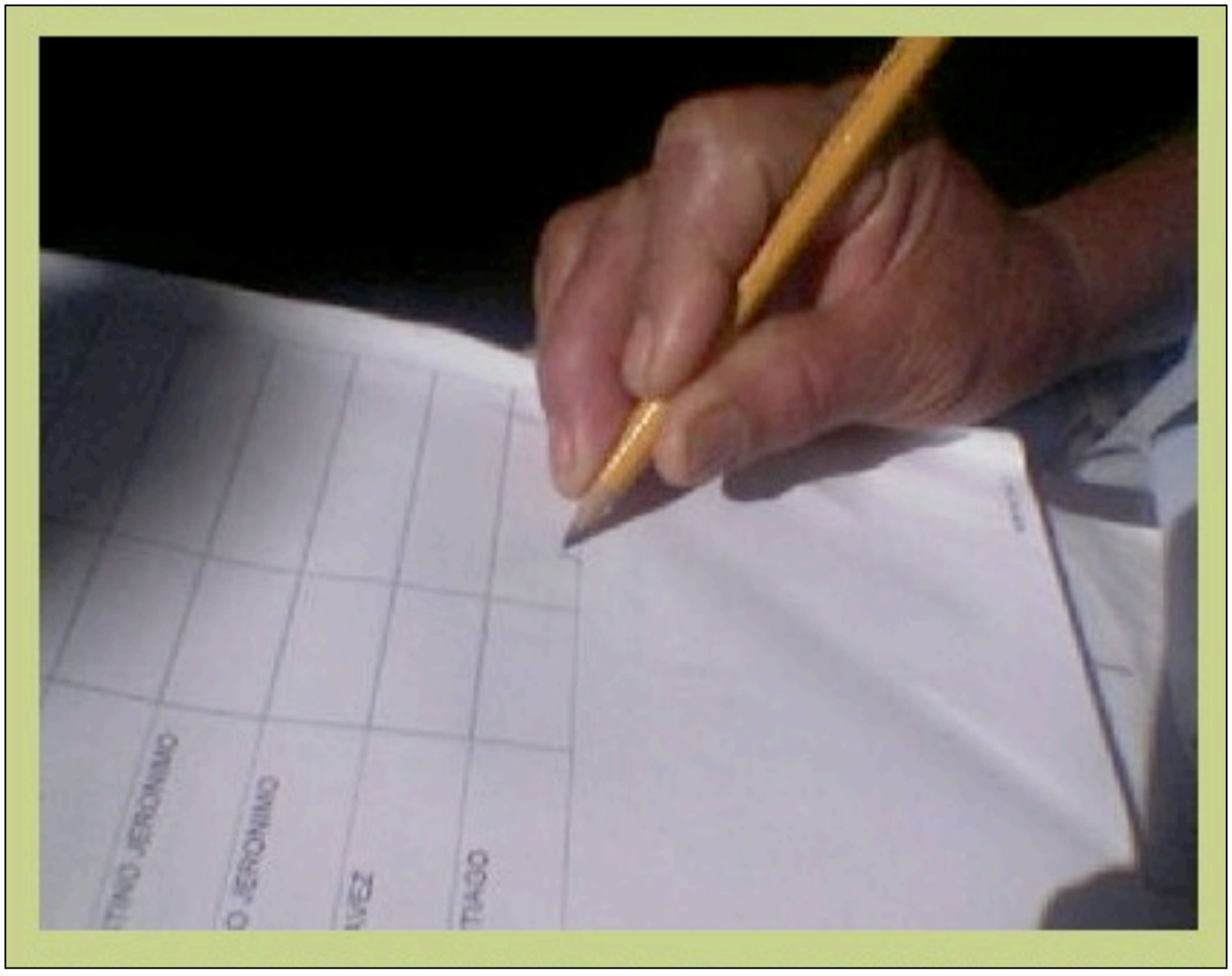
Easy to Adapt: Localization essential

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

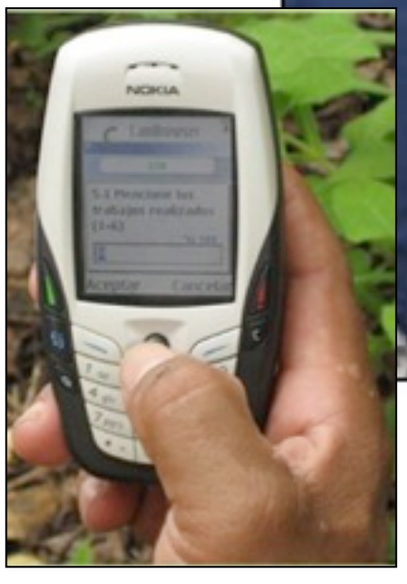


Digital ICS

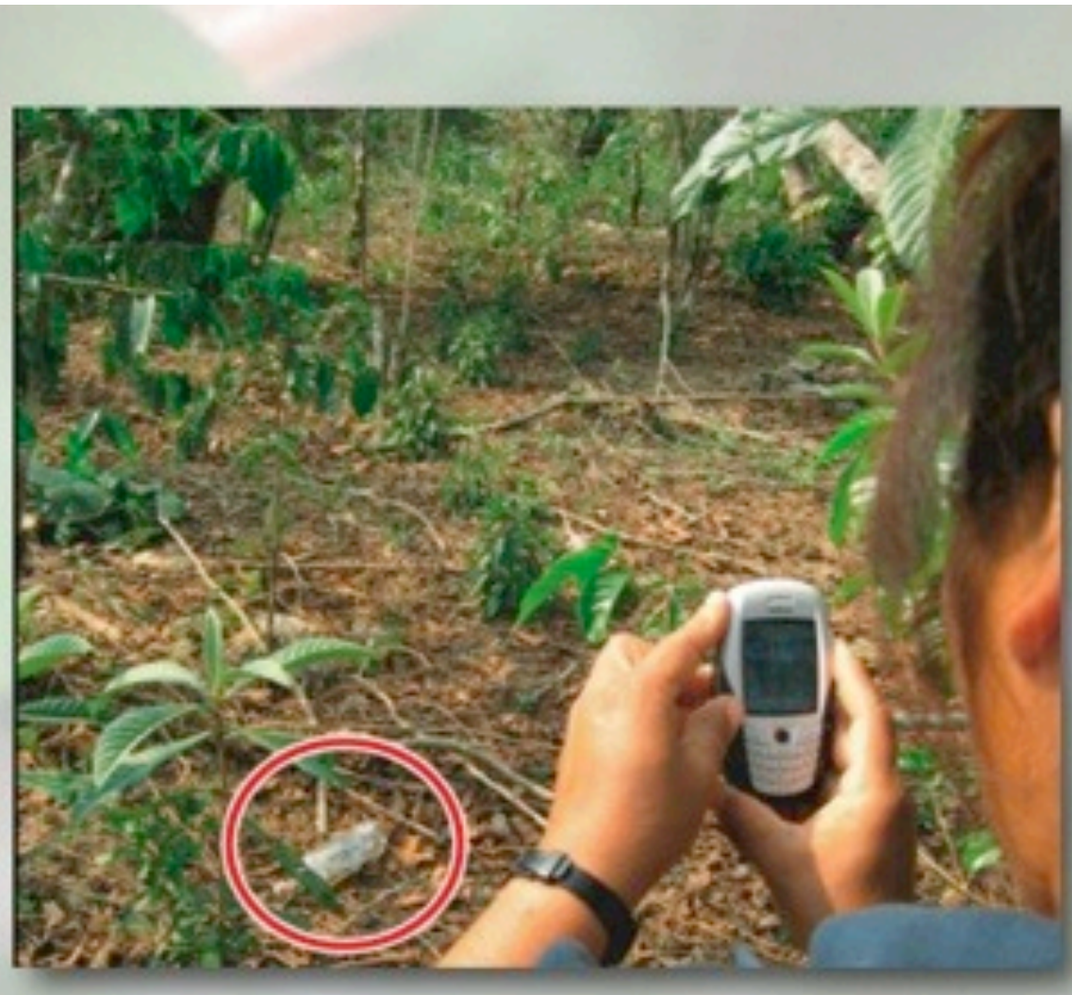
Inspection → Evaluation → Report Generation

Cooperative's field staff use mobile phones to document

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



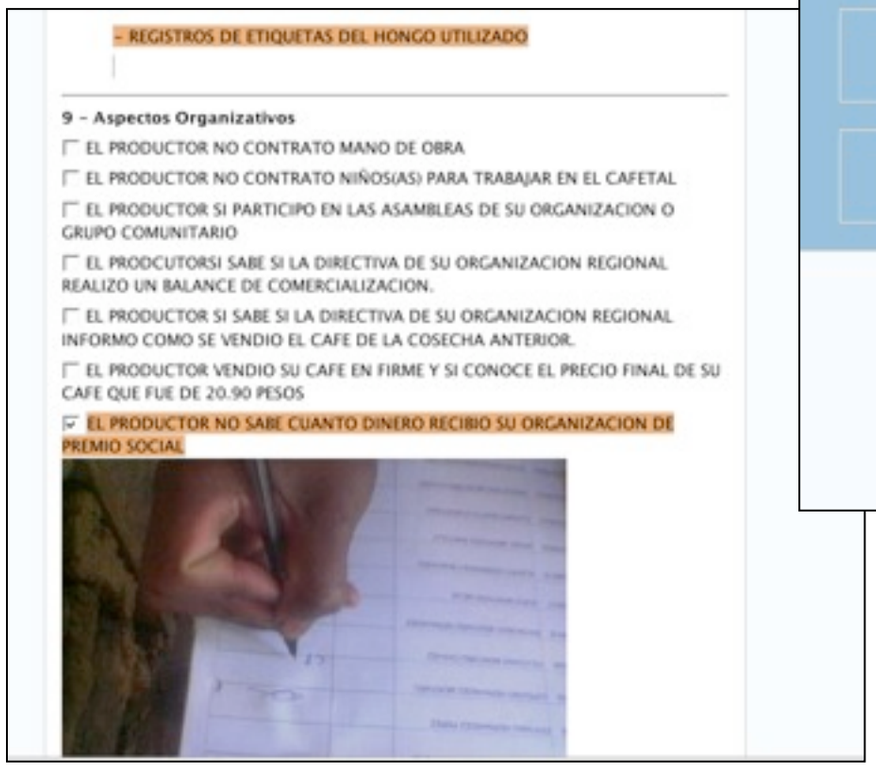
w/ Yael Schwartzman, CEPCO



Digital ICS

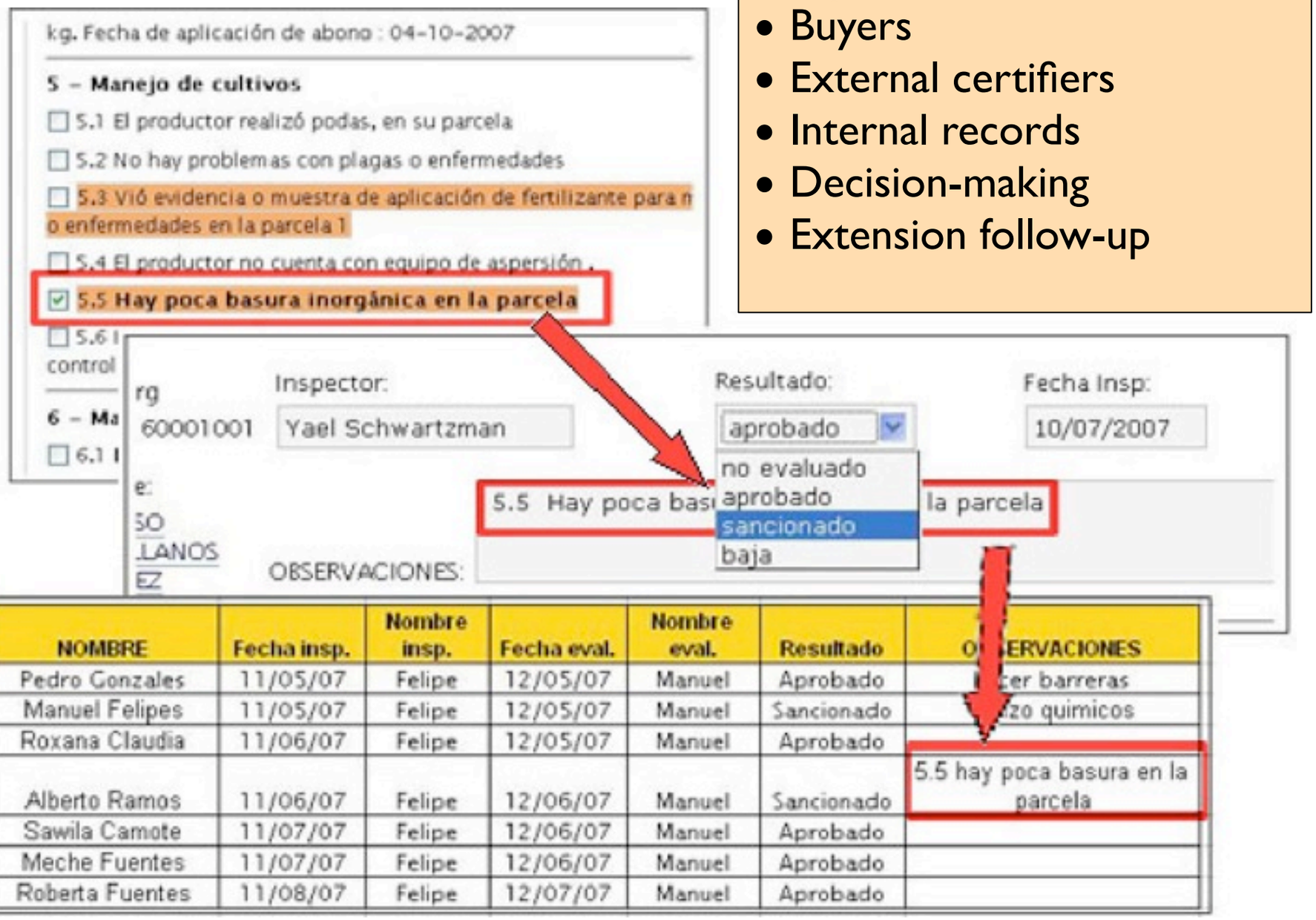
Inspection → **Evaluation** → Report Generation

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



Digital ICS

Inspection → Evaluation → **Report Generation**



NOMBRE	Fecha insp.	Nombre insp.	Fecha eval.	Nombre eval.	Resultado	OBSERVACIONES
Pedro Gonzales	11/05/07	Felipe	12/05/07	Manuel	Aprobado	cer barreras
Manuel Felipes	11/05/07	Felipe	12/05/07	Manuel	Sancionado	zo 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	

Reports for:

- Buyers
- External certifiers
- Internal records
- Decision-making
- Extension follow-up

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