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
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<td>Bank balance</td>
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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
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
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

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

Inspection  Evaluation  Report Generation

Inspectors use mobile phones to monitor farms
Evaluators use a web application to give feedback
Generate reports for extension and certification

w/ Yael Schwartzman, CEPCO, Asobagri

Wednesday, October 21, 2009
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

Wednesday, October 21, 2009
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
Cooperative’s field staff use mobile phones to document:
- Organic certification
- Growing practices
- Farm parcels
- Equipment
- Neighboring crops
- Substances used
- Questions and comments
Evaluators use web application to review data, provide feedback and follow-up.
Reports for:
- Buyers
- External certifiers
- Internal records
- Decision-making
- Extension follow-up
Kownet-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