Benefits of ICT applications to farmers with emphasis on transaction costs: experiences from India

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Presentation Structure

• Nature of benefits and transaction costs
• Examples of ICT initiatives in agriculture
  – eChaupal
  – Computerization of Mandis (agri-markets)
  – eSAGU: extension services and knowledge
  – Agri watch Portal
  – Land record computerization
  – Computerization of milk collection
• Critical Success Factors for ICT use
Transaction Costs for Farmers

- Observable transaction costs: include marketing costs such as transport, handling, packaging, storage, spoilage etc.
- Unobservable transaction costs: include cost of information search, bargaining, screening, monitoring, co-ordination, enforcement
- No systematic attempt to measure costs in India

Travel Costs per trip to Taluk Town in India

Average Cost per Trip is Rs. 18.7
Mandi Computerization
Weighing of Farm Produce:
Preparation of Standard Bags (90 to 100 Kg)

Grain Loss: 2-3 Kg per Quintal
Madhya Pradesh State Agricultural Market Board (Mandi Board)

- Mandi Board’s Head Office is in State Capital in Bhopal. There are 7 Regional Offices, 231 Mandis and associated Sub Mandis and 50 Check posts (Nakas).
- The organization serves around Six Million farmers of the state (trading in 1700 commodities); and 70,000 Licensed Traders
- Trade Volume handled: 12.5 million tonnes annually worth Rs. 1 40 billion. Collect a fee of Rs. 2 billions
- The web site is visited by 8-10,000 visitors resulting in 50,000 page views
- 85% of visitors are from out of state
Mandi Board Website – Main Menu

Background
Citizen Charter
Mandi Board
Manthan 2007
Mandi Members
Expression of Interest
Organization
Vision
DOT Project
Government Schemes
Right of Information

Agriculture Marketing Statistics
- Mandi Basic Information
- Mandi Grade
- Mandi Arrival
- Mandi Rates
- List of Mandis according to Arrival of Selected Commodities
- Mandi Act
- Mandi Bye Laws
- Mandi Manual
- Magazine - KHET AUR

Madhya Pradesh answers to a stream of unknown, an inquisitive eye can explore much. Area wise it is the second largest state population of about 60 million. About 73% population is rural, depending approximately 70% of the geographical Cereals covers 42%, Crop group Commercial (cotton & sugarcane etc.) fodder and medicinal crops. Of the total gross cropped area 59% is about 24%. The state share (2004-05) in the total state (Gram 44%) and the state is ranked Number 2. The state also leads in spices production national production and is second largest. Among vegetables, Malwa potato has a total national production of Pea is 15%. Major Agriculture and Horticulture crops

Cereals:
- Wheat, Sorghum (Jowar), Maize and Paddy

Oilsseeds:
- Soyabean, Mustard, Linseed
ITC’s eChoupal

- Marketing a variety of goods and services (agri-inputs, consumer goods, insurance, market research)
- Procure 2 million Tonnes valued at US$ 400 million
- 6400 eChoupals in 5 states of India covering 38,000 villages, servicing 4.0 million farmers, sourcing 13 agri commodities (oilseeds, grains, coffee, aquaculture)
Low Bargaining Power of the Farmer

- Fragmentation: Average holding less than 1.5 hectare, poor bargaining power
- Geographic dispersion 120 million farmers in 600,000 villages
- Heterogeneity: Knowledge, risk taking ability, soil, precipitation, irrigation
- Lack of Institutional Infrastructure: Credit approval, banking,
- Dependence on middle man for credit, leading to a vicious circle
Services and Benefits to the Farmers

- Internet kiosk in the house of a trained farmer within walking distance of target farmers
- Warehousing hub managed by the erstwhile middleman, within tractorable distance of target farmers
- Relevant & Real-time Information despite Distances
  - Commodity prices, Local Weather, News
- Customised Knowledge despite Heterogeneity
  - Farm Management, Risk Management
- Supply Chain for Farm Inputs
  - Screened for quality, demand aggregation for competitive prices & efficient logistics
- Higher Incomes for Farmers through
  - Increased Yields; Improved Quality; Reduced Transaction Costs
  - Power of Scale to the Small Farmer
- Lower Transaction Costs, Better Value through Traceability
Reduction in Transaction Costs

Farmer Incurs:
- Trolley Freight to ITC Hub = 120
- Labour = 50
- Kacchha Adat = 150
- Handling Loss = 50

Rs per MT: 370 120

Processor Incurs:
- Commission to Sanchalak = 100
- Cost of Gunny Bags (net) = 75
- Freight to Factory = 120
- Storage & Handling at Hub = 40
- Cash Disbursement Costs = 50

Rs per MT: 335 215

Total Chain:
Rs per MT: 705 335
e Sagu System: A Collaboration Amongst Research Institutions

Parts of eSagu system. C indicates coordinator. A double arrow indicates the information flow.
eSAGU Impact on Costs

- Implemented in 5000 farms spread in 40 villages over six districts in Andhra Pradesh for 6 major crops
- Benefit to farmer is about Rs 3,820/- per acre.
  - fertilizers (0.76 bags) per acre = Rs 229.70/- per acre
  - pesticide sprays (2.3) = Rs 1,105/- per acre
  - extra yield (1.56 quintal) = Rs 2,485/- per acre.
- Expenditure is Rs 1200/- per acre.
- Farmers in a few Mandals have formed small cooperatives, pooling funds, for purchase of fertilizers and pesticides.
- Farmers need not be literate
Making Dairying Economically Profitable at the Farmer’s Level

- Increasing transparency in collection through e-weight, fat testing and immediate payment
- E-commerce: cattle feed, artificial insemination
- Knowledge on disease
- Veterinary services
- Increasing the yield of milk per animal
- Reducing dry days and increasing yield per day
## Transaction Costs Saved Through Different Projects

<table>
<thead>
<tr>
<th>Stages</th>
<th>Invisible and Visible Costs</th>
<th>eChaupal</th>
<th>Mandi</th>
<th>eSAGU</th>
<th>Agri-watch</th>
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</thead>
<tbody>
<tr>
<td><strong>Decision</strong></td>
<td>Visits to meet farmer association officials to decide on a crop</td>
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<tr>
<td><strong>Seed</strong></td>
<td>-Cost of finding info on a particular seed</td>
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<td></td>
<td>-Cost of traveling to purchase seeds if the seeds not available</td>
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<tr>
<td><strong>Land and planting</strong></td>
<td>-Costs of finding labor</td>
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<tr>
<td></td>
<td>-Costs finding machines to prepare the land</td>
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<tr>
<td><strong>Growing</strong></td>
<td>-Costs of finding fertilizer, pesticides, weedicides etc</td>
<td></td>
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<tr>
<td></td>
<td>-Costs of traveling to purchase fertilizer, pesticides, weedicides etc if those were not available</td>
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<tr>
<td><strong>Harvesting, Packing, and Storing</strong></td>
<td>-Costs of finding market prices</td>
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<td></td>
<td>-Costs of finding labor</td>
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<td>-Costs of finding storage, packing materials etc</td>
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<tr>
<td><strong>Selling</strong></td>
<td>-Costs of comparing prices of different traders</td>
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<td></td>
<td>-Costs of finding transport</td>
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<td></td>
<td>Freight and handling losses</td>
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Land Record Computerization (Karnataka)

- 20 million records, 6.7 mln farmers, 9000 villages.
- Manual RTC issue took 3-30 days and a bribe of Rs 100-2000. Mutation can take up to 2 years (30 days)
- 180 centers operational for one year where RTCs are issued online for a fee of Rs 15. Mutation request filed online
- 5.2 million users, Rs. 80 million collection goes to dept.
- Investment of Rs 180 million. Operational expenses: Rs 40 million at 5 million users
- **Issue of land records from 800 Tele Centres** thru a private agency with bar code embedding digital signature
- **Crop updation using Tele Centres:** Pilot at 50 centres. Web enabled for citizens to verify records on Internet.
IMPACT OF LAND RECORDS COMPUTERIZATION

**Number of Trips**

- Gujarat
- Haryana
- Himachal Pradesh
- Rajasthan
- Tamil Nadu
- Uttarakhand
- West Bengal
- Madhya Pradesh

**Waiting Time**

- Gujarat
- Haryana
- Himachal Pradesh
- Rajasthan
- Tamil Nadu
- Uttarakhand
- West Bengal
- Madhya Pradesh

**% Pay Bribe**

- Gujarat
- Haryana
- Himachal Pradesh
- Rajasthan
- Tamil Nadu
- Uttarakhand
- West Bengal
- Madhya Pradesh
IMPACT OF LAND RECORD COMPUTERIZATION

SERVICE QUALITY

GOVERNANCE

IMPROVEMENT OVER MANUAL ON A FIVE POINT SCALE

PERCENT PREFERING COMPUTERIZATION

Gujarat, Haryana, Himachal Pradesh, Rajasthan, Tamil Nadu, Uttarakhand, West Bengal, Madhya Pradesh
ON rice, wheat, maize, oil, pulses, spices, coffee, sugar, livestock, herbs, aromatic plants, seeds, agrochemicals, and fertilizers FOR farmers, traders, processors of agricultural outputs, suppliers of inputs.

OFFERS news analysis, expert opinions, advice, agri statistics, Government schemes, tenders, analysis of commodity prices collected through a network of 60 markets (national and international), price trends, international trade flows, crop forecasting, freight market information, weather analysis.
Where can ICT help?

Farmers

Supply of consumer produce & services

Issue of Certificates and Licenses

Supply of inputs

Procurement of Produce

Development info projects, programs, schemes & feedback

Access to Markets

Education, training to enhance employment & economic opportunity

Delivery of health & educational services

Entertainment & info for social needs

Issue of Certificates and Licenses

Supply of inputs

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FARMER’S INFORMATION NEEDS
- Prices in markets of inputs/commodities
- Weather forecasting
- Information on crop insurance
- Early warning/management diseases/pests
- Marketing of milk and milk products
- Soil testing/sampling information
- Question-and-answer service
Bridging the Digital Divide

Technology that makes rural access inexpensive and robust

Applications that draw a large clientele that pays for the service, ensuring economic viability of the kiosk

Content that empowers rural citizens and enables formation of communities

NGOs and grass root organizations that catalyze and manage the community building process
Innovations and Creativity: Key to Success

- Making a market despite many missing links

- Creative use of technology in places or for a purpose not originally intended.

- Organizational design- coming together of partners with specific value proposition, incentives and rules to cooperate.

- Combining emerging and traditional technologies to overcome constraints

- Adapting business models to local contexts

- Role of network orchestrators
Challenges in Replication and Scale Up

- Poor telecom access and infrastructure in rural areas--high installation and maintenance costs
- Entrepreneurial capacity of the rural community-great acumen, but needs plenty of training
- Management capability to execute complex business models and to manage scale
- Understanding the agricultural value chain and rural society to figure out the value addition of Information Technology
- A large number of pilots, most are economically unviable. Limited revenue generating potential
- Reluctant donors-lack of evidence of macro impact and experience of failed projects
Successful Scaling Up Requires:

- Success is likely in organisations with financial resources, leadership, strong project management and ability to discover services that are valued. Three models have emerged:

- Large private/public/cooperative sector companies operating in rural markets may be able to derive sufficient value by improving business processes. to make such centers viable and scalable.

- Government services that are valuable can charge a user fee for electronic delivery through privately owned telecenters.

- Intermediary organizations partner with providers of valued service as well as rural entrepreneurs who create access points to orchestrate the operations of a large network of kiosks.
• Cost of access to information, its economic value, trust and accuracy are important
• Do farmers