eSagu: The Next Generation IT-based Query-less, Cost-effective and Personalized Agro-Advisory System

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Outline

- **Motivation**
- Objective and Basic idea
- Prototype system: demonstration
- Main results and experiences
- Current project: Cluster-based eSagu
- Summary and Conclusions

Motivation: Crisis in the farming community

- **One of the factor: unscientific practices**
  - Farmers are using untimely, unnecessary, excessive pesticides and fertilizers.
- **Consequences**
  - Debt trap
  - Deterioration Public Health
  - No demand in international market
  - Environment pollution
  - Ecological imbalance

Information Exists !

- The information is with the universities, research institutes researchers.
  - ICAR
  - Universities
  - Researchers
  - Department of Agriculture

- Existing agricultural extension methods need improvement.

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eSagu: Objective

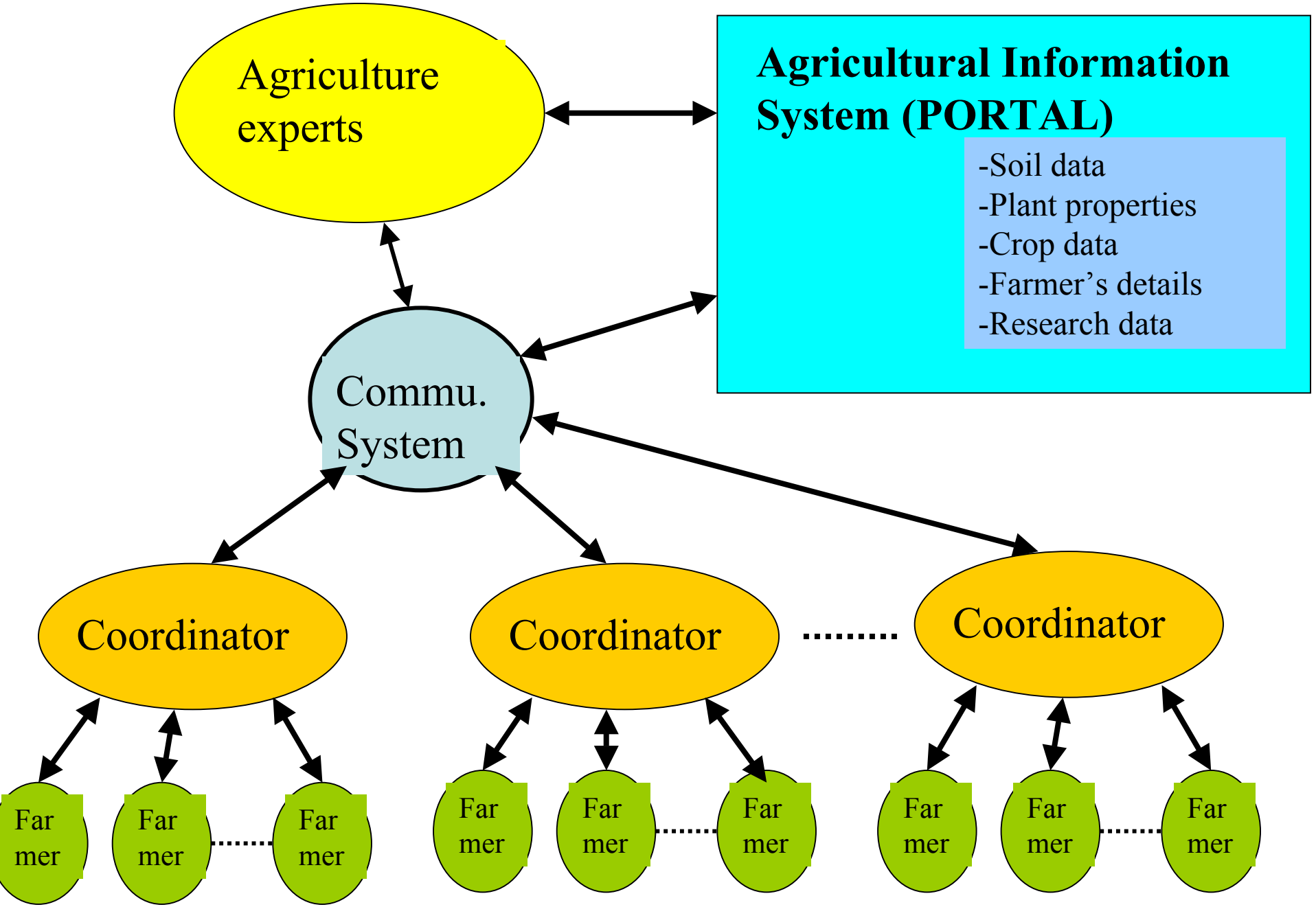
- **To develop an IT-based Agriculture Extension System such that**
  - **Personalized:** Provides personalized advice to each farm of India (all crops and farmers) once in a week.
  - **Query-less:** Farmer does not ask a question
  - **Timely:** Provides the advice in a timely manner (within 24 hours)
  - **Cost-effective:** service should be affordable by the farmer.
  - **Easy development:** Should be developed on the existing infrastructure.

eSagu: basic idea

- **IT-based method**
  - Rather than agricultural expert visiting the crop, the status of the crop is brought to AE using both text and digital photographs.
- **Advantage:** agriculture expert can advice more farmers.
  - AE will spend less time on good crops and more time on bad crops.
  - AE can work during the night !

eSagu: basic idea

- Who will send photographs
- Option 1:
  - The farmers can send the photographs
    - Difficult to implement as several farmers are illiterate and can not send photographs.
- Option 2:
  - Instead of farmers, educated and progressive farmers send photographs.


Agriculture experts
Agricultural Information System (PORTAL)
-Soil data
-Plant properties
-Crop data
-Farmer's details
-Research data
Commu. System
Coordinator
Coordinator
Coordinator
Far mer
Far mer
Far mer
Far mer
Far mer
Far mer
Far mer
Far mer
Far mer

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- Current scaled-up project:
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Prototype System Description

- Cotton crop was selected.
- Villages: Orgalpur, Oorugonda, and Gudeppad in Warangal.
- All the farmers: 751 farmers, 1053 farms
- Coordinators (14); Agricultural experts (5)
- Computer Facilities
  - Main Computer Facility at Hyderabad
  - Computer Facility at the village
  - Software system is built.
- Communication System
  - Village to main system
    - By hand
  - Main system to the village
    - Through Internet

Place of Implementation

Location of farmers – 3 villages nearb
Warangal

Location of AEs – Hyderabad

Season – Kharif,2004

Prototype Operation

- At first we have identified programmers, agricultural experts, coordinators, and social scientists
- Farm registration is completed.
- The following steps are repeated.
  - Collection of farm status by coordinator
  - Renaming of photographs at the village
  - Transmission of CDs to the main system
  - Advice preparation by AEs
  - Transmission of advice to the village center
  - Explaining the advice to the farmer

eSagu: Demonstration

- We have built an information system
- Web-based Agricultural Information Dissemination System(web)
- Web-based Agricultural Information Dissemination System(local)
- We have provided 20,000 advices and collected 1,11,000 crop photographs.
- Please visit “http://agriculture.iiit.ac.in/esagu/” to know the details.

Outline

- India's development challenge
- eSagu: Motivation and scope
- Basic idea
- Prototype system and its Operation
- **Main Results and Experiences**
- Current project: Cluster-based eSagu
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Main Results(1)

- **It worked** !

- It is possible for the agricultural expert to provide the advice by observing the crop status through photographs.

- Round-trip response time is 24-36 hours

- One visit/advice per week is sufficient for the cotton, chilies crops.

Main Results (2)

- Coordinator can cover 125 farms in a week.
- Agricultural expert can cover 500 farms per week.

- The system can be maintained at the cost of Rs 400/- per acre.
  - Re 1/acre/day

- Every farmer saved Rs.3,820/- per acre
  - Savings in fertilizers
  - Savings in pesticides
  - Increase in yield

Main Results (3)

- AE can give more effective advice
  - History of the farm
    - History adds extra dimension/angle
    - Weather parameters helps in understanding the dynamics of the pest.
    - Availability of all information at a click of mouse gives more power to AEs.
  - Zooming of Photographs
    - Photograph can be zoomed to get the finer details than a naked eye.
    - It enables the predication of pests/disease/nutritional damage at early stage.
  - Availability of several AEs with diverse background at one place
    - Gives opportunity for an AE to discuss the problem with other AEs.
  - Usage of Internet
    - Internet is helping to access the latest inventions/reports and use this knowledge to give a better advice.
  - AE can work during night.

Main Results (4)

- AE can cover more farms
  - AE spends his energy for giving advice only. Coordinators are doing time taking job of interacting with the farms. So AE can give advice to more farms.
  - AE can work around the clock.
  - Spends less time on good crops.
- System is scalable
  - Response time: less than 36 hours (next day). Farmers are satisfied.
  - Scalability: Most of the tasks are performed in an asynchronous manner.
    - Preparation of advice is done offline.
    - Coordinators observe crop status without disturbing the farmer.
  - However, coordinator must meet the farmer to explain the advice, which is reducing the performance of the coordinator by half.

Observations

- It is difficult for the farmers to cultivate the crops scientifically with the knowledge they have.
  - **Farmers need expert advice**.
- **Farmers are unable to pull the information**.
  - Ignorance, illiteracy and confidence
  - We have to design **push-based systems**
- Assumption regarding **sharing of knowledge** by the farmers with other farmers should be re-looked.

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- **Ongoing scaled-up project**
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Ongoing Scaled-up Project

Table 1: Crops, eSagu local centers, and corresponding villages		
Crop	eSagu Center name and address	Villages attached
Cotton	Oorugonda (Atmakur mandal; Warangal district)	Oorugonda, Gudeppad, Sitaramapuram, Dammanapeta, Nandigama, Rangapur, Relakunta
	Malkapur (Station-Ghanpur mandal, Warangal district)	Malkapur, Venkatadripeta, Chilpur, Peechara, Maddelagudem, Lingampalli
Chilies	Banapuram (Mudigonda mandal, Khammam district)	Banapuram, Kamalapuram
Rice	Jinnuru (Poduru mandal, West-Godavari district)	Jinnuru, Poduru
Groundnut	Nagrireddipalli (Ananthapur-rural mandal, Ananthapur district)	Nagireddipalli, Taticherala, Somaldhoddi
Castor	Gurukunta (Atmakur mandal, Mahabbobnagar district)	Gurukunta, Darpalli, Lingampalli
Redgram	Kotabasupalli (Thandur mandal, Ranga Reddy district)	Kotabasupalli, Gengurthi, Inelli, Kothlapur
Aqua	Pathepur (Nidamarru mandal, West-godavari district)	Pathepur

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Is eSagu an Ideal Agricultural Extension System for India ?

- An ideal extension system should
  - provide personalized advice
  - Should be feedback based
  - provide timely advice
  - be query-less
  - cover all the farms (poor farmers)
  - Should be cost-effective
  - Should be developed with the available infrastructure
  - Should be able to cover all the farmers within few years (five years); parallel development
  - Incremental milestones

- **eSagu satisfies all the properties.**

Summary

- The model is ready
- eSagu main center can be started
  - Agricultural scientists deliver the advice
  - About 100 scientists can take care of one district.
- Local centers can be started
  - One local center can cover 10 villages.
- We are experimenting an entrepreneur model by providing additional services in one local center
  - Esagu service
  - input service
  - Banking (ICICI)
  - Warehousing service
  - Marketing service

Conclusions

- The proposed project has a potential to help India's poor.
- We can build the system to cover all the farmers of India within few years on existing infrastructure.
- Provides a cost-effective opportunity to reduce the farming community's crisis.
- Makes agriculture innovative
- Lab to farm gap is reduced.
- Helps farmers in the era of globalization.
- Employment generation
  - New Agricultural Institutions and Coordinators

Inspiration

Recall the face of the poorest and the weakest man whom you may have seen and ask yourself **the step you are going to contemplate is going to be of any use to him**. Will he gain anything by it ? Will it restore him to a control over his own life and destiny ? In other words, will it lead to Swaraj for the hungry and spiritually starving millions ?

-Mahatma Gandhi

Visit eSagu lab at IIIT, Hyderabad, India whenever you visit Hyderabad.