eSagu
An IT-based Scalable System to Disseminate Location-specific Best Agriculture Practices to all Farmers

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Research Areas

- **Data mining/ Web Mining/ Bio-mining**
  - Frequent patterns, Periodic frequent patterns, Diverse Frequent patterns, Coverage patterns, Association rules, Rare knowledge extraction, Classification/prediction, Clustering.
  - Link-based community extraction, Recommendation systems, E-commerce, Banner advertisement placement, Internet monetization.
  - Protein function prediction.

- **Database Systems/ Systems Building**
  - Schema summarization, Transaction synchronization, Database recovery, Data replication, Speculative transaction management, Performance evaluation, Data warehousing, User interfaces, Decision support systems.

- **IT for Agriculture**
  - Personalized agro-advice advisory, Systems for bridging lab to land gap, Virtual crop labs for agriculture education, Location-specific content development, Agriculture extension, Weather deviation pattern extraction, pest prediction. Agriculture planning tools for a farmer.

- **IT for law**
  - Finding similar judgements

Key Ideas Developed

- Dense-bipartite graph based web communities
- Rare frequent/knowledge patterns
- Mining of special features
- Conceptualized the notion of weather deviation
- Coverage patterns
- Diverse frequent patterns

- Deadlock prevention using data flow graphs
- Replica synchronization using data flow graphs
- Backup commit protocol
- Speculative locking protocol for regular and read-only transactions
- Temporality-based user interface design
- Query by object based user interface design

- Personalized agro-advisory (eSagu and eAgromet)
- Post-graduate Diploma in applied agriculture and IT (PGDAAIT)
- Virtual crop labs

Future Research

- Diverse frequent patterns based clustering and classification.
- Protein function prediction
- Coverage patterns based banner advertisement placement
- Building query by object interface for non-SQL users
- Improved synchronization protocols based on speculation for large scale information systems.
- Scalable decision support system for agriculture experts to prepare agriculture expert advice.
- Scalable decision support system for agromet scientists to prepare agromet expert advice
- Building of resource planning tool for farmers
- Virtual crop labs for enhancing practical agricultural education.
- Decision support system for law

Systems Built

- **eSagu**: An IT-based Personalized Agro-Advisory System
- **eAquaSagu**: An IT-based Personalized Aqua-Advisory System
- **eAgromet**: An IT-based agro-meteorological advisory system
- **Village-level eSagu**: A Scalable and Location-Specific Agro-advisory System
Main Research Activities at IIIT, Hyderabad Related to Agriculture

• Cost-effective and scalable personalized agro-advisory system
  – eSagu, Village-level eSagu, eAquaSagu
• IT-enabled agro-meteorological advisory system
  – eAgromet
• Crop-specific virtual labs for enhancing practical education
• Crop planner/scheduler to farmer.
Outline

• Introduction
• Overview of Village-level eSagu System
• Implementation details and Methodology
• Study Findings
• Conclusion and future work
<table>
<thead>
<tr>
<th></th>
<th>Need water to each farm</th>
<th>Government is making efforts to water to each farm.</th>
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<tbody>
<tr>
<td>2</td>
<td>Need Finance each farm</td>
<td>Government is making efforts to finance each farm.</td>
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<tr>
<td>3</td>
<td>Need knowledge for each farm to reduce crop failure and low income risk</td>
<td>• Gov. has knowledge dams (ICAR labs and Agriculture Universities), But, • We do not have knowledge canals for each farm for flowing knowledge like water • Existing Systems are generalized and pull-based</td>
</tr>
</tbody>
</table>
Main Question?

• How to build a knowledge canal to deliver actionable knowledge to each farm in a regular manner?
Provide Knowledge to Each Farm

• Through MGNREGA, we are making efforts to provide employment to every one.

• **Similarly, we should make efforts to provide knowledge to each farm.**

• Providing knowledge to each farm will create multiplier effect.
  – Improves water and finance utility
  – Benefit poor and marginal farmers
    • Small land holdings, illiterate

• **Knowledge delivery is NOT a problem**
  – Most of the farmers are (will be) empowered with (powerful) mobile phones

• **Research Question: How to create a actionable knowledge to each farm?**
eSagu is a Personal Information System for farmers

- eSagu is an IT-based Personalized agro-advisory system
  - Personalized
    - Provides Personalized agro-advice to farmer’s door-step.
  - Timely:
    - Provides the advice within 24 to 36 hours
  - Regular
    - Advice is provided regularly (once in a week)
  - Feedback: two way communication
  - Query-less: Farmer need not ask a question
  - Cost-effective: Can be made sustainable with a nominal subscription fee
  - Powered by IT: Record keeping, availability, reliability
  - Scalable and can be developed on the existing infrastructure
- Started in 2004 and the system is evolving
Basic Observation

• In medical domain, a doctor examines black and white X-ray, and detects the human health problems.
• In agriculture domain, why can not agriculture expert examine color photographs and detect the crop health problems?
Outline

• Introduction
• **Overview of Village-level eSagu System**
• Implementation details and Methodology
• Study Findings
• Conclusion and future work
eSagu: basic idea

• Extend developments in IT to agriculture
  – Agriculture scientist does not visit the crop.
  – Crop photos are brought to agriculture expert.

• As a result, the agricultural expert
  – can utilize the time efficiently
  – spends less time to provide the advice
  – can work during the night

• Reference
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:
  – Educated and experienced farmers brought in as coordinators.
    • Needs only a few educated and experienced farmers.
    • Can be implemented in every village.
Fig. 1. The Parts of eSagu System. Here, ‘c’ indicates coordinators at eSagu Local Centers. Bi-directional arrow indicates Information Flow.
Operational Procedure

• Farmer registers into the system by supplying soil, water, capital, crop details.

• Coordinator visits each farm once in a week/two weeks.
  • Takes problematic photographs.
  • Fills-in observation-cum-feedback form and takes its photograph.

• Upload the data into eSagu portal

• Agriculture scientists prepare the advice based on photographs and other information.

• The advice is downloaded at the village center and takes the printout.

• The coordinator delivers the advice to the farmer.
**Problem(s)**

Brown plant hopper, Sheath blight and Neck blast

**Advice**

- **Brown Plant Hopper**: Spray Ethofenprox @ 300 ml or Imidacloprid @ 60 ml per acre.
- **Sheath Blight**: Hexaconazole @ 400 ml per acre or Propiconazole @ 200 ml per acre.
- **Neck Blast**: As the incidence is low, no need to spray.

**Note:**
1. Drain out water and maintain thin film of water.
2. Direct the spray towards the base the plant while spraying.
<table>
<thead>
<tr>
<th>Crops</th>
<th>Gain in Fertilizer</th>
<th>Gain in Pesticide</th>
<th>Gain in Yield</th>
<th>Total Gain</th>
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<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>Cotton</td>
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<td>3349</td>
<td>4908.6</td>
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<td>484.8</td>
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<td>900</td>
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<td>225</td>
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<td>1803</td>
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<td>890</td>
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<td>3713</td>
</tr>
<tr>
<td>Other Crops</td>
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<td>1117.2</td>
<td>4694.55</td>
<td>6396.85</td>
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<tr>
<td>All Crops</td>
<td>443.6</td>
<td>928.8</td>
<td>2501.6</td>
<td>3874</td>
</tr>
<tr>
<td>Year</td>
<td>Villages</td>
<td>Farmers</td>
<td>Advices</td>
<td>Crops</td>
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<td>--------</td>
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<td>---------</td>
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<tr>
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</tr>
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<td>2007-08</td>
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<td>7135</td>
<td>31484</td>
<td>36</td>
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<tr>
<td>2008-09</td>
<td>41</td>
<td>1101</td>
<td>4080</td>
<td>8</td>
</tr>
<tr>
<td>2009-10</td>
<td>91</td>
<td>1400</td>
<td>7613</td>
<td>11</td>
</tr>
</tbody>
</table>
eSagu Technology Evolution

• Capturing farm status
  – In 2004: Cannon cameras
  – From 2008 onwards: Mobile phones

• Access:
  – Courier to broadband
  – Written slip/Printout/SMS/PDF/GPRS: To deliver advice to farmers

• eSagu core system
  – 2004-05: Personalized and fixed-interval visits
  – 2005-06: Cluster-farms+ fixed-interval visits
  – 2006-07: Virtual-expert+ fixed-interval visits
  – 2007---: Virtual-expert+ adaptive intervals+ comprehensive advice
    • AE can deliver advice to 80 to 100 farms per day
Key Results

• The farmers are happy with the service.
  – Encouraging IPM, judicious use of pesticides and fertilizers by avoiding their indiscriminate usage.

• Gain
  – 2004: Rs. 3,820/- per acre; cost benefit ratio 1:3
  – 2005: Rs 3,874/- per acre; cost benefit ratio 1:4.1.

• Agriculture expert can deliver advices to 80 to 100 farms a day.

• Turnaround time for advice delivery is 24-36 hours.

• The farmers are charged for the services and they are satisfied with the service.
Observations of eSagu Implementation

- eSagu system benefitted all kinds of crops: input intensive (cotton, chilies, mango) and food crops (cereals, pulses)

- An analysis was made on the advices of 1051 cotton farms of three villages
  - Several farms are facing the same problem
  - Considerable number of farms are facing distinct problems in any week during crop cycle period.

- The farmers and other stakeholders have felt that the operational cost of personalized advice under eSagu system is high.
Improved eSagu:
Village-Level eSagu System

• Revised Objectives
  • Should be accessible to poor farmers throughout year.
  • Should cover all crops
  • Should not compromise on personalization
  • Should be affordable and scalable
  • Should encourage community discussion
  • Should encourage knowledge empowerment
Village-level eSagu: Operational Procedure

• One physical notice board is put in each villages. Coordinator is equipped with computer, Internet, color printer.

PROCEDURE

• Selection and registration of sample farms
• Once in 10 days
  – Capturing of farm observations and uploading to eSagu portal by coordinator.
  – Advice delivery by subject matter specialists
  – Preparation of crop-specific advice summaries with crop photographs and advisories.
  – Place the color print out of advice summary sheets on the notice board.
• Deliver one-time and regular advice to subscribed farms
Registration of Farms

• A cluster of five villages with similar farming situation will be formed.

• Thirty sample farms (five sample farms for each of five major crops and five farms for other minor crops) will be identified for each cluster.
  – Sample farms will be identified such that they represent all farming situations/problems.
  – Five sample farms will be registered for each new crop
Advice Delivery: Once in 10 Days

• Capturing of farm observations and uploading to eSagu portal
  – Sample farms are visited once in 10 days and problems are captured through digital photographs.
  – The farm problems reported by the farmers will be captured.

• Advice delivery by subject matter specialists through Internet
  – Based on the digital photographs and other information, the experts prepare the agriculture advice to farms.
  – The senior agricultural expert approves the advice.
  – Crop-specific advice summaries are prepared for each crop.

• Advice dissemination to farmers
  – Notice Boards:
    • The coordinator accesses downloads the crop-specific advice summaries.
    • The prints of advice summaries are displayed in the notice boards of five villages.
  – SMS: The critical advice consists of few sentences will be sent by SMS.
  – Distribution:
    • The coordinator also distributes the advice to the progressive farmers.
Farmer in Village-Level eSagu

• Gets access to actionable agriculture advice through notice boards/SMS at regular intervals throughout the crop growing period.

• If she/he cannot decide and has the doubt, the coordinator visits the farm and sends the photographs and advice will be delivered.

• Regular advice will be delivered for subscribed farms.
కేంద్ర నాయకుడు మీద ప్రమాణములను కలిగించాలంటే, ప్రత్యేక ప్రత్యేకంగా, సమాధానం లభించడానికి చేసిన ఉత్తమ వాణియాను చేసిన ప్రాతిపదిక అంచులు.

1. విల్లాండు (Village eSagu): ఈ విల్లాండు విల్లాండులో అందుబాటులో ఉన్న పరిస్తితులు తెలియజేస్తాం. ఈ విల్లాండు విల్లాండులో ఉన్న పరిస్తితులు వర్షానికి ముందు ప్రాతిపదికంతే ఉన్న పరిస్తితులు కలిగించాలంటే, ప్రత్యేక ప్రత్యేకంగా, సమాధానం లభించడానికి చేసిన ఉత్తమ వాణియాను చేసిన ప్రాతిపదిక అంచులు.
Problem: Stem and fruit Borer

Advice:
- For the control of stem and fruit borer apply 3 grams of Carboril 50% w.p. or spray Profenofos 2ml in 1 liter of water.
- Remove the infected stem and fruits from the plant and destroy them.

Weeds:
Weeds are more in the field, with the help of Gorru do the intercultivation and remove the weeds.

Advice:
- Sucking Pest: To control sucking pests spray Dimethoate or Profenofos 2ml in 1 liter of water.
Problem Name: Stem Borer

Advice:
- Crop is infected by Stem borer. For the control of this pest apply 3 kgs of Carbofuran 3G Granules in the leaf whorls for one acre.
- Remove the infected plants and destroy them.

Advice: Irrigation Management
- To get the best results Irrigation should be given regularly at the time of cob-formation to grain-formation. At this stage, if the irrigation is not given properly the yield will be decreased to 40-50%.
Village: Malkapur  
Crop: Paddy  
Date: 24/03/2012

**Problem:** Zinc Deficiency

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**Advice:**
- To control Zinc deficiency spray 2 grams of Zinc-Sulphate in 1 liter of water for 2 to 3 times at every 5 days interval.
- Do not mix the Zinc-Sulphate with any Pesticide or Herbicide.

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**Advice:**
- For one acre of the farm 15 kgs of MOP should be applied evenly/uniformly.
- Maintain 2-3 cms depth of water in the field.
**Problem:** SIGATOKA LEAF SPOT ON LOWER LEAVES

**Advice**

- పహారి ఎరుమ మారే స్వాప్స్సు యొక్క 2.5 గ్రామ్ముల పాలనాచేది (ఆరు సెంటీమీటర్ల మాత్రము) 2 గ్రామ్ముల చినితో ఉండి మరియు 15 సంవత్సరము సంపన్నత్వాడు కాదం పొందండి.
- రామను ఆధారంగా కావాలేది. పిస్తొంది 5 గ్రామ్ముల చినితో ఉండి విశేషంగా రాగం లేదా సరిపెట్టి పెరుగులు నిషేధించండి. ఆసంపాదిత పరిస్థితిలో @ 15 సంవత్సరం అడిగే.
<table>
<thead>
<tr>
<th>village:</th>
<th>Crop: Chilli</th>
<th>Date: 13-10-2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem: Thrips (low) Leaf spot:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Advice:**
  
  సమాధానం వచ్చింది. సంధించి వచ్చింది మాత్రము. దీని క్రమంలో, వృక్షాయామారు (రోడా శించింది) 2 ప్పి మరియు 30 ప్పి రెండరు సమయంలో మాత్రం నీటి బసి ఉండాలి. 10 నుండి 15 సంధించింది సమయంలో బాగా నీటి బసింది.

- దీని లో సంధించి సర్వీ సంచాలక, కండ సాధారణంగా మరియు ఆకాంపి మాత్రము బిడ్డించింది (తురుకు శించింది) 2.0 మియాటి, మాట లేదా మాట (కార్డు శించింది) 2.0 మియాటి ఇంటి అందరికి (రుడు శించింది) 0.4 మియాటి నీటి బసింది సమయంలో నీటి శించింది.

- సమాధానం వచ్చింది. సంధించింది శించింది 1 రోడి నీటి బసింది సమయంలో నీటి బసింది.
Problem: Zn deficiency, Fruit sucking moth

Advice:

The key issue of zinc deficiency (Zn) and the presence of fruit sucking moths are affecting the citrus crop. To address these issues, the following advice is provided:

1. Apply a fertilizer containing zinc and organic matter:
   - Zinc + 10 grams of organic matter
2. Use a natural insecticide:
   - 10 grams of neem + 5 grams of garlic
3. Maintain the soil pH at 6.5
   
These steps are recommended for a period of 15 days to see noticeable improvement in the crop health.
<table>
<thead>
<tr>
<th>కాలం</th>
<th>పాలన: విధానం</th>
<th>25-10-2012</th>
</tr>
</thead>
</table>

**విధానం:** ఫలం రైవత దినానికి మధ్యం ఉన్న వేయార్ల మధ్యాండా (అంగులు)
20 గ్యా + వెంచికలగా 2 గ్యా 10 కోటుపు నిర్కోటు మధ్యాండా 10 కోటుపు నిర్ణయం నుండి 2 - 3 సంవత్సరాల తరువాత.

**హిందు కాలం:** హిందు కాలం పరిమితంగా ఉండదు. కాలం ముఖ్యంగా పెంచుకోవడానికి తేదీ ప్రతి సంవత్సరం నిర్ణయం. పరిమితం ప్రతి సంవత్సరం నిర్ణయం మాత్రమే తట్టకు తయారు చేయవచ్చు.హిందు
మామూలు @ 5 గ్యా + వెంచికలగా మామూలు @ 2 గ్యా + మామూలు @ 1 గ్యా + మామూలు @ 6 గ్యా + మామూలు 10 సంవత్సరం పండు జీవితం మామూలు తట్టకు తయారు చేయవచ్చు.

**అదరగా వివరణ:** 1 కోట్ట 750 గ్యా మున్నపెట్టి మరియు 1 కోట్ట మామూలు + 350 గ్యా నిర్ణయం
విస్ఫూరం - దీనితో మామూలు నిర్ణయం. 1.750 గ్యా మున్నపెట్టి 1 కోట్ట మామూలు + 350 గ్యా నిర్ణయం విస్ఫూరం - దీనితో మామూలు నిర్ణయం.
<table>
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<tr>
<th>నాటకం:</th>
<th>మౌలికంలో</th>
<th>25-10-2012</th>
</tr>
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</table>

| పాకం: లోపా, బిరి రోఘా సాధనం. లోపా రోఘా విస్తరితం చేసే ప్రాంతంలో మిశ్రమం ఉంది. ప్రతి రోఘా @ 5 ప్రక. + పాపాకసంగం రోఘా @ 2 ప్రక. + పాపాకసంగం @ 1 ప్రక. + మాండిమా @ 6 ప్రక. + మమిపా మూడు 10 పిటి తొందరి క్రమంగా విస్తరించి పరిశీలించండి. |
| ప్రత్యేక తరపు 650 ప్రక పరిశోధన | 2 పాపాకసంగం + 500 ప్రక మమిపా విస్తరించండి - విస్తరించి మమిపా పరిశోధన. |
Knowledge Access By Farmer

• Gets access to actionable agriculture advice through notice boards/SMS at regular intervals throughout the crop growing period.
• If she/he cannot decide and has the doubt, the coordinator visits the farm and sends the photographs and advice will be delivered.
• Regular advice will be delivered for subscribed farms.
Village Level eSagu: Advantages

• Covers all the farms.
• Accessible to all the farmers.
• Location-specific actionable knowledge is delivered in a timely manner.
• The advice is delivered throughout the year.
• Continuous farmer empowerment
• Cost is reduced.
• Provides scope for alternative ways of dissemination.
Outline

- Introduction
- Overview of Village-level eSagu System
- Implementation details and Methodology
- Study Findings
- Conclusion and future work
## Implementation Details

<table>
<thead>
<tr>
<th>Item</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation agencies</td>
<td>IIIT Hyderabad and Center for Good Governance.</td>
</tr>
<tr>
<td>Implementation period</td>
<td>June 2012- February 2013</td>
</tr>
<tr>
<td>Location of main lab and experts</td>
<td>eSagu lab, IIIT Hyderabad</td>
</tr>
<tr>
<td>Distance between the main lab and local center</td>
<td>200 KM</td>
</tr>
<tr>
<td>Location of villages</td>
<td>Kurnool district, Andhra Pradesh</td>
</tr>
<tr>
<td>Names of Mandals (villages)</td>
<td>Banaganapalli mandal (Tangutoor, Appalapuram, Kyapa, Sankalapuram, Vittalapuram ), Bandi Atmakur Mandal (Bandi Atmakur, Bhojanam, Kakanur, Paramatur, Santhajutur), Gadivemula mandal (Gadivemula, K.Bollavaram, Bujanur, Manchalakatta, Pesaravayi), Mahanandi mandal (Gajulapalle, Mahanandi, Seetharampuram, Bukkapuram, Gopavaram), Nandyal mandal (Chabolu, Ayyalur, Billalapuram, Kottala, Rythunagaram) and Panyam mandal (Balapanur, Bhupanapadu, Kowlur, Nerawada, Panyam)</td>
</tr>
<tr>
<td>Major crops</td>
<td>Rice, Cotton Chilli, Maize, Turmeric, Banana</td>
</tr>
<tr>
<td>Infrastructure at Hyderabad</td>
<td>System administrator, Computer operator, agriculture experts, server, desktops, software system</td>
</tr>
<tr>
<td>Infrastructure at local center</td>
<td>coordinator, laptop, camera, internet connection, color printer, Two wheeler motor vehicle.</td>
</tr>
<tr>
<td>Infrastructure at the villages</td>
<td>Notice boards</td>
</tr>
</tbody>
</table>
Methodology

- The assessment was conducted to assess whether village level eSagu project made any impact in enhancing farmers’ access to advice on crops/agriculture.
- The assessment was designed to collect and analyze data from both primary and secondary sources.
  - The primary data includes interviews with farmers whose farms were enrolled as sample farms and detailed interviews/discussions with eSagu coordinators and community members formed part of primary data sources.
  - The secondary data sources include monthly data on farm observations made and advice given on crop problems and monthly progress reports prepared by IIIT Hyderabad.
## Study Findings: Number of Advices and Advice Bulletins

<table>
<thead>
<tr>
<th>Crop</th>
<th>Number of advices</th>
<th>Number advisory bulletins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>676</td>
<td>93</td>
</tr>
<tr>
<td>Cotton</td>
<td>88</td>
<td>47</td>
</tr>
<tr>
<td>Chilli</td>
<td>188</td>
<td>46</td>
</tr>
<tr>
<td>Maize</td>
<td>197</td>
<td>46</td>
</tr>
<tr>
<td>Turmeric</td>
<td>133</td>
<td>26</td>
</tr>
<tr>
<td>Banana</td>
<td>145</td>
<td>26</td>
</tr>
</tbody>
</table>
Percentage of Farm Observations Needed Advice: Healthy or not Healthy
Profile of eSagu Beneficiaries

• **Age**
  – More than a third are 40 years old and nearly 50 percent were in the age group of 40-45 years, while the remaining one-sixth were above 45 years.

• **Caste**
  – One-tenth beneficiaries belonged to scheduled caste / scheduled tribe. Forty six percent were from backward castes and 43 percent belonged to general caste (forward caste).

• **Education**
  – 80% of esagu beneficiaries have some education.

• **Land**
  – About a quarter of the respondents were marginal/small farmers (having agriculture land up to 5 acres), while more than two-thirds (68.7%) were semi-medium / medium farmers (5-25 acres) and the remaining seven percent were large farmers (≥ 25 acres).
  – Median land holding of *VL-eSagu* beneficiary farmers was reported to be 10 acres.

• **Irrigation**
  – Main source of irrigation was canal for 46 percent farmers followed by tube/bore well (44.6%).
Crop Profile

- Paddy (72.3%), Chilli (56 percent), Banana (27%), Groundnut (16.9%)
Extension by Agri Department

• About one-half of the interviewed farmers reported that they get extension services/advice from Agriculture Department.

• Of those who got advice from the department, 55 percent reported receiving advice once a year, one-fourth received twice a year and the rest availed thrice.

• The advice received from the agriculture department was mostly related to ‘purification of seeds’ and ‘advice on soil test’.
Awareness About eSagu Project

• Almost all farmers knew about *VL-eSagu* notice boards in their village.
  – They knew about display of *VL-eSagu* notice boards in their villages mainly through *VL-eSagu* coordinators (98%) followed by fellow farmers (72.8%).

• Two-thirds of the farmers informed that the eSagu notice boards were kept/displayed at right and popular place
  – such as gram panchayat building, rachcha banda, bus stand /tea stall where farmers regularly visit.
Services Provided by eSagu Coordinators

- More than 85 percent farmers stated that VL-eSagu Coordinators visit their farms once in every 10-14 days (which is the norm as per the project contract), while the remaining reported coordinators visiting once in 2-3 weeks.
- Almost all farmers indicated that they received advice on pest and fertilizers
- 63 percent farmers said they also received advice on application of pesticides.
- A negligible percentage of farmers (3%) reported receiving advice on irrigation for their crops as well.
Farmers’ Visit to Notice Board

• All sampled farmers knew that the advice is in the notice boards had to be changed once in a fortnight.

• More than 95 percent farmers mentioned that information in the eSagu notice boards was changed every 10-14 days.

• About 27 percent farmers visited notice board 1-2 times in the last one month and less than two-thirds (63%) visited thrice, while remaining one-tenth had gone to the place where notice board was displayed more than three times in the last one month.

• When asked farmers “how many people in your village visit the notice board in your view?”, they informed that a minimum of 10 to a maximum of 60 people in their village visit the notice board (median = 40).
Correlation between number of visits and number of times read advice:

- There was a high positive correlation \((r=0.96)\) between number of visits to eSagu notice board and number of times farmers read the advice in notice boards.

- Majority (88\%) of the beneficiary farmers reported that they followed scientific advice given through eSagu notice board.
  - Of those who followed the advice, 53 percent farmers indicated that they used the advice 1-2 times, and 37 percent used the advice thrice. Only 10 percent farmers used the advice more than three times.
Receipt and Usage of eSagu advice

• Almost all farmers (99%) reported that they received advices pertaining to pest and pesticides application followed by advice on fertilizers (96%). Barring a small percentage, all farmers (93%) said they followed the advice received from eSagu.
Usefullness of eSagu Advice

• When asked farmers “Do you feel the advice useful?”, 90 percent said ‘useful’ and the remaining felt that the advice was ‘very useful’.

• More than 80 percent respondents opined that they were benefited from the eSagu advice.

• About 95 percent farmers stated that they reduced usage of fertilizers as they got convinced with eSagu advice and almost an equal percentage of farmers (92.5%) reported decreased pesticide usage (92.5%).

• One-third farmers also mentioned that their crop yield was increased. The beneficiary farmers also told fellow farmers (median = 16) to follow eSagu advices.
Positive Features of eSagu

• An attempt was made to know what the farmers think the positive features of VL-eSagu project are. Most of the farmers unequivocally mentioned ‘timely advice with photos of infected crops’ as the positive feature.

• More than two-thirds of the respondents also stated ‘personalized advice on crops’ and ‘courteous eSagu coordinators available on call’ as positive features.
Suggestions for Improvement

• More than two-thirds of the farmers interviewed gave some suggestions to improve VL-eSagu project.
  – According to the farmers, eSagu project can be improved by conducting periodic workshops for farmers to educate and disseminate knowledge on new varieties of seeds/crops well before sowing season and also giving information on market information for common varieties of crops being grown in the region.
  – Some other farmers even indicated the need for including soil test services.
Informal Discussion with Key Participants

• Adarsha Raitus
  – Three adarsha rythuus indicated that though VL-eSagu project takes pictures only sample farms, the advice displayed in the notice boards was widely discussed among farmers and often the place where notice board displayed becomes a platform to exchange their concerns and experiences. Some adarsha rythuus also stated that there were several instances wherein beneficiary farmers encouraged fellow farmers to follow the advice.

• Village elders
  – Discussions and sharing of the contents in the notice board among farmer community empowered them with timely advice/information.
Summary and Conclusions

• The implementation results of 30 villages in Kurnool district in Andhra Pradesh are very encouraging.
• The farmers are accessing the expert advices
• The farmers are able to understand the advice based on the colour photographs
• They are also sharing the advice to fellow farmers.
• So, it can be concluded that the system is enabling all the farmers (including illiterate farmers) to get the access to actionable agricultural knowledge at regular intervals and enabling knowledge transfer among the community.
• The farmers have reported that they have significant savings by saving pesticide sprays and fertilizer inputs.
Ongoing Efforts

- Implementation is going on
  - 30 Villages in Medak district with the support from Bharat Dynamics Limited-
    Corporate Social Responsibility
  - 25 villages in Ranga Reddy district with the support from Bharat Electronics Limited-
    Corporate Social Responsibility