CHAPTER 3

e-Sagu*:
The Next Generation IT-based Query-less, Cost-Effective and Personalised Agro-Advisory System

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Introduction to e-Sagu

e-Sagu is a tool for an IT-based personalised agro-advisory system ('*sagu*' means cultivation in Telugu language). It aims to improve farm productivity by delivering high-quality personalised (farm-specific) agro-expert advice in a timely manner to each farm at the farmer's doorsteps without the farmer asking a question. Advice is provided on a regular basis (typically once a week) on everything from sowing to harvesting, which reduces the cost of cultivation and increases farm productivity as well as quality of agri-commodities. In e-Sagu, developments in IT such as data base, the internet, and digital photography are extended to improve the performance of agricultural extension services. The e-Sagu system offers a next-generation agro-advisory tool, and supplements and integrates it into the existing agricultural extension system.

System Architecture and Operation

In e-Sagu, rather than examining the crop in person, the agricultural scientist delivers expert advice by getting the crop status in the form of digital photographs and other information. The description of e-Sagu is as follows (Fig. 1 on page 75): The farmers are the end users of the system and may be illiterate. A coordinator is an educated and experienced farmer who is stationed in the village. Each coordinator is attached to the e-Sagu local centre, which contains a few computers and a computer operator. Agricultural experts possess a university degree in agriculture and are qualified to provide expert advice. The agricultural information system is a computer-based information system that contains all the related data. The communication system is a mechanism to transmit information from farms to agricultural

* CSI Nihilent e-Governance Awards 2005–06, Best Project Overall – Winner.

experts and vice versa. If enough bandwidth is not available, photographs from the village to the main system can be transmitted through courier service. However, the advices (text) can be transmitted from the main system to the local centre through a dial-up internet connection.

The operation of e-Sagu is as follows: A team of agriculture experts work at the e-Sagu (main) lab (normally in a city) and are supported by the agricultural information system. One e-Sagu local centre (few computers and one computer operator) is established for a group of about ten villages. Educated and experienced farmers (who are from the villages) work as coordinators. Depending on the crop, each coordinator is assigned a fixed number of farms. The coordinator collects the registration details of the farms under him including soil data, water resources and capital availability, and sends the information to the main e-Sagu system. Every day, the coordinator visits a fixed number of farms and takes four to five photographs of each farm. A CD is prepared with the photographs and other information and transported to the main system by a regular courier service. The agricultural experts, with diverse background (entomology, pathology, agronomy, etc.) at the e-Sagu (main) lab analyse the crop situation with respect to soil, weather and other agronomic practices and prepare a farm-specific advice. At the local e-Sagu centre, the advice is downloaded electronically through a dial-up internet connection. The coordinator collects the advice printout and delivers it to the concerned farmer. In this way each farm gets proactive advice at regular intervals starting from pre-sowing operations to post-harvest precautions.

Experience till 2006

- The development of e-Sagu was started during *Kharif* season of 2004. The e-Sagu system was implemented by delivering advisory information to 1051 cotton farms for the farmers of three villages in Warangal district in Andhra Pradesh. The experiment was successful.
- During 2005–2006, the e-Sagu system for 5000 farms has been implemented for cotton, chillies, rice, groundnut, castor, and red gram farms in 35 villages spread over six districts in Andhra Pradesh. In addition, the e-Sagu system is developed to deliver advise to fish farms. Table 1 shows some basic information about e-Sagu. Table 2 shows the details of e-Sagu local centres and villages. The details regarding benefits accrued to farmers are given in Table 3.

Table 1: Details of e-Sagu implementation (2005–2006)

Description	Value
Number of centres	8
Number of villages	35
Number of crops	30 + Aqua
Names of major crops	Cotton, chillies, paddy, groundnut, castor, red gram and fish
Number of farms	4,894 + 160 (fish ponds)
Number of advices delivered	35,925
Number of crop photographs	2,62,136 (2.6 lakhs)
Number of fish photos	7,195 (Fish photos)+1,723(Report photos)
Number of photos per observation	5

Table 2: Details of crops, e-Sagu local centres and villages

Crop	e-Sagu local centre	Names of villages attached
Cotton	Oorugonda (Atmakur mandal; Warangal district)	Oorugonda, Gudeppad, Sitaramapuram and Dammanapeta, Nandigama, Rangapur, Relakunta, Saireddipalli
	Malkapur (Station: Ghanpur mandal, Warangal district)	Malkapur, Venkatadripeta, Chilpur, Peechara and Maddelagudem
Chillies	Banapuram (Mudigonda mandal, Khammam district)	Banapuram, Kamalapuram, Gandhasiri, Mangapuram and Pedamandava
Rice	Jinnuru (Poduru mandal, West-Godavari district)	Jinnuru and Poduru
Groundnut	Nagrireddipalli (Ananthapur-rural mandal, Ananthapur district)	Nagireddipalli, Taticherala and Somaldhoddi
Castor	Gurukunta (Atmakur mandal, Mahabbobnagar district)	Gurukunta, Darpalli, Lingampalli, Kamaram and Karoor
Red gram	Kotabasupalli (Thandur mandal, Ranga Reddy district)	Kotabasupalli, Gengurthi, Inelli, Kothlapur, malkapur and Sankireddypalli
Fish	Pathepur (Nidamarru mandal, West-godavari district)	Pathepuram

Table 3. Details of benefits accrued to farmers due to e-Sagu

S. No	Gain in fertiliser	Gain in pesticide	Gain in yield	Total gain
Cotton	419	1140.6	3349	4908.6
Chilli	751.2	1093.8	6040.1	7885.1
Paddy	315.2	795.3	699.9	1810.4
Red gram	293	451.7	484.8	1229.5
Groundnut	282	70.5	900	1252.5
Castor	218	225	1360	1803
Major crops	425	890	2398	3713
Other crops	585.1	1117.2	4694.55	6396.85
All crops	443.6	928.8	2501.6	3874

(*Source:* Evaluation Report, 2006[1])

Key Results

- The farmers are happy with the expert advice as it is helping them improve input efficiency by encouraging integrated pest management (IPM) methods, judicious use of pesticides and fertilisers by avoiding their indiscriminate usage.
- The details of benefits accrued to farmers are as follows:

  (a) For 2004 experiment: Rs. 3,820 per acre with cost–benefit ratio = 1:3

  (b) For 2005 experiment: Rs 3,874 per acre with cost–benefit ratio = 1:4.1.

  (*Source:* Impact Analysis by Social Scientists)

Fish farmers have realised significant benefits. e-Sagu advisories provided to 162 farms covering 1027.85 acres has resulted in per acre gain to the order of Rs. 14816 in a cross-section analysis.The relative contribution of yield enhancement is about two-thirds and is followed by saving in feed, which is around one-fourth[2].

1. P. Krishna Reddy, A.Sudarshan Reddy, B.Venkateswar Rao, G. Shyamasundar Reddy: e-Sagu: Web-based Agricultural Expert Advice Dissemination System, Final Evaluation Report, IIIT, Hyderabad, 2005.

2. P. Krishna Reddy, A.Sudarshan Reddy, B.Venkateswar Rao, G. Shyamasundar Reddy: Building a Cost-effective and Personalized eSagu, Final Evaluation Report, IIIT, Hyderabad, September 2006.

- The turnaround time for advice delivery is 24–36 hours.
- In some centres, the farmers have paid the subscription fee for the services and they are satisfied with the service.

Benefits

- It provides a quality personalised agro-advice to farmers.
- It is a query-less system and provides agro-advice even without the farmer asking a question by following a proactive approach. It averts problematic situations.
- It provides accountable advice with two-way communication. The advice is comprehensive, complete and regular in terms of diagnosis, analysis, advice delivery, follow-up and feedback.
- It is a scalable system.
- It can be developed on the available infrastructure even without bandwidth.
- It is a cost-effective system. It can be made self-sustainable with a nominal service charge.
- It enables farmers (marginal and poor) to cultivate with the same efficiency as agricultural experts.
- It provides a strong data base to support decision making and documents success stories and new problems.
- It enables quick deployment of services during times of crisis.
- It capacitates rural livelihoods and generates rural employment.
- It helps in validation of agriculture technology.
- It aids in successful implementation of crop insurance schemes by making the farm as a unit of insurance.
- It significantly reduces the lag period between research efforts and field application.
- It shows great promise in the era of globalisation, as it can provide the expert advice that is crucial to the Indian farmer to harvest different kinds of crops based on the demand in the world market with quality and assurance.

Future

- Continued experiments to bring down the cost of e-Sagu services.
- Investigating the development of agri-business model by providing multiple services under one roof. The services will include e-Sagu, input (fertiliser and pesticide), banking, warehousing, insurance and marketing.
- Scaling-up of operations in Andhra Pradesh and extending the concept and services to other states in a phased manner.

- Standardisation of the e-Sagu system
- International standards certification for the e-Sagu system
- Certification for the e-Sagu farmers' produce under international standards to enable them to compete in export markets
- Expanding e-Sagu to horticulture, aquaculture and animal husbandry.

Collaborators and Partners

The e-Sagu system is being developed by IIIT, Hyderabad, and Media Lab Asia under the aegis of Media Lab Asia. The development/deployment and collaborators include National Institute of Smart Governance, Acharya N G Ranga Agricultural University (ANGARU), Byrraju Foundation, ILFS, M/s JANANI Foods Pvt. Ltd., NASSCOM Foundation, PRAMAN Allianz, Sowbhagya Krishi Vikas Pvt Limited, and Confederation of Kisan Organizations. Organisations such as the Central Research Institute of Dry land Agriculture (CRIDA), National Institute of Agricultural Extension Management (MANAGE) and Center for Environmental Studies are also associated with the project.

Recognition and Awards

- e-Sagu has been recognised worldwide as one of the latest novel internet applications in the Innovative Application Case study 2006 of the Institute for Information Industry, Ministry of Economic Affairs, Taiwan.
- e-Sagu has been awarded the CSI Nihilent e-Governance Award for the year 2005–2006.

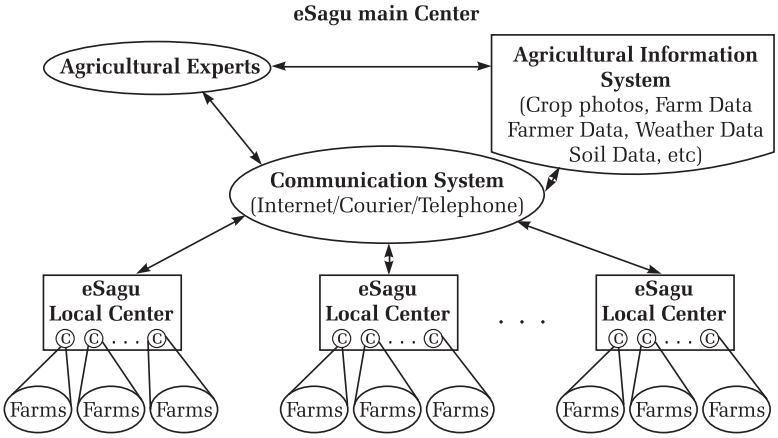

Fig 1. The parts of e-Sagu system. Here, C indicates coordinator. A double arrow indicates information flow.