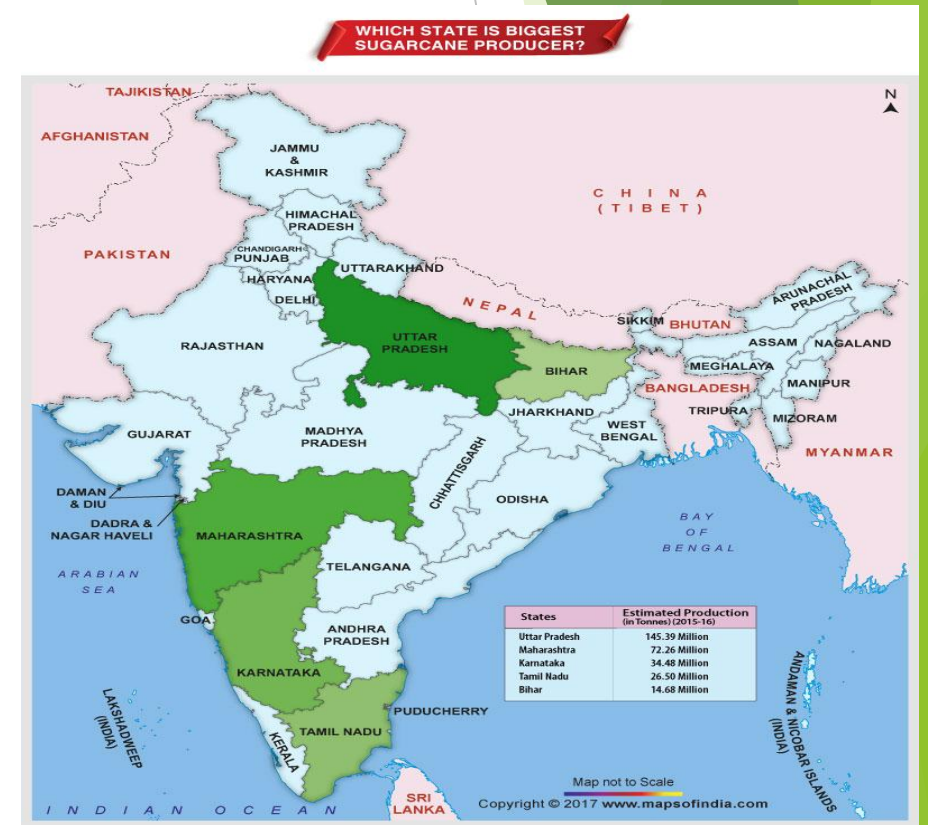


Agricultural Innovations and ICT application in India

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THE INDIAN AGRICULTURAL SCENARIO

- India has 127 different Agro climatic zones, immense biodiversity and natural resources
- India is one of the biggest food grain and oilseed producers in the world
- Small farms produce 41 percent of India's total grain (49% of rice, 40% of wheat, 29% of coarse cereals and 27% of pulses), and over half of total fruits and vegetables
- Largest producer of milk, tea
- Fruits & Vegetable and Sugar-Second in the world
- Provides Employment to 62.5 percent work force,
- Export Earnings 14.7 Percent
- Contributes 18 Percent to GDP



National Agricultural Innovation Project (2000 -)

- ▶ Jasmine Flowers - From Village to Global Market: Thanks to packaging technology. It has been developed for enhancing the shelf-life of flowers and it has enabled the export of Jasmine flowers from villages in Tamil Nadu to Gulf, European and American markets.
- ▶ Fabric from Banana fibre: Value-chain for use of banana *pseudo* stem developed for converting fibre to fabric, providing employment and income generation in rural areas. Units are coming up in Gujarat, Tamil Nadu and Andhra Pradesh.
- ▶ Natural Dye from Flowers: Colours and their combinations from natural sources like flowers, bark, leaves, etc. have been developed for use as natural dye for textile industry. This will reduce the use of chemical dye.
- ▶ World's First Cloned Buffalo: Cloning technology is successfully developed. Cloned 'Garima' buffalo calf is growing healthy. It will help in conserving the endangered species and fast reproduction of elite and high yielding animals.
- ▶ Foot rot in Sheep in the mountainous regions: A vaccine for the control of foot rot in sheep in the mountainous regions has been developed.
- ▶ Health Food from *Jowar* and *Bajra*: The value-added products from millets, *jowar* and *Bajra* have been developed as a health food.

National Agricultural Innovation Project (2000 -)

- ▶ **Kadaknath for Tribal Areas:** Improved housing, feed and health-care reduced mortality in high-value poultry (Kadaknath) in tribal areas. These interventions have enhanced income besides nutritional supplement.
- ▶ **Less Known Fruits for More Income:** The underutilized trees/fruits e.g. *ber*, *palas*, *jamun*, pongamia, tamarind, etc have been exploited for extra income generation through value-added products for rural areas.
- ▶ **Online E-publishing and Access for Sharing of Agricultural Contribution:** E-publishing of two research journals of ICAR, online submission and access have started and on global platform for sharing of research contributions. Besides, online access to over 2,900 international journals in 124 libraries is benefitting scientific communities and 1.20 million articles have been free downloaded by the readers.
- ▶ **Unique Approach for sharing Agro-information:** A unique approach of mobilizing mass-media resources for sharing and dissemination of agricultural technologies is working across the country.

DIFFERENT ICT INITIATIVES IN INDIAN AGRICULTURE

| Initiative | Description | Established in the year |
|---------------|--|-------------------------|
| AGRISNET | An infrastructure network existing at block level facilitating agricultural offices, agricultural extension services and agribusiness activities to enhance rural development. | 2000 |
| Digital green | The agri. information of local relevance is disseminated through digital video. The system consists of a digital video database prepared for farmers by farmers with the help of experts. The recordings are shown to individuals or small groups using laptops, DVD player, television and to communities through village cable network | 2008 |
| eSagu | eSagu provides personalised expert advice in a timely manner from sowing stage to harvest for small and marginal farmers at their door-step. | 2004 |
| Warana | The project provides access to a wide range of information including agriculture to the member of the cooperative in local language. It provides information on crops, market prices, employment schemes, educational opportunities, etc | 1989 |
| IKSL | village information kiosks. The operators of these kiosks are the main linkage between the farmers and the information centre | 2002 |

| | | |
|---------------|--|------|
| Agmarknet | This initiative provides daily market price and arrival information in respect of 300 commodities and 2000 varieties in eight local languages. | 2000 |
| Pravara | The information on government scheme, agricultural marketing, healthcare, education, agro-processing and economic development are disseminated through IT centres established under the project | 1999 |
| iKisan | iKisan is a one-stop solution for farmers in providing information on crops, crop management techniques, fertilizers, pesticides and other related information like market updates and weather forecasts. | 1999 |
| Digital Mandi | Digital Mandi is an electronic trading platform for agri-commodities to bring the benefit of ICT to farmers and traders by eliminating geographical barriers and temporal limitation and removing cash crunch through active participation of various financial institutions. Digital Mandi is inspired by the vision of Media Labs Asia sustainable village through culturally appropriate use of new technologies. | 2009 |

| | | |
|-----------------------|--|------|
| Akashganga | The initiative facilitates timely collection of milk, proper payments and generates higher income for dairy farmers. | 2002 |
| aAQUA | aAQUA is a multilingual online problem solving system that facilitate farmers getting their queries answered by experts. | 2005 |
| eKrishi | The aim is to enable farmers to take informed decisions on sale of their produce and bring transparency in the working of the Madhya Pradesh State Agricultural Marketing Board | 1999 |
| Mahindara Kisan Mitra | The information is available on sections such as loans, insurance, Mandi database, cold storage and warehouses, etc. The farmers can also get motivated and take benefits from the success stories of other fellow farmers reported on the website | 2008 |
| Earik | It provides expert consultation on production, plant protection and marketing. | 2001 |

| | | |
|-------------------------------|---|------|
| Fisher Friend Mobile Advisory | The information relevant for fishermen is provided in local language through mobile phones. The information covered are wave height, wind speed and direction, potential fishing zones, relevant news, government schemes and market price. | 2010 |
| KCC | The Kisan Call Centre utilises telecom infrastructure to provide customised information on various aspects of agriculture in local language using toll free number 1800-180-1551. | 2005 |
| Reuters Market Light | Reuters Market Light provides mobile phone based customised information according to the individual farmer's preferences on crops, markets, and location. | 2005 |
| e-agri kiosk | An initiative by NABARD and Central Agricultural University. Touch screen kiosk for technology transfer among tribal farmers of Arunachal Pradesh. | 2011 |
| e-choupal | It is a kiosk located in a village and equipped with computer with internet access managed by trained sanchalak. | 2000 |

SUCCESSFUL STORY :E-CHOUPAL



- e-Choupal , is widely acclaimed and successful application of ICT in Indian agriculture. e-Choupal was started in 2000 by the ITC (Indian Tobacco Company) primarily to improve its procurement efficiency of soybean in Madhya Pradesh.
- At present, it has become the largest initiative among all Internetbased interventions by private sector in rural India covering over 4 million farmers growing a range of crops - soyabean, coffee, wheat, rice, pulses, shrimp - in over 40,000 villages through 6500 kiosks across ten states
- Over 1200 e-Choupals are in Madhya Pradesh. These Choupals have been provided with internet connectivity with solar panel battery back-up and VSAT equipment. Although, the primary objective of this is to empower producers with information on market prices of agricultural products, it also gives latest information on weather and farming practices to help them in decision making.

SUCCESSFUL STORY :E-CHOUPAL



- The e-Choupal acts as a direct marketing channel, and eliminates market intermediaries and reduces price spread. It thus helps producers reduce transaction costs of information search and transportation. Also the farmers realize better returns with increase in sale value for their soya produce by around two per cent.
- Besides, e-Choupal helps providing high quality inputs to producers by tying up with input manufacturing companies.

CATEGORISATION OF ICT INITIATIVES IN INDIAN AGRICULTURE

| Ownership/ Delivery mechanism | Government | Non-Government | Cooperative/Private/ Consortium |
|---|---|--|---|
| Web-based | AGRISNET, eKrishi, AGMARKNET | | Pravara, Akashganga, iKisan, aAQUA, Mahindara Kisan Mitra, Haryali Kisan Baza |
| Sanchalak (Facilitator between the user and service provider) | | | Warana, eSagu, iKisan, e-Choupal |
| Mobile/ Mixed Approach | KCC, Earik, Digital Mandi, e-Agri Kiosk | Fisher Friend Mobile Advisory, Digital green, MSSRF FFMA | IKSL, Reuters Market Light |

SOURCE OF INFORMATION FOR INDIAN FARMERS

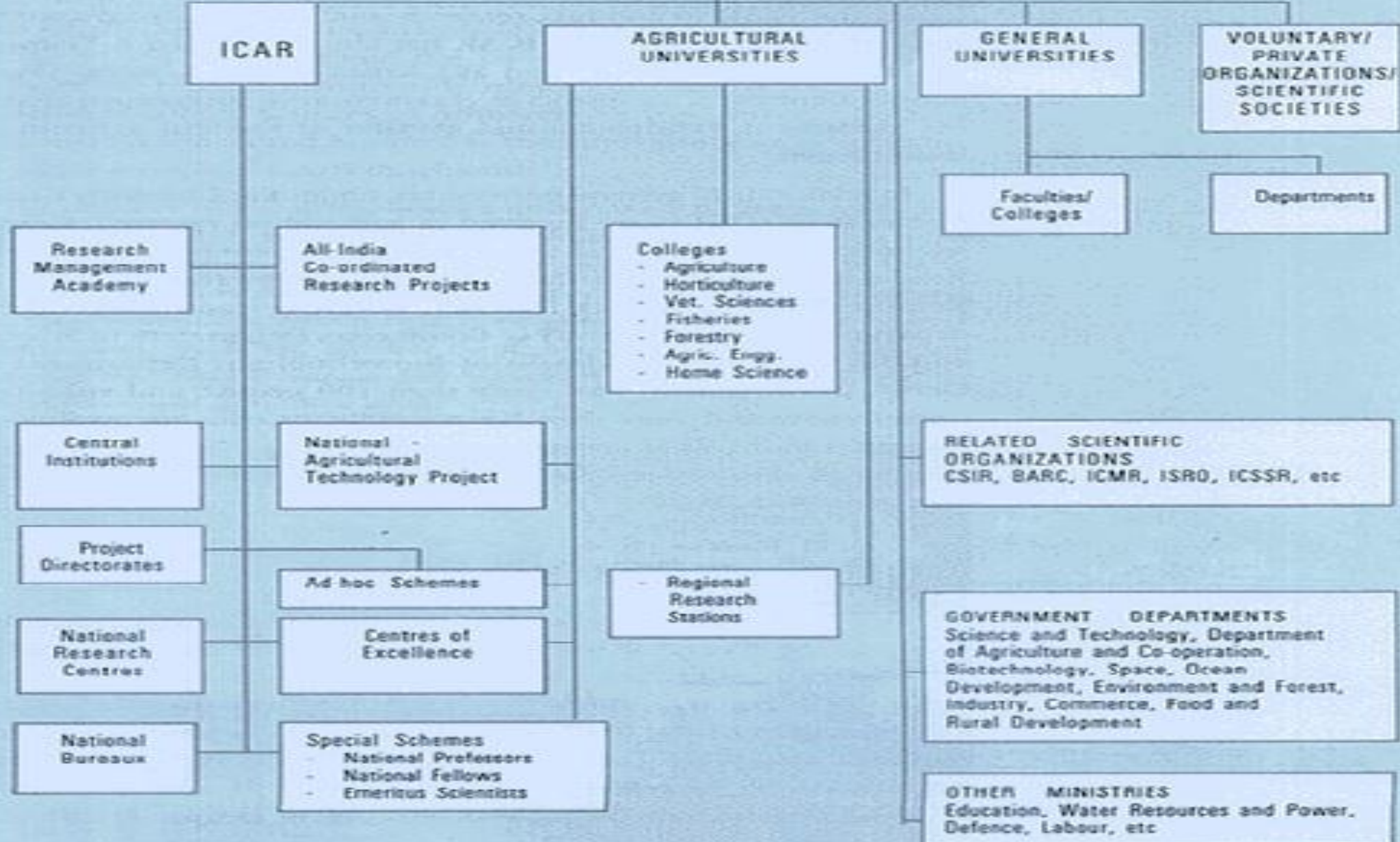
| Sr. No | Source of Information | Total (N=183) | Per cent |
|--------|-------------------------------|---------------|----------|
| 1 | Mobile phone | 183 | 100 |
| 2 | Mobile -phone-enabled service | 138 | 75.4 |
| 3 | Television | 118 | 64.5 |
| 4 | Newspaper | 98 | 53.6 |
| 5 | Kiosk | 51 | 27.9 |
| 6 | Other farmers | 43 | 23.5 |
| 7 | Radio | 37 | 20.2 |
| 8 | Input dealers | 42 | 23.0 |
| 9 | Extension workers | 121 | 66.1 |

Source: Calculated from Mittal et al., (2017). *The locations covered are Allahabad, Agra, Mathura, Alwar, Dausa, Bhilwara, Baran, Jaipur, Satara and Puducherry.

CONSTRAINTS IN ADAPTING ICT SYSTEMS

| | 2014 n=291 | 2015 n=568 | 2016 n=388 | 2017 n=258 |
|---|---------------|---------------|---------------|---------------|
| Cost of technology | 19.2 | 21.3 | 17.5 | 10.9 |
| Do not understand the value of ICT, awareness | 60.8 | 41.7 | 46.4 | 40.9 |
| Personal impediments (Illiteracy or ICT skills) | 70.8 | 63.9 | 62.3 | 67.3 |

National Agricultural Research System



KEY QUESTIONS FOR THE NEXT GENERATION OF ICT

- Is ICT Adoption in Agriculture unique in its characteristics
- Are there ICT Adoption commonalities between the various agricultural activities, production chains, efficiencies and various countries
- Is ICT Adoption for agricultural production, development and rural viability a public concern
- Do agricultural end users merit a role in ICT development and are the agricultural sector's needs unique
- Is Agricultural Extension, as a public service justified?

CONCLUSION AND RECOMMENDATIONS

- Assessment of information needs of the farmers and appropriate mode of reaching them as per local conditions is crucial before developing an ICT Model
- The information dissemination model should be viable and user-friendly so that the initiatives may be sustained in long-run. A string backward and forward linkage should be in place for accurate information collection and its dissemination.
- Integration of various agencies under one roof for providing vital information on various components of agriculture so that it will act as a one stop solution for the needs of the farmers.
- Introduction of delivery mechanism of information in the case of government initiatives like agmarknet.nic.in is need of the hour so that the information reaches the end user.
- It is essential to create the requisite ICT infrastructure in rural areas for effective dissemination of information.
- Creating awareness among farmers and other stakeholders on the importance of information and its optimum utilisation will help in the development of agriculture and overall well being of the farming community.