Information Communication Technology (ICT): A Revolution for Agriculture

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ABSTRACT   E-Agriculture is an emerging field focusing on the enhancement of agricultural and rural development through improved information and communication processes. More specifically, e-Agriculture involves the conceptualization, design, development, evaluation and application of innovative ways to use information and communication technologies (IT) in the rural domain, with a primary focus on agriculture.

Farmers' suicides are a matter of significant concern and controversy in India. With the highest number of farmer suicides recorded in the year 2013, Maharashtra continues to paint a dismal picture on the agrarian front with over 3,000 farmers taking their lives. According to NCRB data, over 60,000 farmers have killed themselves in the state since 1995.

Effective utilization of ICT in agriculture can definitely change the current situation of farmers and also reduce the suicidal rate of farmers.

Introduction

Farmers' suicides are a matter of significant concern and controversy in India. Some allege the beginning of the increase in farmer suicides to the early 1990s. It was also claimed, that while a comprehensive all-India study is still awaited, that most farmers suicides occurred in states of Andhra Pradesh, Maharashtra, Karnataka, Kerala and Punjab. The situation was grim enough to force at least the Maharashtra government to set up a dedicated office to deal with farmers' distress.

In the beginning it was believed that most of the suicides were happening among the cotton

Total **57,604** in 18 years
Source: NCRB 1995-2012
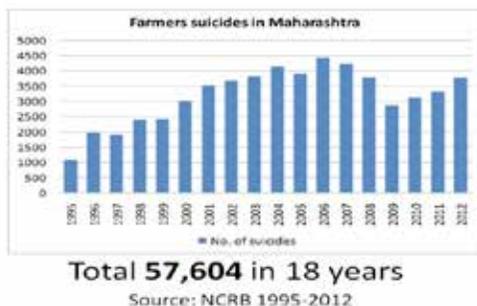
growers, especially those from Vidarbha. A look at the figures given out by the State Crime Records Bureau, however, was sufficient to indicate that it was not just the cotton farmer but farmers as a professional category were suffering, irrespective of their holding size. Moreover, it was not just the farmers from Vidarbha but all over Maharashtra who showed a significantly high suicide rate.

With the highest number of farmer suicides recorded in the year 2013, Maharashtra continues to paint a dismal picture on the agrarian front with over 3,000 farmers taking their lives. According to a recent report of the National Crime Records Bureau (NCRB), a total of 3,146 farmers killed themselves in the state in 2013.Maharashtra repeated this performance despite the state registering 640 less farm suicides than 2012.According to NCRB data, over 60,000 farmers have killed themselves in the state since 1995.The Vidarbha region of the state, once considered the epicentre of the farmers' suicide in the country, recorded 942 suicide in 2013, claims the Vidarbha Jan Andolan Samiti (VJAS), a farmers' advocacy group working in Vidarbha.

Various reasons have been conjectured as the causes behind farmers' suicide in India ranging from droughts to debt to genetically modified crops to public health; but there is no consensus. Studies dated 2004 through 2006 identified several causes for farmers suicide, such as insufficient or risky credit systems, the difficulty of farming semi-arid regions, poor agricultural income, absence of alternative income opportunities, a downturn in the urban economy which forced non-farmers into farming, and the absence of suitable counselling services.

Review of Literature –

The e-Transform report on ICTs in agriculture, prepared by Deloitte, echoes many of the challenges of the climate change report. Though there have been significant gains in ICT capacity and physical infrastructure, further development is limited by a lack of an infrastructure backbone. This is compounded by a lack of literacy and numeracy skills, diminishing the accessibility and impact of many existing ICT systems. Government and NGO efforts must take these realities into account when designing ICT-enabled interventions into agricultural markets. The report looks at various examples and two deep-dive case studies in Namibia and Egypt to find current practices that can teach valuable lessons about ICT-facilitated interventions in agriculture. The figure below identifies the areas where ICT solutions integrate into the agriculture value chain.[7]

The study of Dr G V Ramaraju1, Dr. T.S Anurag, Dr. Hrishikesh Kumar Singh, Shambhu Kumar on "ICT in Agriculture: Gaps and Way Forward "found that

1. There is a need felt for aggregation when catering to the farmer queries in multimedia mode i.e voice mode (in local language) along with text, image and video.

2. Requirement of farmers through friendly and simple inter-faces to access information and advisory services in effective manner preferably through smart phones

3. Need is to develop a combination of push and pull based interactive system (essentially pull based) so that the com-munication can be possible in both ways, i.e from farmers to expert and vice versa.

4. It is essential to interlink location specific information from various service providers to cater to the specific needs of the farmers.

5. A necessity for maintaining farmer's database with their farming details, to enable an expert to provide appropriate solutions to the concerned farmer's.

6. Requirement of expert support system which has user friend-ly interfaces and reference content (e.g SAU's Knowledge repository, farmer's details, FAQs from the farmers query, etc) for fast and proactive delivery of advices. The system should also facilitate an expert to be virtually available by giving him any time anywhere access. [9]

Need of the Study –

1. To identify different ICT tools & techniques for agriculture.
2. Create awareness among the farmers about the use of ICT in agriculture.
3. Highlight the issue of farmer's suicide.

Analysis -

The application of information and communications technology (ICT) in agriculture is increasingly important. E-Agriculture is an emerging field focusing on the enhancement of agricultural and rural development through improved information and commu-nication processes. More specifically, e-Agriculture involves the conceptualization, design, development, evaluation and applica-tion of innovative ways to use information and communication technologies (IT) in the rural domain, with a primary focus on agriculture. E-Agriculture is a relatively new term and we fully expect its scope to change and evolve as our understanding of the area grows. Indian Agriculture contributes to 18.6 per cent of India's GDP, and approximately 59 % Indians derive their liveli-hood from the agricultural sector. Private sector initiatives like contract farming have commercialized the Indian agricultural sector.[1]

Computer-controlled devices (automated systems)

Automatic Milking systems are computer controlled standalone systems that milk the dairy cattle without human labor. The complete automation of the milking process is controlled by an agricultural robot, complex herd management software, and specialized computers. Automatic milking eliminates the farmer from the actual milking process, allowing for more time for su-pervision of the farm and the herd. Farmers can also improve herd management by using the data gathered by the computer.

By analyzing the effect of various animal feeds on milk yield, farmers may adjust accordingly to obtain optimal milk yields. Since the data is available down to individual level, each cow may be tracked and examined, and the farmer may be alerted when there are unusual changes that could mean sickness or in-juries [2]

Biometrics in India

Improving agricultural public service provision is critical. Public agriculture programs are riddled with challenges—elite capture and social exclusion, unreliable data on household preferences and sustenance activities, limited human capital, and poor road infrastructure are just a few. When governments fail to provide agriculture extension, vouchers, insurance and credit, inputs, and other pertinent services to those who need it most, the chances of stimulating growth weakens.

Today, ICT is improving governments' ability to provide sustain-able and cost-effective services. Mobile phones and the Inter-net have expanded the scope of government reach, even where there are traditional barriers to reaching the rural poor. Biomet-rics is one area that public organizations and donors have been exploring in Southeast Asia. The use of biometrics—electronic methods that measure unique characteristics like fingerprints or retinal scans to verify a person's identity—holds a great deal of potential in public service provision. Verifying identities to ensure that loans are appropriated to the correct person, for ex-ample, is important to reliable repayment. Biometrics and the effects on loan repayment, drawing upon a study conducted by researchers at the International Food Policy Research Institute.

Soil Testing Services

Soil testing service in India began in 1955-56 with the soil test-ing laboratory at IARI as the hub to coordinate with all the other soil testing laboratories in the country. This laboratory, called as Central Laboratory for Soil and Plant Analysis, is well known among research and extension agencies, and farmers for its ad-vanced facilities, reliability of analysis, and an efficient advisory service. The Laboratory has advanced analytical facilities includ-ing ICP-MS, CHNS Analyzer, and Atomic Absorption Spectro-photometer (AAS) with flame and graphite version, N-Analyzer etc. The Laboratory offers soil, plant, manure and irrigation wa-ter analysis services to the farmers and other clients. A regular Advanced Level Training in Soil Testing, Plant Analysis and Wa-ter Quality Assessment is also imparted every year for the scien-tific and technical personnel associated with soil testing.

Services offered:

• Soil and plant testing for macro-

Participants of Advanced Level Training undergoing a hands-on excercise

and micronutrients

- Irrigation water quality assessment
- Manure analysis for total nutrient content
- Soil and plant analysis for heavy metals and pollutant elements
- Advisory on balanced fertilizer use
- Advisory on management of problem soils

Impact of the Industrial Revolution on Agriculture

Industrial revolution brought about drastic changes in the farming process. Farmers discovered the crop rotation system that allowed them to forgo leaving up to half of the land unused or fallow between each planting. This phase witnessed the use of animal husbandry. The industrial revolution brought about an end to tedious handiwork and encouraged the invention and manufacture of other labor-saving farm implements and machinery. Few of the inventions include:

Seed Driller

Seed drill was an innovation that allowed seeds to be easily planted deep into the earth instead of on top where the majority were washed away or otherwise lost. The machine was pulled by horses and consisted of rotating drills or runners that planted seeds at a set depth.

Design of wireless sensor networks applied to survey of agriculture environment communication

A kind of wireless sensor networks applied to the survey of agriculture environment communication is supported. It is used to test the temperature, humidity and illumination in the experimentation field. In the same network nodes the establishment and maintenance are achieved by name and polling mechanism. The sensor nodes can obtain the temperature, humidity and illumination information real time. The user can inquire the information what he wants. The experiment results show that the networks are able to achieve the required information and transmission functions.[8]

Conclusion

Some conclusions can be drawn from the study:

- Efforts should be made to incorporate ICT in all endeavors related to agricultural development.
- The organization's and departments concerned with agricultural development need to realize the potential of ICT for the speedy dissemination of information to farmers.
- Government at national and state level in India has to re-orient agricultural policies so that a fully-fledged strategy is formed to harness ICT's potential for assisting overall agricultural development. As part of this process policy makers should utilize the analysis of the ICT projects in this study, to become acquainted with how such projects function.
- Effective utilization of ICT in agriculture can definitely change the current situation of farmers and also reduce the suicidal rate of farmers.

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