

## ENABLING INCLUSIVENESS AND INTEGRATION OF KNOWLEDGE SYSTEMS THROUGH ICT AMONG SMALL AND MARGINAL FARMERS

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### ABSTRACT

Coconut and coconut based farming system is the major livelihood option of lakhs of small and marginal farm families. The major coconut growing states had a higher tele density of more than 100 percent with an added advantage of high literacy rate. Several studies reported very low level of ICT use among the coconut farming communities. A participatory study was conducted during 2016-17 in Alappuzha district to evolve an ICT strategy for coconut communities and to develop an interactive mobile application customized to farmers of different states in their mother tongue. Cloud based interactive multi lingual Android application for stakeholders in coconut sector “e-kalpa” was developed, pilot tested and refined with additional components and uploaded in Google Play store. ICT use in Social Science research with particular emphasis to Agricultural Extension requires accurate and reliable data collection in faster and cheaper mode. “e plantation survey App” designed and evaluated successfully for real time geo referenced data documentation, archiving and analyzes.

### INTRODUCTION

Indian farming is challenging but showcasing potential of technology integration with the changing scenario of preponderance of small and marginal farmers. Small holdings are being managed by farm families depending entirely on farming for their livelihood as well as from off farm income sources. Appropriate and timely technology or information back stopping can improve their efficiency. A case in point, is the coconut-based homestead farmers of Kerala state. The families who are entirely depending on farming per se was reported to be less than 10 percent. [1]

The national level overall tele density in the urban and rural areas were reported to be 172.28 percent

and 57.55 percent respectively. The overall tele density of the major coconut growing states such as Kerala (115.67percent), Tamil Nadu (128.97 percent), Andhra Pradesh (97.54 percent) and Karnataka (113.40 percent) is on the higher level. [2]. India is the second largest nation of online internet users with 460 million users ranked only behind China. But only 26 percent of the Indian population accessed the internet in 2015, and 71 percent of them were male users. It was also reported that around 74 percent of total internet users were aged less than 35 years as per data of 2016. [3]. Data from Kerala State on the gender of persons using farm information from Facebook also indicated 72.1 percent were men and 27.83 percent women. [7]. The statistics on the mobile penetration and internet access in the major coconut growing states of India can be considered as a strong indicator of the suitability and need for ICT in the coconut development sector. ICT enables the extension system in reorienting itself towards the overall agriculture development of small production system. [4]. A study conducted among the coconut farmers of Alappuzha district of Kerala state during 2017 in the Farmer FIRST Programme (FFP) among 740 farmers showed that all the farmers possessed mobile phones, among which 17.75 percent had operating system of Android, 0.68 percent had Windows and 0.14 percent Apple. Hence it was estimated that all the farmers could be reached through SMS/tele calls and 18 percent through Android mobile apps. Majority of the land holdings were only of 0.1 to 0.4-hectare size. This data indicated that the number of farmers to be reached out by extension systems ranges from 4 to 10 per year with varying resource base. Reaching out to the farming community through Farmer Producers Organizations (FPO) such as Coconut Producing Society (CPS) and Coconut Producing Federation (CPF) is one of the feasible and effective channels of ICT in coconut extension.

Hence this study was taken up with objectives as follows:

1. To evolve ICT strategy for the coconut farming community for integration with existing extension system.
2. To develop an interactive mobile application for faster access to research outputs and bridging gap between stake holders.
3. To design and evaluate survey application for real time geo reference accurate social science data documentation, archiving and analysis which can lead to deep learning.

### METHODOLOGY

The study was conducted in Alappuzha district during 2016-17. Survey of 60 coconut farmers were conducted to analyze their needs, socio economic status and access to ICT infrastructure based on a pretested interview schedule. A prototype of Android mobile application for coconut farmers was uploaded and participatory study of the users perception in terms of contents, presentation, acceptability and refinement was done. A mobile based survey application also was designed and uploaded for assessing the user friendliness, efficiency in real time data documentation, transfer to csv format and reliability of the instrument, for social sciences research.

### RESULTS

Integrating technologies and knowledge systems effectively among small and marginal coconut farmers is a challenge. Hence, based on the feedback received from the farming community/users a cloud based interactive mobile application called "e-kalpa" which runs on android operating system was developed and uploaded in Google Play store. The multilingual App is accessible in offline and online mode also in English, Hindi, Malayalam, Kannada, Tamil and Bengali languages. The components of the e-Kalpa comprises of knowledge base containing 105 technology snippets on coconut (69 Nos.) arecanut (21 Nos.) and cocoa (16 Nos). Other than that "Crop Information" in English and Malayalam languages of 59 inter/mixed crops is available for users practicing coconut based cropping systems as a ready reckoner. Based on the farmers' needs an "input calculator" was designed and uploaded for facilitating users in

integrated nutrient management of coconuts, sine maximum queries and information need was recorded inn INM by farmers. The user has to enter the number of seedlings and palms of various age categories to get a detailed output for nutrient management. Since information and knowledge considered as important as production factors e-kalpa could empower the farmers extension officials and stake holders for technology dissemination, adoption and improving farm income. The field problem/ farmer issue reporting system of e-kalpa enables real time reporting of field issues as images, videos or chatting as per farmers' choice. Farmers reported 4 to 5 cases daily on an average. The GPS locations, mobile number and address of the farmers could be archived and the data could be utilized for evolving community or geographic location specific problems mapping, in temporal and spatial pattern for better research input and effective extension approaches to benefit farming community, reducing cost, time, inputs and resources of farming. Thus the income of farmers could be improved through ICT in a sustainable, long term planning and evolving programmes using data archived in a time saving manner.

### ICT FOR SOCIAL SCIENCE RESEARCH

Agricultural Extension research and development requires accurate, reliable and real time data documentation and to avoid human errors. Survey based on interview schedules and questionnaires are the major data collection methodologies among Social Science researchers. Data of sample respondents for various studies has to be collected from different stakeholders, from the field, and directly interviewing the sample respondents. Hence based on the scientific needs and for effective utilization of available resources "e-plantation survey app" for digitized data collection was developed. Survey could be done paperless, time saving, avoiding drudgery of master sheet preparation, maintain data integrity, GPS tagged real time data documentation and rapid downloading in compatible csv format. This app was evaluated and confirmed about the utility of rapid automatic archiving and multiple surveys saving time and expenditure. The app could be operated in online and offline mode enabling data documentation from remote areas also avoiding internet dependency. A total of 28 surveys with customized multiple interview schedule/ survey forms were completed successfully using e-survey App

documenting more than 30,000 data using multiple mobile phones, accurately and precisely, indicating the robustness of the Application.

Appropriate, active and systematic management of messages is critical in achieving the required impact. Since involvement and participation of the younger generations in farming is on the decline, customized trainings and concerted efforts are needed for bringing the middle aged and old farmers in utilizing ICT as a handy tool for technology dissemination. A study in Malaysia indicated that among farmers usage of ICT were low due to the gap in knowledge and skills. [5]. Another study in Philippines reported that mobile phone based technology transfer was not a preferred information source among rural farmers. Several issues like socio economic status, illiteracy and lack of ICT trainings were some of the reasons cited for this.[6]. The use of ICT tools by coconut farmers also reported to be very low in Kerala State. [7].The propensity of innumerable mobile applications on farming and ICT tools from various sources, warrants empowerment of farming communities with knowledge, skills and proper management and choice of information. An appraisal mechanism needs to be evolved by social science research for ensuring authority in contents and grading methods by research and extension systems. Standardization of quality parameters for mobile applications in farming is imperative for facilitating ICT use towards doubling farm income with confidence.

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