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Development of Android App Model for Sericulture

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ABSTRACT: Information and communication technologies (ICT) are now being used widely, with remarkable positive results to perform these tasks in agricultural development projects. Mulberry sericulture forms a part of agriculture sector in India, where a large number of farmers participating in production silk cocoons in far off places. A new technology has been developed using Android App to collect precise and valuable information from the farm households for evaluation. The App is built with good validation mechanism to prevent bad data being entered into the system thus eliminating the risk of refactoring the received data. Training is an important component to collecting data through ICT tools. Field enumerators and farmers using new technologies need additional training and support. This has a greater impact on the economic and policy perspective for taking decisions at the gross root level in sericulture the industry.

KEY WORDS: Mulberry sericulture, Android, Data, Evaluation

I. INTRODUCTION

In an increasingly complex operating environment, the discipline of development demands a strong practice and use of evaluation as a crucial tool to analyse the development efforts and to make decisions based on the best available evidence [1]. Data collection, monitoring and evaluation are a vital part of development work, as the results determine where extension services are most needed and what approaches will prove effective [2]. Traditional approach is time consuming and susceptible to human error that, may affect productivity and accuracy. Information and communication technologies are now being used widely, with remarkable positive results to perform these tasks in agricultural development projects [3].

Information and communication technology (ICT) tools, including hardware like mobile phones and tablets, applications with the capacity to create digital surveys and software that allows users to upload data to storage facilities in real-time, have reduced the conventional challenges associated with remote data collection. Therefore we explored the digital options for these tasks [4]. This is the first report in sericulture.

The discussion is focused largely on applications and experiences using hardware and software components and the impact of using digital tools for these purposes. Choosing the right hardware is a critical step in a project using ICT for data collection. Complex data collection usually requires more capable devices but for simple collection, leveraging SMS may be appropriate. We selected Android device as the best tool because it is compatible with the needs and requirements of our system design. In areas where connectivity lacks, the app allows users to sync data without a connection. Upon reaching a location with connectivity, the data be uploaded onto the app. The paper shows the application of ICT in sericulture, which is a component of agriculture sector, where collection of scientific information from the far off places with farm households has been one of the key functions of sericulture industry in India.

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II. ARCHITECTURE OF APP MODEL

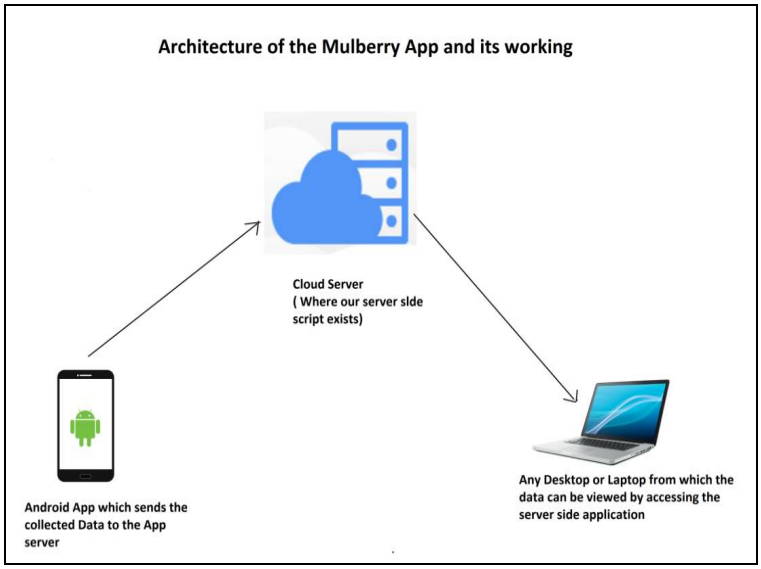

Figure 1: Architecture of Model

The Mulberry Rearing App is an Android Application which helps in data collection of mulberry sericulture from different parts of India. The collected data will be sent to a server side application, which stores it in a formatted way in the database. The server side application provides an interface to view the collected data and retrieve the information by downloading in a excel sheet/file. The biggest advantage of the application is to get an end to end system from the direct source. In other words, the data will be directly accessed from the source and further can be manipulated for different purposes.

III. DEVELOPMENT OF APP AND ITS WORKING SYSTEM

This section discusses the working pattern of the App and recording and retrieval of data to be collected from the field. Figure 2 indicates the data structure developed for input recording which would be used for retrieving to the end user. The fields are defined as required to generate mulberry sericulture rearing data to analyse the economic impact at the farm households.

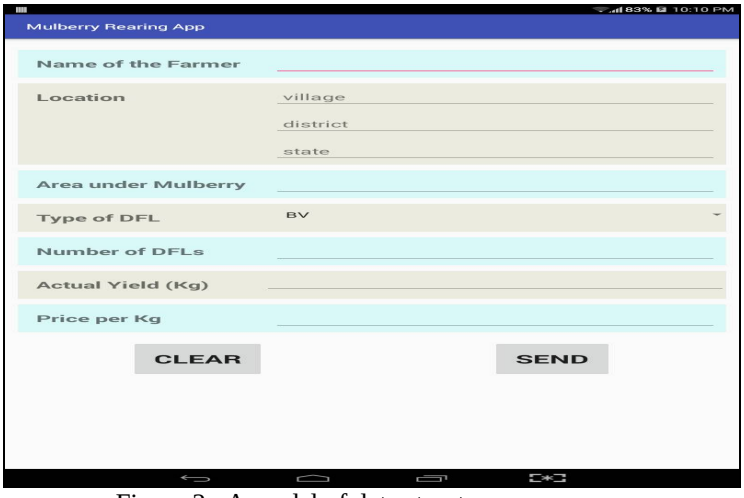

Figure 2 : A model of data structure

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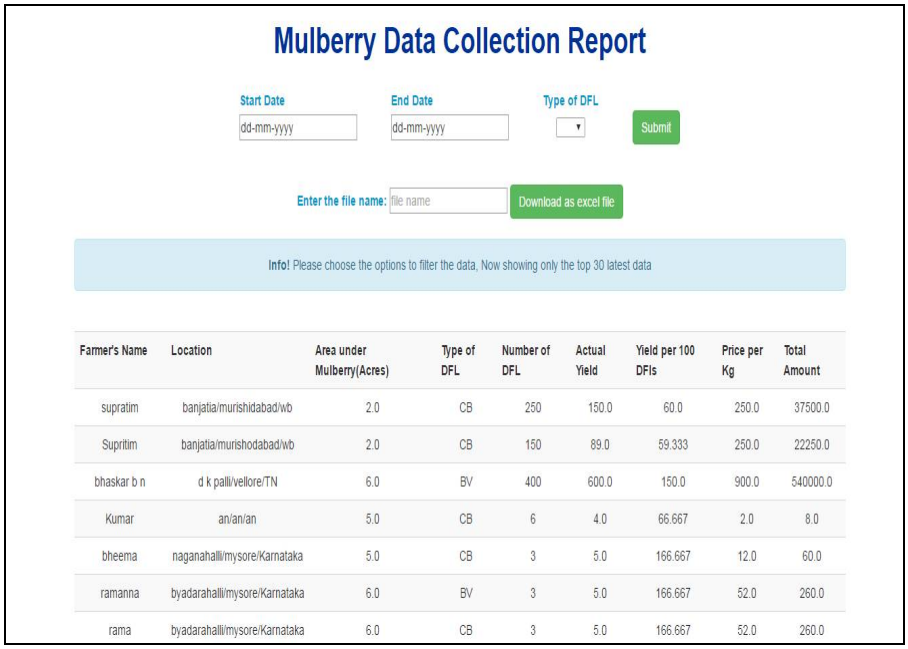
The Android Application is written in the Java Programming Language and is designed using XML as a single page application which conforms the current standards of Mobile App development. The App has a simple user interface for navigation and also comes up with features such as working in offline mode to store data locally when internet connectivity is absent and sent automatically when the device gets connected to internet. The App is built with good validation mechanism to prevent bad data being entered into the system thus eliminating the risk of refactoring the received data.

The Web interface which provides the end user to access the data sent from various mobile devices across different parts of the country is built with a scalable technology which involves some of the cutting edge technology like Python, Datastore (NoSQL based), HTML5, jQuery, Bootstrap3 etc. which makes it a robust backend. Also the system is fool proof and only authorized users can access the system. It provides the authorized user to filter out data by providing fields such as start date and end date from which a user can look into the data collected for a specific time period. The system is also provided with features such as downloading the filtered data into a csv format which can be opened using any excel program for further processing of the collected data.

IV. SIMULATION RESULTS

Data collection and ICT can make a significant contribution to monitoring and evaluation. ICT implementation requires that a project rigorously define its requirements, rules and policies. By doing this, a project often identifies duplicate or inefficient processes and inconsistent data standards. ICT implementation, therefore, often results in more systematic processes and uniform data standards. Monitoring and evaluation through mobile apps is fast taking over traditional methods of collecting and using information and the results are impressive. ICT can help projects data collection by making the process faster while providing higher data quality with fewer staff. Rather than spend days or weeks manually transcribing data from paper surveys into a spreadsheet or database, mobile data collection tools enable direct transfer of data to central databases where data can be immediately analyzed and acted upon.



Farmer's Name	Location	Area under Mulberry(Acres)	Type of DFL	Number of DFL	Actual Yield	Yield per 100 DFls	Price per Kg	Total Amount
supratim	banjatia/murishidabad/wb	2.0	CB	250	150.0	60.0	250.0	37500.0
Supritim	banjatia/murishodabad/wb	2.0	CB	150	89.0	59.333	250.0	22250.0
bhaskar b n	d k palli/vellore/TN	6.0	BV	400	600.0	150.0	900.0	540000.0
Kumar	an/an/an	5.0	CB	6	4.0	66.667	2.0	8.0
bheema	naganahalli/mysore/Karnataka	5.0	CB	3	5.0	166.667	12.0	60.0
ramanna	byadarahalli/mysore/Karnataka	6.0	BV	3	5.0	166.667	52.0	260.0
rama	byadarahalli/mysore/Karnataka	6.0	CB	3	5.0	166.667	52.0	260.0

Figure 3: Simulated results report

The simulated results are presented in Figure 3. Nine fields, such as Farmers' name, Location, Area under mulberry (acre), Type of DFL, Number of DFL, Actual yield, Yield per 100 DFLs, Price per kg and Total amount, were created which are considered to be essential in evaluation of performance of silk cocoon production at the farmers' level. For instance, the important parameters such as actual yield realized by the farmers and the marketed price per kg

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would provide return for the farmers. These data would be much helpful to the planners and decision makers to understand at field level reality and would provide some indication to the bench mark level. Another, interesting issue is that such instant information/data can be accessed immediately and can be interacted with the concerned, based on the field data for further action for improving the yield and quality parameters at the farm households. This has a greater impact on reduction of manpower and less cost of operation and processing.

The developed mobile data collection tool is now available and work in both online and offline modes. This enables field workers to collect data in remote areas and then synchronize the data into a cloud database when they return to an area with connectivity. In online mode, when the mobile device is within range of a mobile phone signal or connected to the internet, that data can be automatically transmitted to the server (similar to how one can draft emails in Outlook when offline and send them later when online). As a result, data quality is improved because the transcription from paper surveys to an electronic data store is eliminated, significantly mitigating the opportunity for human errors in the data entry process. The mobile data entry forms offer numerous data validation options that can ensure that all required data is entered and that the data conforms to the correct formats and value ranges, again reducing the effort required to clean data.

Periodic data audits may still be needed, such as against new users of the mobile app, and because people can still make typographic errors and enter a response that is logically inconsistent with other responses. However, the data review effort becomes an occasional, instead of an ongoing, intensive activity. The trend with the tool is to store the data “in the cloud”—in a central database accessible from any internet connected location. This makes the data more readily available to those who previously may have waited weeks or months for paper reports to be transcribed and summarized. Storing data in the cloud also makes the data more open and transparent, as it can be made accessible to stakeholders, from field workers to Mobile tool which also enable regular feedback and early insights that can be applied immediately for greater impact, whether to correct course or to address emerging issues [5].

Using these tools also allows timely data mining to monitor trends to inform program design and direction. Instead of traditional M&E efforts with intensive data collection and analytical periods, such as baseline and end of project analysis, the data can now be collected iteratively and continuously throughout the project period. The country and head office staff, governments, partners, and donors, all of whom may need the data for planning and decision-making [6]. Moreover, the use of a mobile application for monitoring and evaluation can pay dividends beyond a single project. Survey designs, data management processes, and data definitions and standards developed on one project can potentially be leveraged on other projects, reducing the need to reinvent the wheel on each project [7]. This paper highlights a few projects using mobile applications for monitoring and evaluation in agriculture and draws insights from their experiences. These examples are by no means exhaustive, but will hopefully be useful to anyone planning to use ICT to enhance their monitoring and evaluation efforts in sericulture and related fields.

V. CONCLUSION

Use of information and communications technology (ICT) more successfully- via sustainable and scalable approaches to improve the impact of sericulture-related development initiatives in India. It focuses on the application of mobile applications for monitoring and evaluation (M&E) in sericulture, including a few examples of how projects are, or could be, using mobile enabled M&E tool. The paper goes on to define evaluation as, “the systematic collection and analysis of information about the characteristics and outcomes of programs and projects as a basis for judgments, to improve effectiveness, and/or inform decisions about current.

One of the primary lessons is that technology itself is not sufficient to meet project objectives. Even a platform for free data collection does not guarantee the right data will be collected effectively. Maintaining a team that can design the collection efforts, implement them accordingly and evaluate the data are as important as the technology. Training is an important component to collecting data through ICT tools. Until the staff capacity is such that they are capable of doing it on their own. Field enumerators and farmers using new technologies need additional training and support. With proper instruction, we have found that even poor, uneducated farmers are capable of picking up the skills.

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