Integrated platform for Agriculture in India using ICT platform mGAP :Survey

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Abstract- **This project is going to develop to improve quality of food material and farmer growth. This platform will provide better product through farm by using best practices and Agro-Expert advisory system to Farmer through mGAP®. So this best agriculture practice and Agro-Expert suggestion will help the farmer to develop better quality of product and will standalone at global market.**

Keywords- **ICT (Information and Communication Technology), mGAP® (mobile KRISHI services).**

I.   INTRODUCTION:

India is an agricultural country. It is the largest livelihood provider in India. Agriculture sector in India contributes 16% of Gross Domestic Product& 10% of export earnings. In the current scenario of Indian agriculture, farmers are facing problems related to crop pest/diseases, water scarcity, and weak linkages with agro commodity market, labor and good equipment. ICT based project in Indian agriculture helps farmer which offer agro advisory services to the farmer. Information technology will cater all information which is necessary in agriculture field. This collected information extracted as per need of farmer. Farmer will get precise information according to their needs. Mobile Agro Advisory System (mGAP®) connects farmers with internet technology i.e communication media of modern world that empowers them to make sound decisions about Agriculture, drive profits and conserve the environment. Farmers require information on weather, soil, fertilizer and pesticide that are specific to their plot of land. They require information on the type of seeds, crops which is available in the market and local market prices. eSagu model helps the farmer which will provide advice from scientific expert of agriculture field. The communication channel in eSagu uses a local coordinator who communicates the details of the farm and crop condition to the agricultural experts using digital photos and textual farm data [3]. Whole communication goes on local language so farmer easily understands the expert advice. In the figure 1 class diagram, their two important roles are farmer and expert. First, Farmer will register their information through Famer console such as name of farmer, mobile no, location, crop name, date of sowing, plot name, plot_ID, area of plot, crop type, history of soil (i.e. previous crop taken, pesticide, fertilizer and chemical used etc). Expert of Agro advisory system play very important role in order to deliver precise solution to

the farmer. Expert console will collect the query raised data by farmer. Then he will analyze all data collected from mGAP® server and provide very valuable solution of the query which is raised by the farmer.

The expert has access to all the content as well as contextual Information related to the query of the farmer on the *expert's console*. The expert's console shows the query attributes communicated by the farmer, that are farmer voice, text and the images associated with the query. In order to help the expert in decision making, the expert console also provides his view on soil and water report. In this way, expert does their job by as long as farmer raised problem area regarding their crop and soil and water condition. Expert console will provide right and meaningful advice to farmer as long as farmer will support to him.
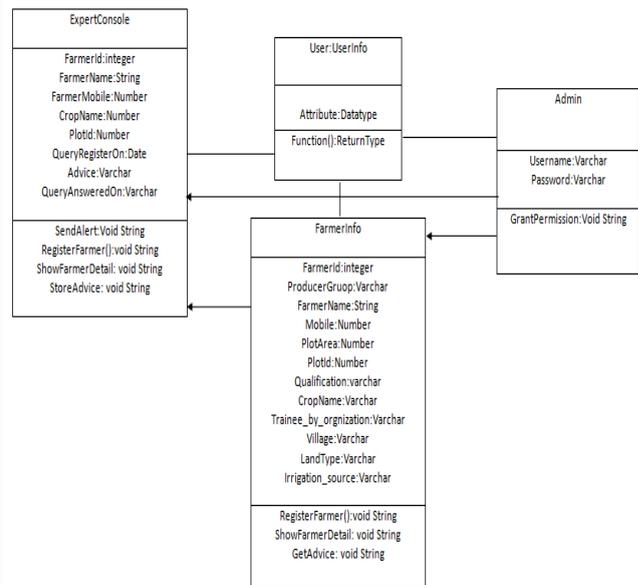

Fig .1 Class Diagram FarmerDetail

II.   ICT CASE STUDY

This paper is an outcome of the explorative case studies of ICT based projects, which are successful in productivity, reducing the cost of production and by increasing profitability. The study tried to focus on the use of ICT (mobile based services in particular) in agricultural development in general and looking at such technological interventions impact on Indian rural areas socio economic

development. The study is specific to India to see strategically and managerially to analyses some of the intricacies involved in the intervention of ICT based systems. The projects are purposefully selected because each of them fit into broad categories of ICT initiatives built-in. [2]

III. ICT SOLTUION SURYED IN AGRICLTURE

A. mGAP®:

The mGAP® system consists of mobile phones with mGAP® client application to be used by the farmers, expert's console accessible to agriculture experts and the mGAP® server as shown in figure 2. mGAP® system get uploaded soil, water analysis report from agriculture university which will analyzed by authorized lab and approved by agriculture lab. Each farmer, seeking the service, is initially required to perform registration by providing the details of the field location, crop, crop type, soil type, petiole analysis reports, and history of irrigation, fertilizer and pesticide application on the field. The TCS mKRISHI® mobile phone application allows the farmer to raise a query using text, voice, pictures and videos. The facility of sending multimedia information along with the query provides the appropriate context corresponding to the query. The expert has access to all the content as well as contextual information related to the query of the farmer on the expert's console. The expert's console shows the query attributes communicated by the farmer, that are farmer voice, text and the images associated with the query. In order to help the expert in decision making, the expert console also provides the information such as soil test report, history of the fertilizers applied, farmer's cell number, query date, pruning date, stage of the farming, variety and grafting.[1].

TCS mKRISHI® is present in three version: Light, Regular, Plus. mKRISHI® Light is interactive voice recognition facility which will record audio of farmer's problem domain by generating questionID for each query. Expert gives their advice by sending the audio massage on their mobile that problem has been solved. mGAP® Regular is one of the application based service present on farmer's mobile. Farmer can download this application on their handset with internet access to communicate with mGAP® team. Farmer submits their personal data, crop and plot information and other data as per need of application in their local language. mGAP® Plus is automatic weather station which provides information regarding weather, rainfall, Humidity, temperature corresponding to farmer's location with mGAP® regular services. This is integrated

platform provide regular agro advisory services on regular basis. [4]

B. eSagu

eSagu is a Agriculture project started in 2004 by the International Institute of Information Technology IIT, Hyderabad, and Media Lab Asia. eSagu delivers farm-specific, query-less advice, typically once a week from sowing to harvesting. This service reduces the cost of cultivation and increases farm productivity as well as the quality of agriculture product. The founders characterize eSagu as "an IT-based personalized agriculture extension system to improve agricultural productivity by disseminating a fresh expert agricultural advice to the farmers, both in a timely and personalized manner". [3] eSagu consist of agriculture expert and information system having their own database for storing crop images, farmer database and soil, weather and water report. There are group agriculture expert which are divided according to crop and soil condition. It also consist of five component which is agriculture expert, agriculture information system, coordinator communication system and Farmer as shown in figure 3. A few computers and an operator, and covers about ten villages. A weather station is placed on this level as well. Educated and experienced farmers work as coordinators and intermediaries with other farmers. Coordinator act as communication channel to the farmer which collect the data over seven days on regular basis and take some photograph of crop and other information of soil and water report analysis. Coordinator deeply analyzes the problem area of crop then makes report and delivered to the agriculture expert. So coordinator makes face to face communication with the farmer in their local language.
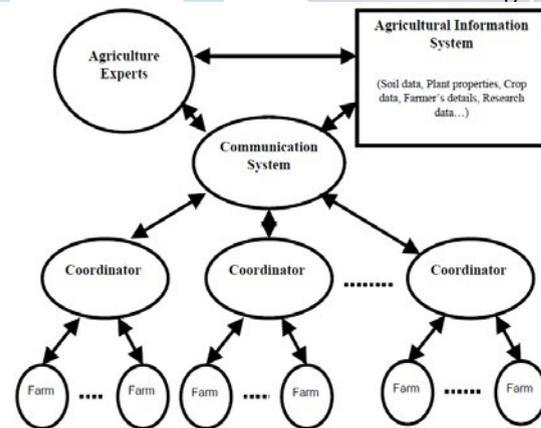

Fig 2. eSagu Model

Some of the advantages eSagu over traditional system is availability diversified expert across field, conservation of cost and time, premise solution on their problem, and information system, strong database and collection photographs. In eSagu the agricultural expert delivers the expert advice by getting the crop status in the form of digital photographs and other information rather than visiting the crop in person. Unique number is generated for farmer. Farmer information and soil and water data is collected and stored in the system. Expert will provide effective advice to the farmer as compared to the personally visiting the person. Expert will suggests farmer about usage of fertilize, chemical and pesticide. In eSagu model problem is discussed by several agriculture experts and analyze solution provided different agroexpert.It delivers best agro advice services to farmer that will enhance the efficiency of farmer. [5]

TABLE I COMPARTIVE STUDY

Solution	mGAP®	eSgau
Data (GPRS/CDMA)-based Smartphone Required	For Full package mKRISHI®. must have Smartphone or android based mobile	Not required as it is Face to Face communication happened.
SMS/Data usage charge	Yes	No
Proprietary solution	Yes	No
Productive rate increased	Yes	Yes
Usage	Required experience.	No intermediate tool is present. Reliable for regular use.
Registration and Subscription charges to Farmer	Yes	No

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IV.   CONCLUSION

mKRISHI® project aims to deliver best agriculture practices and methodology to the farmer using ICT platform. In this we have studied TCS mKRISHI® and eSagu project. TCS mKRISHI® uses ICT technology to cater agriculture database so they will provide precise information to the farmer. They are giving relevant solution to their query (i.e problem area of agriculture field or crop) rose by farmer using expert advisory system to their mobile. Whereas in ESagu model helps farmer by increasing their productivity and quality of the food material. In ESagu model, coordinator makes face to face communication with Farmer and offer best agriculture services on regular interval with the help of experienced farmer or agriculture scientist of their lab.