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ICT – Crucial for rural development

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Abstract

Information and Communication Technology (ICT) can be powerful tool for narrowing down the digital divide between IT rich and IT poor and thus providing the upliftment to the real India. Our government and society should work together to display ICT in rural areas so as to accelerate the economic and social growth. This paper examines the present scenario of India's agriculture growth and how ICT can contribute in making the agriculture taskforce to be major contributor to India's economy. We can envision spreadsheets distilling mountains of figures into easily usable information.

Keywords: Information technology, Geo Information Systems, Wireless Sensors, Agriculture, Decision-making.

1. Introduction

An economy can be broadly divided into three sectors namely: the primary, secondary and tertiary sectors. Agriculture is the most important constituent of the primary sector including forestry, animal husbandry, mining and fishing. The secondary sector contrails all types of industries and tertiary sector represents the services sector includes banking, insurance, trade and other services. The primary sector is the backbone of the economy and economic development of the most of the nations of the world. If we look at the history of the economic development of the most of the present developed nations or those, which have embarked on the development path, it is the development of the agriculture that has laid the foundation of the development of their economics.

At present the contribution of the agriculture sector is 30% to the Indian economy. This can be raised to a higher percentage if we could harness the potential of ICT and implement it to the rural areas.

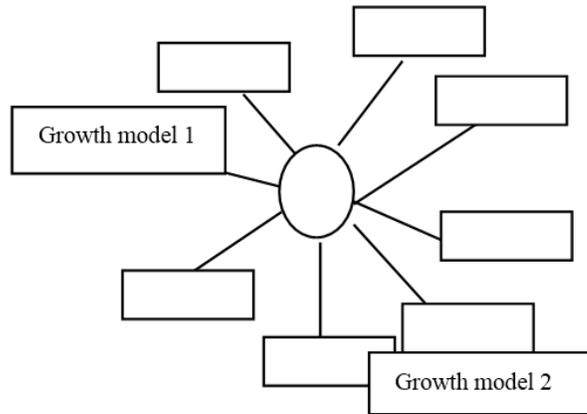


Fig 1^[1]: Schematic Diagram of an agriculture Grid System.

II. Benefits of Bridging the Digital Divide

With the advent of ICT, it is possible to educate the people about the latest technologies being developed to ease their work and provide more utility than ever. We are high lifting some of the major approaches that can benefit the farmers who are the face of the rural India.

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A. Irrigation at click of a mobile button

Water distribution for irrigation purpose is a cumbersome task in itself and irrigating the field at odd hours of midnight is not less than a nightmare. With the introduction of ICT, this whole work can be done at ease of a mobile button. It will take moisture sensors, bunch of wireless devices and controllers to implement the same. Each such gadget will be connected to the controller through a coordinating device. Any time the moisture level of the field goes below the specified level, a customized message will be sent to the owner. After going through a authentication and verification process, the farmer can direct the pump sets to start automatically at the ease of this home [2]. These pump sets will turn off as soon as the moisture level is restored

B. Deploying Wireless Sensors for the timely update of yields, soil nutrients, soil temperature.

According to this approach, an underground network of wireless sensors will be established at a depth of 50 cms, where the temperature level and moisture is best suitable for root uptake. These sensors will monitor soil properties like moisture content, temperature and soil nutrients, which will be used to collect high resolution spatio-temporally varying data needed for accurate climate, hydrologic flow, crop-growth modeling and variable rate control of fertilization. The data thus gathered by sensors network can be employed to accurately calibrate the parameters of the crop-growth, carbon nutrient cycling and hydrologic flow models for obtaining information on the carbon sequestration, nitrogen uptake/leaching and crop development with the goal of developing agriculture management and environment protection policies[3].



Fig 1[4]: Wireless LAN, Autonomous Field Monitoring System

C. Identifying and destroying weeds

Today is the era of information technology and it has grown in copious amount. Floss (free/Libre open source software) also has opened democratic spaces for the participation of civil society, thus creating potential for developing ITC tools to address problems at local level. In this contrast, OSCAR [5] (Open Source Simple Computer for Agriculture in Rural Areas) is an initiative from European and south Asian institution to develop open source ITC solution to assist decision-making on farm level concerns in the agriculture. The project, which has been co-financed by the European Commission's Asia programmer, aims at developing an open source application to identify weed species of Rice-Wheat crop system in Indo-Gangetic. The Prototype application will be based on an existing multimedia species identification system, IDAO (Identification Assisted Pour Ordinnateur) will contain around 50 species in the database and also will have suggestion about appropriate control measures. It will also be available in different local languages so as to address

the cultural diversity of the project area. Peasants relying on information technology to plan their farming practices can now turn to software, which promises to help them identify and destroy weeds.

D. More Profitable opportunities for farmers

The most unorganized sector is agriculture where the procedures, mean the farmers, are not linked with each other for their seeds, pesticides and fertilizer purchases and markets for their crop, vegetable and fruit productions. They end up with wrong deals due to lack of knowledge about the widely spread geo-graphical agro-dealers. Integrating these farmers and dealers through a strong support, which can help them get high rates, quantity, credit and technical expertise, can prove to be profitable. Every day we talk about the increasing costs of vegetables and fruits but farmers are not rewarded for their produces. Sometimes, middlemen earn more than farmers in less than a week against the 3 to 4 months of farmer's time investment. So, to bridge the gap between the farmer and consumers of his products, ICT comes into role. With the help of it farmers will mainly be benefited. It will open doors for farmer's vegetables and fruits directly to the malls and vegetable vendors.

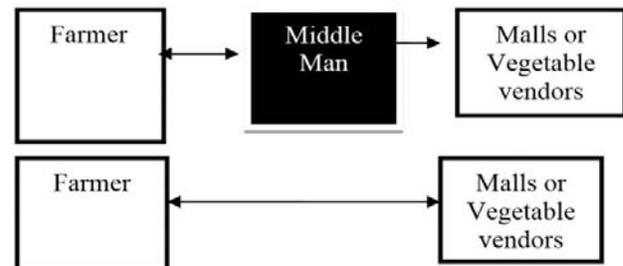


Fig 2: Transaction after deployment of ITC

E. Digitizing the land records with GIS [6]

Land disputes among farmers have become daily news. We can resolve and prevent such issues by digitizing land records and preparing land maps with the help of Geographical Information System (GIS). The satellite images of any particular area are taken to maintain a database. With the help of GIS techniques a comparison can be done with the existing land records. We will be able to provide authentic information about the crops in the fields, irrigation facilities and means of irrigation, which could also be beneficial for studding land changes, if any. The hardships that farmers face in obtaining duplicate papers of their land records from the burdened district offices will also end. The land maps can also be recovered. This all can be possible once a database containing the satellite images is maintained by government authority.

F. Latest Updates from the internet

Knowledge centers can be setup in rural areas which can impart basic computer usage education the people. The computer educated farmer can utilize the best out of internet for his farming style, the choice of corps according to the soil nature one can keep updated with the latest trend. There are various forums and NGO's which are dedicated to farmers and peoples associated with agriculture sectors. Various issues can be discussed and with the help of video mails, exact problem can be recorded and sent for consultation to the corresponding person.

G. Putting a stop on Rural Brain Drain

In today's world of cutthroat competition, value addition holds the most important. Before deploying ICT in the agricultural domain, the farmer remains in less profit and leaving farming to move to other businesses was a common scenario. We can make farmers understand that with the help of ICT they can do value addition to their existing products and increase their profitability. Small self-help groups can be created with which taking advantage of ICT can benefit from the latest food processing technology. This can bring revolution and generate employment in the village this can lure farmers towards their existing occupation and may put a stop on 'brain-drain' to the cities.

H. Better Health services

Health care services are yet another field where I.T. can play a major role in accurately implementing these developmental programs in the rural area. Doctors or the Paramedic staff at the local PHC or sub-PHC can access updated information about health care and sick advice from specialists about diseases or ailments they cannot diagnose or treat. The village PC can be used as a surveillance system for diseases, and ultimately as a node for tele-medicine.

III. Conclusion

This paper is topic-introductory rather than systemized presentation. It is mainly because the field of information technology in agricultural domain is quite new to be introduced systematically. We believe that, particularly in the case of agriculture, there is a great potential to be benefited from I.T. Agriculture is site specific depending on the climatic and soil conditions, cropping style, market requirements and so on, agriculture stands on very complex interaction between biological, climatic and geographical factors in addition to human economic activities. The information under such a complicated system is unpredictable, unstable, subjective, site specific and reliant on empirical decisions given the inherent variability of biological phenomena, therefore, it is the decision makers using the IT, who are best placed to adapt flexible technologies according to their individual situations.

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