

Design and develop an ICT model for Agriculture System 4.0

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Abstract - Technology is very useful in almost every field and agriculture is not the exception for it. Information communication technology (ICT) is very useful to fulfill growing demands from farmers due to advancement in technology accuracy in result there is increase in demand of farmers. The use of mobile technologies as a tool of intervention in agriculture is becoming increasingly popular. Increase in use of smart phones enhances the multi-dimensional positive impact on sustainable poverty reduction. This technology also identifies the challenges in actual field and tries to suggest solution to solve that problem. This paper focuses on how ICT is useful for increase in productivity of a particular crop. This study also reveals the model for expected output from a particular crop after following the steps in suggested model and achieves sustainability in farmer's life.

Keywords: ICT, Agriculture, Smartphone, Multi-dimensional, Mobile technology.

I. INTRODUCTION

ICT helps in growing demand for new approaches. It also helps in empowering the improved agricultural technologies, effective production strategies, markets, banking and financial services etc.

The primary source of livelihood for about 58% of India's population is agriculture. Gross Value Added (GVA) by agriculture, forestry and fishing was estimated at Rs. 19.48 lakh crore (US\$ 276.37 billion) in FY20 (PE). Growth in GVA in agriculture and allied sectors stood at 4% in FY20. The agriculture, forestry and fishing gross value added (GVA) growth is likely to be 3% in the second quarter of FY21.

First time in the last 17 years the share of agriculture in gross domestic product (GDP) has reached almost 20 per cent. It makes the sole bright spot in GDP performance during 2020-21, according to the Economic Survey 2020-2021.

It also seems that the resilience of the farming community in the face of adversities made agriculture the only sector to have clocked a positive growth of 3.4 per cent at constant prices in 2020-21, when other sectors slid.

The share of agriculture in GDP increased to 19.9 per cent in 2020-21 from 17.8 per cent in 2019-20. The last time the contribution of the agriculture sector in GDP was at 20 per cent was in 2003-04.

Smartphone /mobile apps in agriculture

Tools like mobile apps and use of mobile technologies in agriculture is becoming increasingly popular. Penetration of Smartphone enhances the multi-dimensional positive impact on sustainable poverty reduction and identify accessibility as the main challenge in harnessing the full potential (Silarszky et al., 2008) in agricultural space. The accessibility of Smartphone even in rural areas extended the ICT services beyond simple voice or text messages. Several Smartphone apps are available for agriculture, animal husbandry, horticulture and farm machinery.

Information and Communication Technology (ICT) can revolutionize Indian farming sector and can benefit all farmers including small landholders. In developing country like India, agriculture is the most important sector with the majority of the rural population is depending on it. The traditional approaches of agriculture being adapted, has numerous challenges in terms of production, marketing, profit etc. Information and Communication Technologies (ICT) that play an important role in uplifting the farmer's livelihoods. Along with the large landholders the rural small landholder farmers also benefited and it can address the challenges of the traditional agriculture by using this applications. ICT helps in growing demand for new approaches. It also helps in empowering the rural people by providing better access to natural resources, improved agricultural technologies, effective production strategies, markets, banking and financial services etc. This paper explores the role of ICT in agricultural sector.

II. OBJECTIVES

The objectives of the research paper are given below:

- 1) To study present scenario farms and crops.
- 2) To give suggestions for improvement.

III. EXECUTIVE DISCUSSION

Agriculture is an important sector with the majority of the rural population in developing countries depending on it. The sector faces major challenges of enhancing production in a situation of dwindling natural resources necessary for production.

The growing demand for agricultural products, however, also offers opportunities for producers to sustain and improve their livelihoods. Information and communication technologies (ICT) play an important role in addressing these challenges and uplifting the livelihoods of the rural poor.

Researchers has suggested model in which farmers can get the expected output if they are following all the rules and regulations suggested by the researchers.

Technology play very important role in agricultural business. In order to achieve the expected output from the crop which farmers are going to take from their field.

Nowadays it is possible to obtain data from mobile it is also possible to check the actual area of field of farmers. Through mobile technology it can be able to see the crops which are having good scope in market.

If suggested steps are implemented as algorithm and further through a application it can be possible to keep all the records of activities followed.

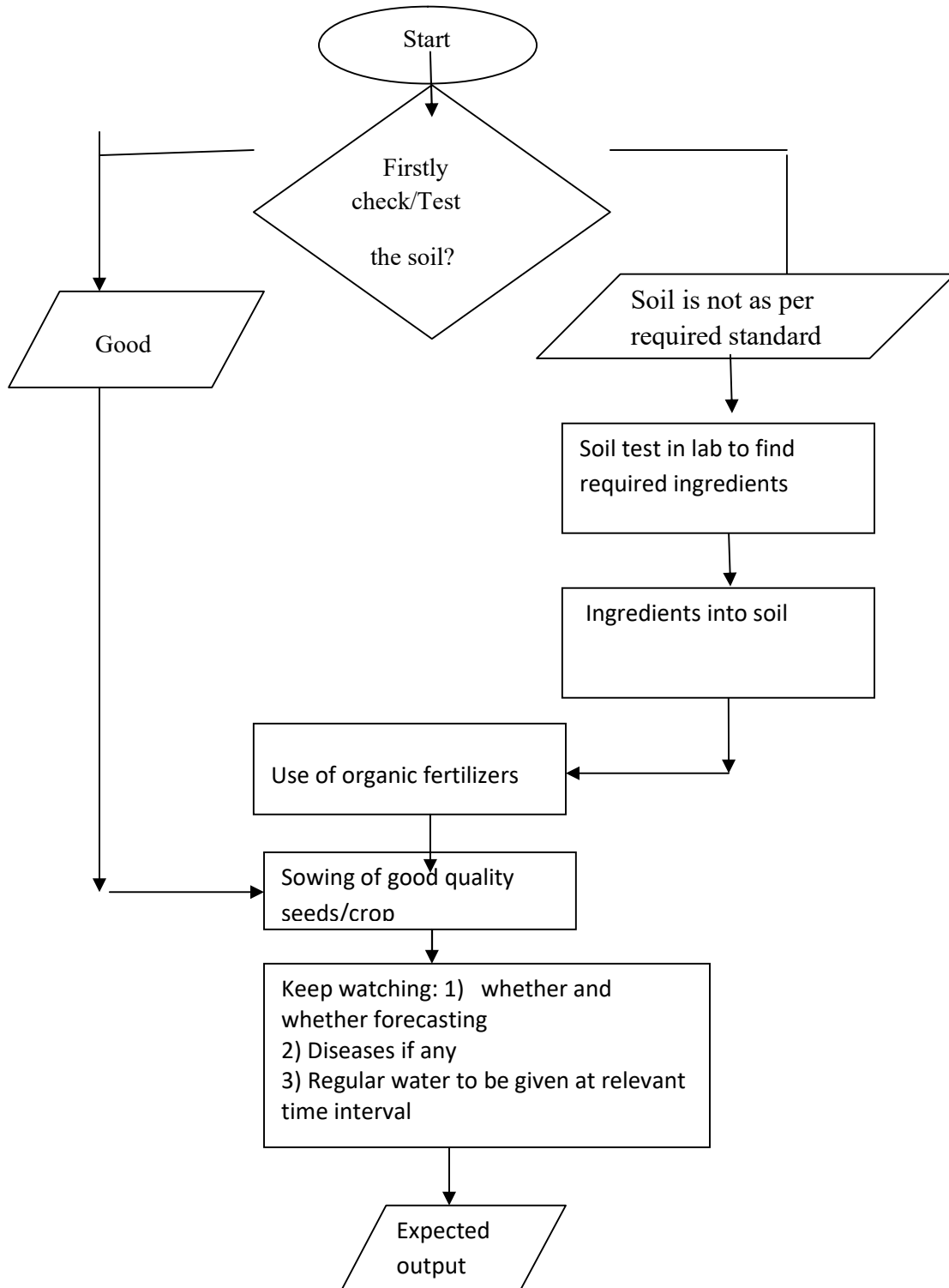
Organic farming also has a number of benefits for the environment. The first is obviously that it reduces the number of pesticides used. Because although some inputs (the so-called “natural origin”) are allowed, organic farming strictly regulates their use. Thus, organic farming reduces the potentially harmful effects of pesticides on ecosystem and biodiversity.

However, organic farming is sometimes singled out for a number of issues. First, the yields of organic farming are generally lower than those of conventional farming, which leads to higher operating costs (and therefore selling prices). The workload of farmers is further increased by the impossibility of using chemicals. Weeding operations are thus more strictly regulated and usually require more work. In summary, it takes more effort and human labor to produce the same amount of food in organic farming as in conventional agriculture.

While implementation of this process it is essential to maintain all the entries on the computer using a program / software/ applications. Due to computerized notes of all the levels or steps taken it will become easy for farmers to take next steps and based on the existing status it may changes in the final plan also.

Researchers have been suggested a model for expected output which is as follows:

Fig: Model for getting expected crop in farm



The standard procedure for taking more crop productivity is mentioned below:

PHASE I

- 1) In the model farmer has to check the soil from the expert.
- 2) If soil is good then farmer can straight away go for sowing of seeds of any crop. Otherwise if soil is not as per the required standard then it need to add the essential ingredients in it along with this farmer may also add organic fertilizers in his farms.

PHASE II

After the improvement of soil quality farmer can go for sowing of good quality seeds/crops in the field.

PHASE III

After sowing of seeds/crops it need to do following activities carefully and as when required which are as follows:

- 1) Keep watching whether and whether forecasting and take action accordingly. If whether is not proper then farmers can take suggestions from the expert about the solution for the problem occurred
- 2) Check diereses on crop if any and give treatment accordingly.
- 3) As per the requirement give water and tonic to the crop accordingly.

PHASE IV

- 1) Make notes of every activity done on mobile or computer from starting from phase –I to phase –III so that one can observe the difference in yield of production of existing and previous, definitely it gives lot of difference ie more yield in production of crops in the field of farmers.

After following all the above steps researchers have been observed increase in the productivity of crops.

In order to obtain the good quality and quantity of crops, farmers need to follow above suggested steps.

Now a day's a soil can be tested and suggested at any soil testing laboratories. Whether and whether forecasting can be obtained from specific department and it need to keep careful watch on it.

It is also suggested by the researchers that all the procedure and activities done are maintained on the computer as a backup so that we can get that data on the fingertips so that we can access the back data whenever necessary.

IV. ADVANTAGE OF ICT IN AGRICULTURE

Information and communication technology (ICT) is very useful for increased agricultural productivity and strengthening the agricultural field involves timely and updated information on agriculture related activities and issues such as new varieties release, emergence of new threats such as diseases, weather forecast, pricing control, warning alerts etc.

ICT in enhancing agricultural productivity:

- It helps for understanding and addressing global agriculture developments both advantageous and disadvantages are critical to improving smallholder livelihoods, in which ICT can play a major role.
- It found due to ICT the continued increase in globalization and integration of food markets has intensified competition and efficacy in the agriculture sector, and has brought unique opportunities to include more smallholders into supply chains.
- Presently agriculture faces a range of modern and serious challenges, particularly in developing countries exposed to price shocks, climate change, and continued deficiencies in infrastructure in rural areas.

V. USE OF ICT IN AGRICULTURE

- Due to ICT it found increasing efficiency, productivity and sustainability of small scale farms.
- It also gives Information about pest and disease control, especially early warning systems, new varieties, new ways to optimize production and regulations for quality control.
- It suggest better of markets resulting from informed decisions about future crops and commodities and best time and place to sell and buy goods.
- It gives up-to-date market information on prices for commodities, inputs and consumer trends.
- It strengthen capacities and better representation of their constituencies when negotiating input and output prices, land claims, resource rights and infrastructure projects.
- It reduce social isolation, widen the perspective of local communities in terms of national or global developments, open up new business opportunities and allow easier contact with friends and relatives.

VI. REVOLUTION IN SYSTEM 4.0 IN EVERY FIELD

Industry 4.0 is the current trend of automation and data exchange in manufacturing technologies. It includes cyber physical systems the Internet of things and cloud computing. Industry 4.0 creates what has been called 'smart factory'.

Technologies like the Internet of Things (IoT), Big data and artificial Intelligence(AI) are impacting major industries and in turn job this is due to the transformation of Industrial Revolution 4.0 . As a revolution in 21st century we can see the replacement of manual jobs by machine handled tasks that occurred. Industry 4.0 will not only affect industries but consequently will transform the jobs, education and agricultural sector also.

VII. CONCLUSION

It is concluded that the impact of technology on the agricultural productivity is very huge. In order to improve the productivity from the field it needs to follow the suggested steps in the model. It is important to keep records of each and every activities performed in the field on mobile or on computer to check the current and previous productivity. It is ensured that if any farmer using above steps definitely farmers would found better results.

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