INTRODUCTION

At present 68 per cent of India’s population is rural and agriculture is the main source of livelihood for 58 per cent of the population. Also it can be seen that use of ICT have gained far more importance after Government of India have launched Digital India on July 1, 2015 to create digital infrastructure for empowering rural communities, enabling digital delivery of services and promoting digital literacy. In which digital agriculture has become an important organ to fulfill the initiative of digital India. Digital Agriculture can be defined as ICT and data ecosystems to support the development and delivery of timely, targeted (localized) information and services to make farming profitable and sustainable (socially, economically and environmentally) while delivering safe, nutritious and affordable food for all.

Why doubling farmer’s Income?

Past strategies for development of the agriculture sector in India has focused primarily on raising agricultural output and improving food security. The net of which resulted a 45 per cent increase in per person food production, which has made India not only food self-sufficient at aggregate level, but also a net food exporting country but the strategy did not explicitly recognized the need to raise farmers’ income and did not mention any direct measure to promote farmers welfare. The net result of it is seen that farmers income remained low, which is evident from the incidence of poverty among farm households. Low level of absolute income as well as large and deteriorating disparity between income of a farmer and non-agricultural worker constitute an important reason for the emergence of agrarian distress in the country during 1990s, which turned quite serious in some years. The country also witnessed a sharp increase in the number of farmers suicides during 1995 to 2004 [5] -losses from farming, shocks in farm income and low farm income are identified as the important factors for this. The low and highly fluctuating farm income is causing detrimental effect on the interest in farming and farm investments, and is also forcing more and more cultivators, particularly younger age group, to leave farming. This can cause serious adverse effect on the future of agriculture in the country. It is apparent that income earned by a farmer from agriculture is crucial to address agrarian distress and promote farmers welfare. In this background, need has arose to double farmers’ income to promote farmers welfare, reduce agrarian distress and bring parity between income of farmers and those working in non-agricultural professions.

Sources of Growth in Farmers’ Income

The major sources of growth operating within agriculture sector are:

- Improvement in productivity
- Resource use efficiency or saving in cost of production
- Increase in cropping intensity

ROLE OF ICT IN EXTENSION STRATEGIES TO FACILITATE DOUBLING OF FARMERS INCOME

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ABSTRACT

In today’s world Information and Communication Technology (ICT) is revolutionizing and has the potential to provide far reaching benefits to every section of the society. At present Indian agriculture is passing through difficult times and even drought have been observed in several parts of nation resulting into wide spread distress among farmers. Although there are several strategies of government to provide benefit to farmers but many of them cannot be fully implemented without the use of ICT as it has become integral part of life of people as well as farmers. ICT at present can be used as a tool to empower rural youth to realize their full potential, farmers to increase their profitability by accessing equitable markets and rural businesses to offer value added services.

Keywords : digital agriculture, information technology, smartphone
Extension Strategies for Doubling the Farmers' Income for Livelyhood Security

- Diversification towards high value crops [2]

The sources outside agriculture include:

- shifting cultivators from farm to non-farm occupations
- Improvement in terms of trade for farmers or real prices received by farmers.

It can be realized from sources of growth in farmer’s income that the work to double the income can be done in many different ways in which one way can by using ICT for farmers benefit and helping them as:

ICT-based agricultural extension brings incredible opportunities and has the potential of enabling the empowerment of farming communities. Information technology can support better crop, fertilizer and pesticide use planning as well as disease monitoring and prevention, both in crops and animal husbandry, besides improving farmers’ operational and financial management and to effectively connect them with the markets for better price realization.

### Role and Road map using ICT

A farmer performs following eight major steps from crop selection to harvesting:

1. Crop Selection
2. Land Preparation
3. Seed Selection
4. Seed Sowing
5. Irrigation
6. Crop Growth
7. Fertilizing
8. Harvesting

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<th>Step</th>
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<tr>
<td>1. Crop Selection</td>
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<td>3. Seed Selection</td>
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The first step is to increase productivity starts from selection of crop. In India big belt of farmers are not aware of practices which will yield best output. So very first step is to make them aware about crop selection practices. We can make them aware by informing them which crop should be selected which would result maximum output as well as increase productivity in terms of their income. This work can be made possible by adopting various beneficial apps which are available.

**Krishi Gyan** - this application enables Indian farmers to connect with Krishi Gyan experts and ask them questions related to farming, and get answers within the application through notifications.

Also information about weather can be sought out by using apps like Weather Underground. After this the second steps which needs to be deal with is preparation of land which can also be sought out by using Krishi Gyan but we must be able to know about the soil its quality and how to improve it. For this government has taken a good initiative by introducing Soil Health Card (Ministry of Agriculture and Farmers Welfare Government of India).
Soil Health Card

The third factor is effective use of inputs, which means increasing production through improved seeds, planting materials, and other schemes. In this information and advisory services through new technologies such as space technology and online and telecom facilities can be a major breakthrough also at present it is been done by use of Kisan Call Centre and Kisan Suvidha App also other such type of beneficiary apps must be invented.
The fourth step is to increase productivity by means focusing on irrigation. India has 159.7 million hectares agriculture land, out of which only 48% is under institutional irrigation [4] which indicates that the rest has not been covered yet, although government has released schemes such as Pradhan Mantri Krishi Sinchai Yojana but effectiveness can only come when farmers gets aware of it which can be done by using ICT by having simply a Smartphone and good 3G/4G connectivity.

The next critical factor is reducing post-harvest losses. One of the biggest problems of farmers is storage after harvesting; as a result, they are forced to sell their products at a lower cost. Harvest Time & Expense Tracker application good solution to tackle the problem. For preventing losses the focus is now been shifted towards storage facilities and integrated cold chains in rural areas. Here an application naming Cold Chain can be invented which can inform farmer about nearby cold store which is in working condition and thereby saving loss due to transportation as well as for agriculture produce getting rotten.

In agriculture marketing, e-marketing can be launched like one as electronic-National Agriculture Market in which mandis can be linked and online trading can be started. Addition to it a model like APMC Act must be passed, which includes private market yards and direct marketing. This helps farmer achieving economy of scale and increase bargaining power.
Other than above mentioned factors few other initiatives can be done such as implementing ambitious Agribusiness Hubs Model, operating on a national platform and establishing multi-functional Agribusiness hubs in all the Gram Panchayats of the country. This will revolutionize the farm economy and create jobs ultimately improving farm incomes. Along with it linking of production with processing can be done which can benefit farmer a lot and making the backbone strong.

Use of Digital Green which uses participatory videos that have farmers explain best management practices to other farmers. This type of approach can be ten times more cost effective than traditional extension services as farmers trust other farmers more given they can better relate to someone like them who are building a livelihood under similar circumstances. It can be helpful in capacity building.

In India as paper money is expensive and risky to rural consumers but mobile money is safer, especially for women, and costs less to transfer. Government of India has initiated direct cash transfer to farmers’ Jan Dhan accounts which also allows rural consumers to bypass poor infrastructure to support savings and access credit.

Price information- ICT can be used effectively to communicate daily prices to farmers and he can decide when to sell the produce. Even weekly trends also can be communicated to him Via SMS etc. Satellite tech and drones can be used to constantly monitor farms for pest attacks and other diseases. This information can be communicated to farmers soon to nip the trouble in the bud and prevent crop loss. Cultivation of crops – can be improved technologies such as automation, decision support system and agriculture robots. E-Krishi Samvad enables farmers to directly approach ICAR (Indian Council of Agricultural Research) with their problems for effective solutions.

Connecting to agricultural universities- Farmer can constantly communicate with researchers and experts in agricultural universities to help them with their troubles and enabling faster trouble shooting. Kisan help lines can be used for this. Financing of agriculture- by knowing about public welfare schemes, MSP prices, insurance schemes, subsidies, compensations farmers can easily access government benefits through online wallet system.

A single picture depicts the use of ICT helping farmer which can ultimately result in doubling the income.

CONCLUSION

The use of modern tools of ICT have lots of potential to help each and every aspect of work including in the area of agriculture which needs to be capitalized so that growth of nation occur along with doubling of farmers income. Also the technology usage happen in right and meaningful direction instead of using for wrong purpose as every coin has two sides.

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